Seattle's Maritime Cluster

May 2009

Paul Sommers, Ph.D., Seattle University
Andrew Wenzl, Ph.D., University of Washington

Executive Summary

The City of Seattle's Office of Economic Development commissioned this report to analyze the Maritime Industry in Seattle, an industry selected for its accessible, family-wage job base and its competitive strength in the region.

This study includes the wide range of businesses that are included in, and provide services to, the Maritime Industry in Seattle. The Maritime Industry is called out separately in this report, and is also included in a broader Basic Industries report, which includes all of the industrial jobs in Seattle.

This study relies on input from many business leaders in the cluster, as well as statistical data from private and public sources. Key findings are:

- **Maritime Employment and Wages**: The maritime cluster in King County employed 16,652 individuals in 2007. About 9,400 of these jobs were positions eligible for covered employment insurance, and these covered jobs paid an average wage of $70,745 on an annual basis. Other workers are employed part time and in the fishing industry many workers are compensated through crew shares, providing variable compensation from year to year.
- **Business Revenues**: King County maritime businesses generated over $5.6 billion in output in 2007.
- **Exports**: The maritime cluster exported over $1.2 billion to foreign customers in 2006, about 25 percent of total production from the private sector industries within the cluster.
- **Growth:** employment of workers eligible for unemployment insurance grew by 3.5 percent from 2002 to 2007, while the total payroll of the cluster grew by 20 percent.
- **Multiplier Effects:** When multiplier effects are considered, the Maritime Cluster supported employment of 60,237 workers in King County, and generated $10.354 billion in revenues. Purchases by three key industries in the cluster from other industries in Washington totaled over $1 billion.
- **Key Areas of Concern for Industry Leaders.** Through focus groups and a survey, business leaders indicated the following major concerns:
    - **Transportation:** Maritime firms cited uncertainty surrounding the Viaduct as an especially important challenge to operations and long term planning activities.
    - **Labor Shortages:** Maritime firms cited an aging labor force and key shortages in many positions, especially vessel crew members, tugboat pilots, and marine engineers, technicians, and architects.
    - **Regulatory Challenges:** Firms within the maritime cluster expressed concern that they are subject to increasingly onerous and overlapping regulations, which are especially impactful to firms during times of growth and capital reinvestment.

Table of Contents

List of Tables

List of Figures

Introduction

The report provides an overview of the maritime cluster located in Seattle and King County. This cluster consists of industrial and related firms that rely on sea-going vessels. The various activities required to construct, maintain, and operate these vessels are the core industries, along with the Port of Seattle which also provides moorage services for large trans-oceanic ships that call regularly in Seattle. Fishing is one of the core industries, and seafood processing is also included because of strong linkages between these two sectors and because many of the seafood processors are located on the waterfront. The cluster does not include recreational boating industries. This report provides an update on the condition of this cluster using data from 2006. Overall economic impacts of the cluster are presented in the next section. Subsequent sections cover significant features of individual industries. Results from focus group discussions are then presented, followed by results of a survey of cluster firms.

This report was prepared with the framework of an industry cluster as suggested by Michael Porter, Stuart Rosenfeld, and other leading scholars. Porter says that:

> Clusters are geographic concentrations of interconnected companies, specialized suppliers, service providers, and associated institutions in a particular field... Clusters arise because they increase the productivity with which companies can compete.[1]

This report provides data on characteristics of industries that are highly interconnected and specialized as the Porter quote suggests. These interconnections are demonstrated in a supply chain analysis in the report. A recent report conducted for the State of Washington also demonstrates the strength of cluster ties in these industries; fishing, seafood processing, and water transportation are included among the clusters with significant competitive strength in King County.[2]

In this report, employment within the maritime cluster is called "direct employment" and total industry sales are called "direct output." This terminology comes from the input-output model used to estimate total employment and output.[3] Total employment and output include the multiplier impacts for the economic activity within the cluster itself. This report relies on several sources of information, including wage and payroll data provided by the Bureau of Labor Statistics at the U.S. Department of Labor, and measures of industry output, total employment, and exports derived from the database for King County provided by the Minnesota IMPLAN Group.[4] The IMPLAN data include information on proprietor's earnings, a particularly important component of earnings in this cluster due to the significant role proprietors play in fishing and other small business dominated industry segments.

---

[1] http://www.isc.hbs.edu/econ-clusters.htm (October 2003).

[2] Sommers, P., W. Beyers, and A. Wenzl (November 2008), Industry Cluster Analysis for Washington State Workforce Development Areas, Olympia: Workforce Training and Education Coordinating Board.

[3] Washington Office of Financial Management, 2002 Washington Input-Output Study, Olympia, WA, 2008.

[4] Minnesota Implan Group data can be accessed at www.implan.com.

Note that the employment estimates shown in Table 1 for fishing and seafood processing come from the IMPLAN database for King County, and IMPLAN's estimates are substantially higher figures than the State of Washington's Employment Security Department reports. The lower figures from the State may reflect suppression of data due to disclosure issues, or differences in the treatment of vessel-based employment for vessels home-ported in the Seattle area. Fishing crews are paid in crew shares rather than a wage or salary, and therefore they may not be included in the state's quarterly covered employment data series. Monthly employment reports from the state include employees not eligible for unemployment insurance, but sampling issues may result in lower counts for fishing vessels.

Also, the water transportation employment estimate in Table 1 includes 1,936 trucking jobs attributed by Martin & Associates to port cargo operations, and 500 railroad jobs attributed to port operations as well. Martin & Associates, in their economic impact report for the Port of Seattle, report a higher figure for railroads than either IMPLAN or the State show in this industry.[5] Accordingly, this report uses an estimate of 500 railroad jobs based on 80 percent of the employment level in this industry in King County reported by IMPLAN, since not all local railroad jobs are due to handling port cargo.

Overall Impacts

The economic impacts of the maritime cluster include business output (sales) and employment impacts. The direct impacts are shown in the output and employment columns of Table 1. Total industry output was over $5.6 billion in 2007, and employment totaled over 16,650. The largest segment in terms of business output was the water transportation industry, followed by seafood processing and fishing. In terms of employment, fishing and water transportation are the largest employers, with seafood processing in third place. Note that employment in this table includes sole proprietors, part-time and seasonal employees, as well as individuals who are full-time permanent employees of businesses. The fishing industry employment figure is significantly higher than shown in state and federal sources; this matter is discussed below.

Total economic impact of the maritime cluster was estimated using the Washington State Input-Output Model for 2002. This recently published version of the model provides the most up-to-date methodology for estimating multiplier impacts of industries such as the maritime cluster that bring significant new income into the region. Fishing is an extractive industry; all income from this sector is a "return" from a renewable asset base, and much of the industry's output is exported to customers outside King County.

[5] Martin Associates, The 2007 economic impact of the Port of Seattle, report for the Port of Seattle, Lancaster, PA, January 12, 2009.

Table 1: Economic Impacts of the Maritime Cluster, 2007

Industry	Direct Output (millions)	Direct Industry Employment	Total Output Impact	Total Employment Impact
Fishing	1,132	5,236	2,477	17,232
Water transportation	2,003	5,702	3,487	15,969
Seafood processing	1,390	3,655	3,074	15,759
Ship and boat building	354	2,065	778	5,749
Ship building and repairing	308	1,351		
Boat building	146	714		
Cruise ship passenger spending	145	1,675	234	3,142
Public sector operations* (NOAA, Coast Guard, UW)	161	1,485	304	2,386
Total	5,639	16,652	10,354	60,237

Source: IMPLAN model, Bureau of Labor Statistics, POS Impact Report, and authors' calculations
*2006 data for public sector operations

The ratio of total output to industry output in Table 1 provides a measure of the multiplier impact of each industry and the cluster as a whole. The total output estimates are derived from an input-output model analysis conducted using the Washington Input-Output Model for 2002.[6] The cluster as a whole has an estimated output multiplier of 1.84; the cluster's total contribution to the state economy is estimated to be $10.354 billion as of 2007. Also, a total of 60,237 jobs in the state are due to the economic activity generated in this cluster. The overall employment multiplier of this cluster is estimated to be 3.61.

Table 2 shows two measures of the competitiveness of selected industries in the cluster; these metrics are not available for either the retail spending associated with cruise ship visits or the public sector activities. The fishing and seafood processing, water transportation, and ship/boat building industries exported nearly $1.2 billion of their $4.98 billion in total output in 2007, about 25 percent of total output from these industries. In addition, many regional scientists argue that sales to the federal government are in effect an export from a region since local taxpayers do not contribute much to the total costs of these activities. Thus, one could include most of the public sector activities (an additional $161 million of output) in the export column since almost all of this activity is paid for with federal funds. However, NOAA and Coast Guard operations based in Seattle provide a direct benefit to the Seattle-based fishing and water transportation industries while simultaneously serving other mariners transiting Northwest waters but based in other ports. Thus, it is less clear that all output in these sectors should be regarded as exports.

[6]Beyers, W. and Ta-Win Lin (2008), Washington Input-Output Model 2002, Olympia: Office of Financial Management (www.ofm.wa.gov/economy/io/default.asp).

Table 2: Competitiveness Indicators: Exports and Location Quotients

Impact Summary	Industry Output, 2007 (millions $)	Exports	Exports as % of Output	Location Quotient (based on output)
Fishing	1,132.07	155.05	14%	21.68
Water transportation	2003.14	685.79	34%	4.66
Seafood processing	1,390.23	257.41	18.5%	10.6
Ship building and repairing	308.56	89.52	29%	1.51
Boat building and repairing	145.75	45.89	31%	1.30
Total for Industries Above	4,979.75	1,233.66		

Source: IMPLAN model and authors' calculations

Table 3 compares the competitive strength of key maritime industries in the Seattle/Tacoma/Bellevue MSA to the same industries in other major port cities on the west coast of the United States. All statistics in Table 3 are based on the covered employment and wages statistics published by the U.S. Department of Labor, Bureau of Labor Statistics. Covered employment refers to workers who are eligible for unemployment insurance, a more restricted definition of employment than we have used in Tables 1 and 2. However, comparisons of competitiveness among the west coast ports are only possible using this data source.

The data in Table 3 show that the maritime industries in the Seattle area are larger and have higher location quotients than their direct competitors in the other three west coast cities with significant ports. This finding has to be qualified with the note that data suppression limits the availability of data from Los Angeles/Long Beach, and one cannot be entirely what the size of the relevant industries is in that metropolitan area. In addition, the large location quotients for establishments, employment, and wages demonstrate the competitive strength of the maritime cluster in the Seattle/Tacoma area.

Table 3: West Coast Maritime Cluster Characteristics, 2007

Los Angeles/Long Beach	Establishments	LQ	Employment	LQ	Total Wages	LQ
Fishing	19	0.16	n/a	n/a	n/a	n/a
Seafood processing	26	0.54	n/a	n/a	n/a	n/a
Ship and boat building	37	0.34	n/a	n/a	n/a	n/a
Water transportation	70	1.27	1,796	1.01	95,022,612	0.66
San Francisco/Oakland	Establishments	LQ	Employment	LQ	Total Wages	LQ
Fishing	13	0.35	73	0.74	3,793,250	0.43
Seafood processing	6	0.39	108	0.18	5,252,684	0.17
Ship and boat building	11	0.32	567	0.24	30,824,703	0.19
Water transportation	23	1.31	1,025	1.62	159,370,091	2.42
Portland/Vancouver	Establishments	LQ	Employment	LQ	Total Wages	LQ
Fishing	8	0.47	n/a	n/a	n/a	n/a
Seafood processing	4	0.57	39	0.13	851,170	0.08
Ship and boat building	25	1.58	n/a	n/a	n/a	n/a
Water transportation	14	1.74	805	2.52	60,036,193	2.63
Seattle/Tacoma	Establishments	LQ	Employment	LQ	Total Wages	LQ
Fishing	187	6.90	1,242	15.06	137,323,080	23.32
Seafood processing	64	5.74	3,884	7.85	286,169,731	14.08
Ship and boat building	63	2.50	3,723	1.86	184,713,016	1.67
Water transportation	35	2.73	2,943	5.56	179,764,408	4.06

Sources: Bureau of Labor Statistics

Table 4 shows the growth trends from 2002 to 2007, also based on the covered employment data used in the previous table. The fishing and water transportation expanded in the number of establishments and annual industry-wide payroll. In the seafood processing and ship/boat building industries, employment levels contracted, but total payroll and annual average wages grew. The average annual wage in all of these industries exceeded the countywide average for all industries, although the average in the seafood processing industry is only a few hundred dollars above the all-industry average. The average annual wage in all of these industries exceeds family wage levels established by a study carried out by the Northwest Federation of Community Organizations.[7]

[7]Northwest Federation of Community Organizations (www.nwfco.org); county specific estimates are provided in an accompanying spreadsheet (http://www.nwfco.org/pubs/2008.12.09_WA.counties.pdf).

Table 4: Growth Trends 2002 to 2007

Industry	2007			2002			Percent Change, 2002 to 2007		
	Average Annual Covered Employment	Annual Payroll	Average Annual Pay	Average Annual Covered Employment	Average Annual Payroll	Average Annual Pay	Average Annual Covered Employment	Annual Payroll	Average Annual Pay
Fishing	1,035	119,637,348	115,620	943	83,153,199	88,211	9.8%	43.9%	31.1%
Seafood processing	3,433	258,394,963	75,261	3,460	217,380,169	62,825	-0.8%	18.9%	19.8%
Ship and boat building	1,959	103,605,248	52,900	2,044	99,526,134	48,686	-4.2%	4.1%	8.7%
Water transportation	3,016	186,413,040	61,806	2,677	155,097,424	57,944	12.7%	20.2%	6.7%
All industries	9,443	668,050,599	70,745	9,124	555,156,926	60,846	3.5%	20.3%	16.3%

Source: Bureau of Labor Statistics, covered employment and wages

The maritime cluster makes a substantial contribution to the City of Seattle through its tax payments (Table 5). Two major taxes paid by these industries are the business and occupation tax and the retail sales tax. According to data provided by the City of Seattle's Finance Department, the maritime industries are contributing over $3.1 million annually through the business and occupation tax, plus in excess of $5 million through the retail sales tax.

Table 5: City of Seattle Tax Receipts from the Maritime Cluster

Fishing	B&O Receipts	Taxable Retail Sales	Estimated City Retail Sales Tax Receipts (local rate =.025)*
Fishing	$28,530	$154,806	$3,870.15
Water transportation	$615,815	$54,136,085	$1,353,402
Seafood processing	$1,210,432	$32,647,291	$816,182
Ship and boat building	$432,989	$27,787,964	$694,699
Marine construction	$472,331	$46,424,920	$1,160,623
Marine fuel dealers	$362,960	$40,739,990	$1,018,500
Cruise ship passenger spending[8]	n/a	$145,000,000	$3,600,000
Total	$3,123,056	$205,491,056	$5,096,151

Source: City of Seattle Finance Department
*Local rate stated in Washington Department of Revenue, *Local Sales/Use Tax Changes* (Effective January 1, 2009)

[8]Cruise ship passenger spending estimated by applying the city's retail sales tax rate to the estimated spending shown in Table 1.

Industry Notes

This section provides further detail about characteristics of some of the maritime industries. The information in this section may aid readers in interpreting some of the data above.

Fishing

Fishing employment levels are very difficult to track for several reasons. There is no authoritative census of the number of vessels home-ported in Seattle. The Port of Seattle indicates that anywhere from 200 to 270 commercial fishing vessels may be moored at Fisherman's Terminal in a particular month. However, some of these vessels may be home-ported elsewhere but in moored for some period in Seattle while maintenance activities are carried out. Many vessels visit Seattle every 2-3 years to carry out maintenance that is less expensive to accomplish in Seattle than up in Alaska.

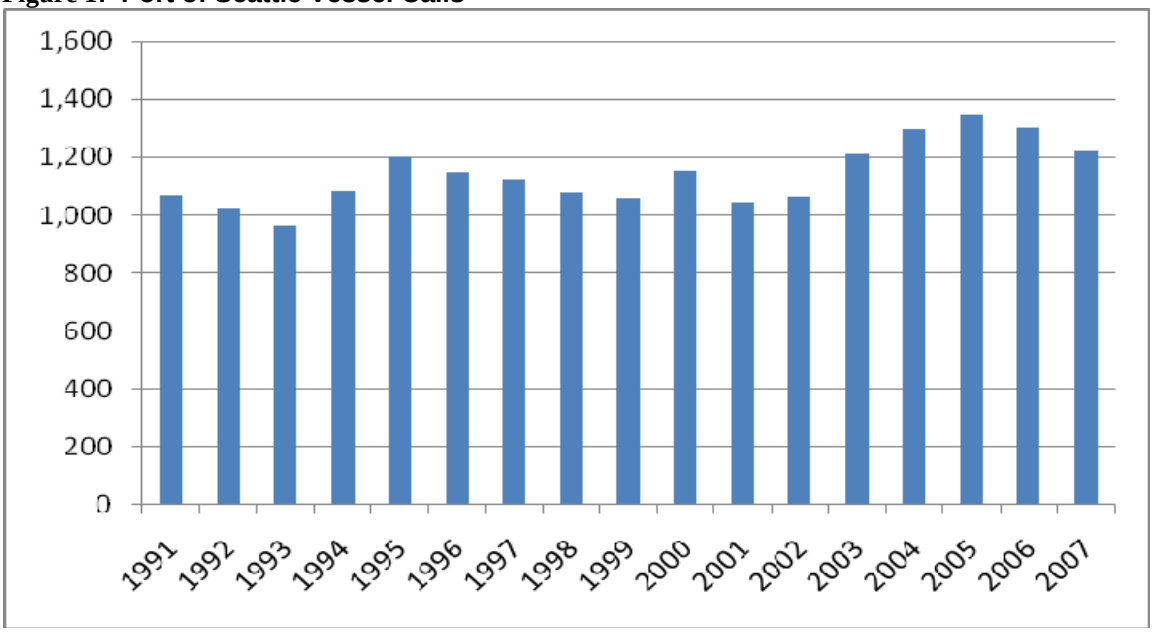
Many of the fishing vessels owned by companies in Seattle or King County are staffed by workers who do not necessarily live in the area. However, employers report the number of workers to the state, and the state counts them in the county of the employer's address. If an individual owns a commercial fishing vessel, the business address may be the owner's home, and that home may or may not be in the same city or county where the vessel is moored when in its home port. Most of the commercial fishing conducted by vessels moored in this area is done in the Gulf of Alaska, and vessels may be away from their home port for months or even years at a time. Due to higher fuel costs in recent years, vessels home-ported in Seattle may be left in Alaska for 2-3 years at a time, returning to Seattle periodically for repairs that cannot be carried out economically in Alaska. However, as long as the business address is in Seattle or elsewhere in King County, employees working on such a vessel will be reported to the State of Washington.

Fishing industry employment reported in Table 1 includes proprietors and workers who are not covered by unemployment insurance. However, the payroll numbers reported in Table 3 and 4 are only for workers covered by unemployment insurance, generally the employees of the larger firms in the industry who have year-round salaried employees. Independent fishing vessels typically hire seasonal workers who are paid in "crew shares;" like vessel owners and captains, these workers earn a share of the gross profits of the vessel which depend on how many fish are caught as well as the market price of these products.

Port of Seattle Vessel Calls

While overall vessel traffic in the Port of Seattle grew substantially from 2001, a cyclical low point, through 2005 when total calls reached nearly 1,350. However, in the last two years traffic has dropped back to about 1200 vessel calls in 2007 (Figure 1). The recent declines reflect changes in which international lines call in Seattle rather than competitive ports, and overall shifts in imported and exported goods shipped by sea as exchange rates change, and fuel price increase that may have contributed to the decline in 2007.

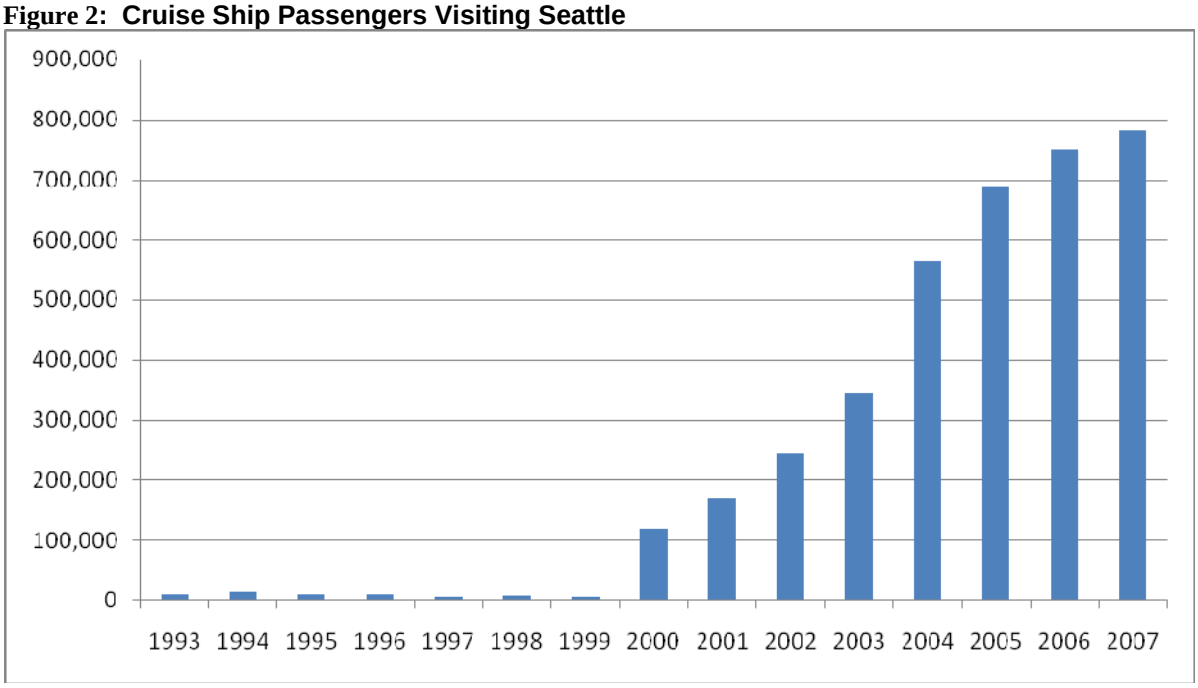
Figure 1: Port of Seattle Vessel Calls



Source: Port of Seattle

Despite the decline in overall vessel calls, there has been dramatic growth in cruise ship visits since 2000. Growth in the total number of cruise ship passengers continued in 2006 and 2007 (Figure 2), offsetting some of the decline in other traffic visiting this seaport.

Figure 2: Cruise Ship Passengers Visiting Seattle



Source: Port of Seattle

Public Sector Operations

Private sector industries in the maritime cluster are significantly assisted by three public sector operations based in Seattle:

- U.S. Coast Guard
- National Oceanic and Atmospheric Administration
- University of Washington

All of these public sector operations benefit a wide range of maritime industries located not just in the Seattle area but up and down the west coast and elsewhere. However, the federal government has placed regional headquarters for its two key maritime agencies in Seattle both due to its key location for providing navigational and vessel assist/rescue services in the Northern Pacific, and to take advantage of the support services for vessel operators located in Seattle. The University of Washington has substantial fisheries and ocean sciences teaching and research departments, much of which is supported by federal research dollars. These UW operations include research vessels based in Lake Union. NOAA's budget for Seattle-based operations was approximately $76 million in FY2006; approximately 1,400 individuals work at NOAA's facilities on the shores of Lake Union and Lake Washington. The University of Washington's Ocean and Fisheries Sciences school has a budget of about $85 million and faculty and staff totaling 570. About $78 million of the budget is for research and $70 million of that is provided from federal grants and contracts.

Maritime Cluster Supply Chain

Table 1 above shows the multiplier impact of the maritime industries on other industries in the state. The three tables below provide further detail, showing the 10 industries most impacted by purchases from three core industries in the cluster: fishing, water transportation, and shipbuilding. These three industries purchased over $1 billion of goods and services from other Washington businesses in 2002. The largest purchases, considering purchases from all three industries, were for transportation services, petroleum products, financial services, and various products supplied by wholesalers.

Table 6: Supply Chain for the Fishing Industry

Top 10 Supply Industries in Washington	millions $	% of all purchases
Petroleum and Coal Products	65.1	22.5%
Construction	51.1	17.6%
Wholesale	41.5	14.3%
Credit Intermediation and Related Activities	27.5	9.5%
Waste Management/Other, and Agriculture Services	13.0	4.5%
Truck Transportation	12.6	4.3%
Other Finance and Insurance	12.1	4.2%
Ship and Boat Building	7.7	2.7%
Legal /Accounting and Bookkeeping /Management Services	7.7	2.7%
Educational Services	7.1	2.4%
Total	287.7	100.0%

Source: Washington Input Output Model 2002

Table 7: Supply Chain for Water Transportation

Top 10 Supply Industries in Washington	millions $	% of all purchases
Support Activities for Transportation, Warehousing and Storage	94.7	20.4%
Other Transportation/Postal Offices	72.0	15.5%
Other Finance and Insurance	60.3	13.0%
Waste Management/Other, and Agriculture Services	54.7	11.8%
Real Estate and Rental and Leasing	40.6	8.7%
Administrative/Employment Support Services	30.0	6.5%
Fabricated Metals	21.4	4.6%
Ship and Boat Building	17.0	3.7%
Legal /Accounting and Bookkeeping /Management Services	16.0	3.5%
Telecommunications	10.0	2.1%
Total All Industries	464.0	100.0%

Source: Washington Input Output Model 2002

Table 8: Supply Chain for Ship and Boat Building

Top 10 Industries	millions $	% of all purchases
Wholesale	44.1	14.3%
Retail	37.2	12.0%
Legal /Accounting and Bookkeeping /Management Services	24.9	8.0%
Machinery Manufacturing	22.4	7.3%
Credit Intermediation and Related Activities	21.2	6.9%
Waste Management/Other, and Agriculture Services	17.2	5.6%
Construction	16.8	5.4%
Administrative/Employment Support Services	14.9	4.8%
Other Information	13.8	4.5%
Other Finance and Insurance	12.1	3.9%
Total	309.1	100.0%

Source: Washington Input Output Model 2002

Mapping Seattle Maritime Cluster Firms

This section contains maps depicting the location of firms in the Seattle maritime cluster. These maps were produced though a combination of data from InfoUSA, a public business database, as well as the City of Seattle, where available. It is important to note that because these do not reflect complete administrative data; there are likely to be maritime firms that are not reflected in these maps since neither data source used to prepare the maps has a comprehensive listing of firms connected to this cluster. InfoUSA's selection criteria are not clear; the City of Seattle data only contain firms that have tax accounts with the City. Essentially, we used the City data to capture the locations of firms in two industries whose NAICS codes are fairly broad and include firms not part of the maritime cluster. With a few exceptions,[9] retail or consumption-oriented maritime activities, such as sales of yachts, boats, and other personal watercraft, and the sale of goods and services aimed at recreational boaters, are excluded from this analysis.

The first map below shows the location of Seattle region maritime cluster firms. Note the high level of concentration in the Ballard, Fremont, and Magnolia areas of Northwest Seattle, along the waterfront in downtown Seattle, and in the Duwamish and SODO districts of South Seattle.

[9] A small fraction of the firms represented as "Seafood" on these maps may be retail operations which are not vertically integrated with seafood processing operations.

Figure 3: All Maritime Cluster Firms in Seattle and Nearby Communities

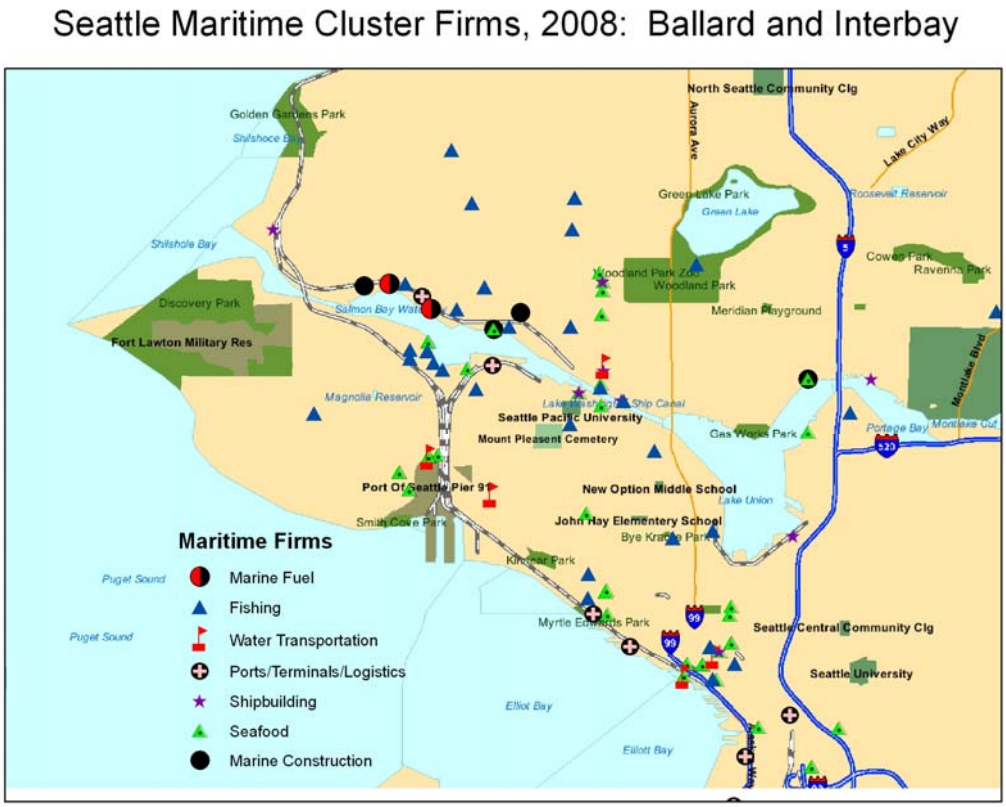
The next map shown below shows the maritime firms with a higher level of industrial detail across regions. Symbols, shown in the legend on the left hand side of the map, are used to represent firms in key maritime industry sub-sectors. This map shows some of the differences in principal maritime activities across regions, such as the strong presence of fishing firms in the Ballard/Interbay region.

Figure 4: Maritime Cluster Firms Classified by Industry

The maps shown on the next several pages provide a higher level of geographical detail, showing the three key maritime sub-regions with the City of Seattle.

The map below shows the Ballard and Interbay region. Note the strong complex of fishing and fuel supply in the area, as well as the diversity of activities across sub-cluster groups.

Figure 5: Ballard and Interbay Maritime Firms

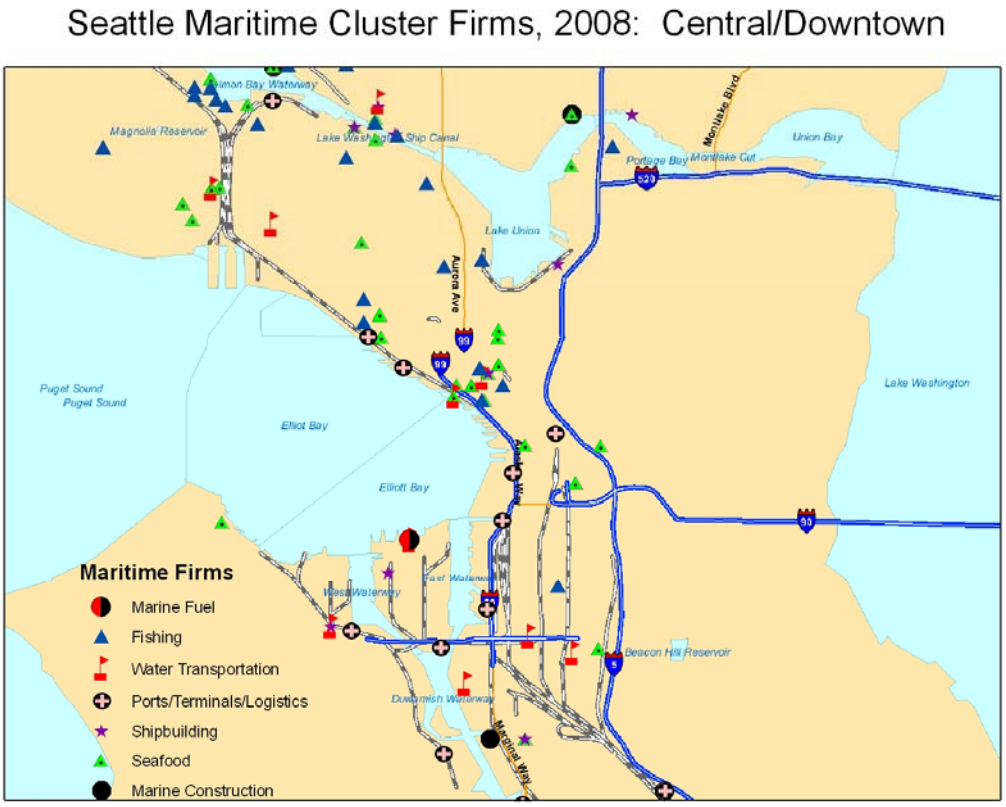


The next map shows the detail for the Duwamish/SODO region. The principal maritime activities in this region differ in scope from those in Ballard/Interbay shown above. For instance, port, terminal, and logistics are highly concentrated in this area, as are water transportation firms.

Figure 6: Duwamish and SODO Maritime Firms

The map below depicts the diversity of maritime activities in the Central/Downtown area. Not surprisingly, water transportation, ports, terminals, and logistics are most significantly represented in this area, with the headquarters of some seafood firms also represented.

Figure 7: Central/Downtown Maritime Firms



Focus Group Meetings

Focus group meetings were held with representatives in key substantive areas of the Maritime Cluster. These included the following:

1. Fishing
2. Marine support industries
3. Deep draft water transportation
4. Shallow draft water transportation
5. Marine construction
6. Passenger vessels
7. Public sector operations

The focus group meetings allowed for a more finely detailed consideration of challenges and opportunities facing firms in the Seattle maritime cluster. The focus groups also participated in the development of the survey, the results of which are discussed in detail in the section below. In general, the focus group meetings were open-ended; a focus group guide was used by the facilitator to ensure that a common set of topics was covered in each of the sessions. While some common challenges and opportunities were discussed, it is clear that each industry or sub-cluster faces some unique issues. The common opportunities and challenges heard throughout the focus group meetings are noted below.

Significant opportunities in the Seattle Maritime Cluster

1) Resource development in Alaska

Alaska's natural resource and tourism activities have grown significantly in recent decades. The key resource industries in Alaska include oil and gas extraction and exploration, mining, fisheries, and tourism activities. Each of these has a significant impact on economic activity in the Seattle region due to the strong maritime relationship between Seattle and Alaska. This relationship was mentioned repeatedly throughout the focus group meetings. Seattle has a unique role as a hub for Alaskan trade; many goods headed for Alaska wholesale and retail markets are transported from Seattle area warehouses by barge to Alaska. In addition, Seattle is a center for specialized maritime service industries which support the resource activities. For decades, work boats from Alaska often utilize specialized marine services (including financial, insurance, legal, and engineering), repair and maintenance facilities and "mobile" repair businesses, and marine fueling locations in the Seattle area. Vessels that spend most of their time in Alaska visit Seattle every 2-3 years to take advantage of these services. As a consequence, Seattle has the largest and most extensive array of maritime services of any city on the west coast. Ship Canal and Lake Union locations are particularly favored for

moorage and yards to work on vessels because the fresh water environment reduces maintenance costs.

There was some concern mentioned, particularly during the dramatic rise in fuel prices during the 2nd and 3rd quarters of 2008, that many fishing boats have been staying up in Alaska and re-fueling there instead of voyaging back to Seattle during the off-season. The subsequent decline of fuel prices in the 4th quarter of 2008 may well have reversed that trend. Regardless, Seattle retains a significant competitive advantage for significant maintenance and repair activities, as boats continue to return to Seattle from Alaska during the off-season, or at longer intervals of 2-3 years, to take advantage of local expertise and lower pricing.

Exploration in Alaska and the Arctic Circle is also an important part of the public sector activity based in the Seattle region. NOAA continues to voyage to the Arctic regions for nautical charting activities, including scientific monitoring of global climate change conditions. Some in the fishing focus group mentioned that some aspects of climate change could support additional resource activities in Alaska, which could have a positive impact on maritime activities in Seattle.

2) Strong growth in ship building and boat yard activity

The strong cyclical trend in ship building has resulted in employment gains in ship and boat yards in the Seattle area. Increased environmental regulations have contributed to this surge in ship building by placing restrictions and limitations on new construction and maintenance and repair activities. The surge in demand for new vessels caused by both organic market demand growth and cyclical renewal cycles has been across many categories of vessels, including shallow draft and passenger vessels. This demand is leading to strong gains in ship building and maintenance activity. However, the cycle leading to the need for new vessels is leading to some significant challenges for some firms. For instance, the pressure of environmental regulations has led these firms in the past to continually retrofit their vessels, benefiting local and regional maintenance and repair firms. However, once the useful life of the vessel has been exhausted and retrofit is no longer a possibility, these firms face difficult decisions regarding whether to make substantial capital investments in new vessels. Some firms operating vessels in the region noted that the added expense of new vessels due to environmental requirements will likely prevent their firms from expanding their fleet or even replacing vessels as they age and become uneconomic to repair. Many of these decisions are currently being made or will be in the near future, and will have a significant impact on many maritime sub-clusters, especially those in the fishing and passenger vessels groups.

3) Public sector maritime operations growth in the region

The United States Coast Guard Sector Seattle is expanding, which has the potential to positively benefit employment in the Seattle region. NOAA is undergoing a fleet recapitalization plan which has the potential for increased employment and output for Seattle are ship and boat yards, maintenance and staffing, and dockside opportunities for local contractors. However, a fire destroyed the docks NOAA was leasing from a private vendor on the eastern shore of Lake Union, and as the long term lease for this facility was up for re-bidding, the vendor has not re-built the docks and the vessels are currently dispersed in separate locations. Unless a new long term lease is negotiated with this vendor, there is a risk that NOAA could move its vessels away from Seattle to alternative west coast locations.

On December 1, 2008, Washington State Ferries (WSF) awarded a contract to Todd Shipyards to build an auto ferry for the Port Townsend-Keystone route on an 18-month delivery timeline. WSF is expected to award additional contracts for three larger vessels in 2009. This cyclical replacement of the WSF fleet will likely keep ship and boat yards handling new construction vessels busy in the near term. These ferries are expected to be built from 2009 to 2011.

Significant challenges in the Seattle Maritime Cluster

1) Transportation and land use issues, particularly uncertainty related to the Viaduct

The Alaskan Way Viaduct was consistently the most important issue raised when transportation was discussed in the focus groups and on the online survey. However, the use of the Viaduct differs greatly across the sub-component groups of the maritime cluster. Many maritime firms in the Ballard/Interbay region utilize inputs from the SODO and Duwamish area and use the Viaduct continuously. One representative noted that when the Viaduct is closed, it takes his trucks ½ hour longer to reach him than when it is open. Even those industry groups which do not directly utilize the Viaduct conveyed concerned about the potential traffic spillover impacts of a Viaduct construction process on surface streets. Others mentioned uncertainty over the Viaduct as an impediment to expansion plans.

2) Labor force shortages and the aging of the skilled maritime workforce

Many areas of the maritime cluster have been subjected to local labor shortages and an aging of the skilled labor force, with the average age of tug boat pilots reaching nearly 60 years of age.[10] The most recent data available for ship and boat yard workers is from 2002, with the average age for these workers at 45 years of age.[11] Although educational and training institutions (such as the Pacific Maritime Institute, Youth Maritime Training

[10] Source: Pacific Maritime Institute
[11] Source: Global Security

Academy, Fisheries Research Institute, University of Washington Marine Affairs and Oceanography, and Puget-sound area community college programs) were mentioned as beneficial, in many cases they are insufficient to meet the needs of skilled labor force in maritime trades and professional services. Areas mentioned as having shortages of qualified personnel include fishing crews, crew members on public sector operations vessels, skilled labor in ship construction, maintenance, and repair, tugboat pilots, marine engineers and technicians, and naval architects. Competition across trades is intense. Ship and boat yard firms in particular discussed their difficulty in finding labor, and highlighted their challenge in competing with other blue collar trades, principally construction which has traditionally paid higher wages for this class of workers than ship and boat building firms.

Maritime firm responses to labor shortages include the poaching of employees from other firms, national recruitment searches, relationships with training providers, and in-house training programs. Many of the positions with shortages have high relative or "family" wages, and there is a sense that there may be potential for greater institutional involvement within the region for occupational training and education tailored to these areas of labor demand.

3) Regulation, particularly the overlap and lack of suitability of regulations

Overlapping and inconsistent regulatory frameworks were cited as challenges in nearly all of our focus group meetings. The Shoreline Master Program updates were cited as a source of concern, because it provides a major impediment to expansion planning. Although willing to comply with regulation, some have been unable to expand on their property because of the lack of agreement among agencies on shoreline planning issues. Many of these firms are willing to pay for shoreline mitigation, but have been unable to get mitigation actions approved because regulations are still in the planning stage. Many focus group participants mentioned that local, state, and federal regulations are far too stringent and impact businesses most when they are attempting to expand and add workers to their payroll.

The TWIC (Transportation Worker Identification Credential) was mentioned as a challenge, particularly to firms hiring seasonal or temporary labor. TWIC identifications, which are screened and issued by the TSA, are monitored by the U.S. Coast Guard. Firms mentioned difficulty and delays by the TSA in obtaining these credentials for their employees.

Within the deep draft space, particular concern was levied about differing levels of security regulation between ports in the United States and other countries. There is concern that differences in security regulatory frameworks could cause ports in the United States to be at a competitive disadvantage in low cost delivery and time in transit.

4) Taxation and land use

Because of the diversity of firms in the maritime cluster, tax policy varies widely across sub-components. Areas of concern mentioned in relation to taxing policy include property taxes (and associated land use pressures) B&O taxes, parking taxes, and sales taxes. However, many respondents felt that taxing issues were less onerous and of less concern than regulatory issues. One issue raised consistently during focus group meetings were issues related to land use and development pressures, and many maritime firms feel pressured from numerous fronts.

First, direct tax effects are being faced by maritime firms. The increase in property taxes has gradually eroded some firms' ability to justify further capital investment on these properties, particularly in a environment characterized by expected fluidity in future zoning decisions. These decisions are further challenged by regulations which place particular pressure and limitations on the activities of water-dependent maritime firms. What they feel is often a myriad and maze of regulations and opaque regulatory environment was discussed widely across focus groups. While most firms acknowledged the need for regulation, they complained across the board that it is particularly the inconsistency and incongruity of regulations which both add onerous costs to operations and make expansion plans lengthy and administratively costly to consider.

Second, there has been mounting indirect pressure from surrounding land uses in formerly industrial districts, which was discussed in many of the focus groups. This pressure can take many forms, ranging from noise complaints to property acquisition proposals that seek to unlock latent value of maritime parcels from either a present or projected future best-use perspective. Because many new mixed-use or residential uses are being approved in close proximity to industrial uses, there is a great deal of concern that noise and quality of life issues may cause conflict among land uses. Maritime firms in the Ballard/Interbay area are especially impacted by the limited distance between industrial and residential zoning, and are concerned about further impacts related to the continued development of the Burke-Gilman path through the heart of these maritime industrial areas from both a safety and business risk perspective.

Maritime Cluster Survey

An online survey was developed and used to gain insight into the challenges, opportunities, and perspectives of firms in the maritime cluster in the Seattle region. This survey was disseminated via both a snowball methodology through key contacts in the maritime industry and by utilizing online databases. Out of 64 maritime firms solicited for participation, 29 filled out the survey, reflecting a response rate of 45.3 percent. All communications in relation to the online survey stressed confidentiality of individual responses. Therefore, the findings from the survey are presented in this report in aggregate form only. Some highlights of the survey responses are presented below.

The first couple of questions presented in the survey are concerned with the structure of maritime establishments in the Seattle region. As shown in Table 9 below, many establishments (precisely half of those in the survey) in the maritime cluster in Seattle are single establishment firms. Another third are the headquarters of a firm with establishments elsewhere, indicating a concentration of head office firms in Seattle.

Table 9: Organizational structure of maritime firm respondents

#	Answer		%
1	The only establishment of the firm		50%
2	An establishment of a firm headquartered outside of the region		14%
3	An establishment of a firm headquartered elsewhere in the region		4%
4	The headquarters of a firm with establishments elsewhere		32%
	Total		100%

Tables 10 and 11 present data on gross revenue levels and growth of these firms, a significant portion of which have very strong levels of gross revenue. This reflects the diversity of firms within the Seattle maritime cluster, which has a number of moderately sized firms with single establishments as well as major national and multi-national firms with broad markets and tremendous revenues. As shown in Table 10, maritime firms in

Table 10: Gross revenue of maritime firms

#	Answer		%
1	Less than 1 million		11%
2	Between 1 and 10 million		37%
3	Between 10 and 20 million		15%
4	Greater than 20 million		37%
	Total		100%

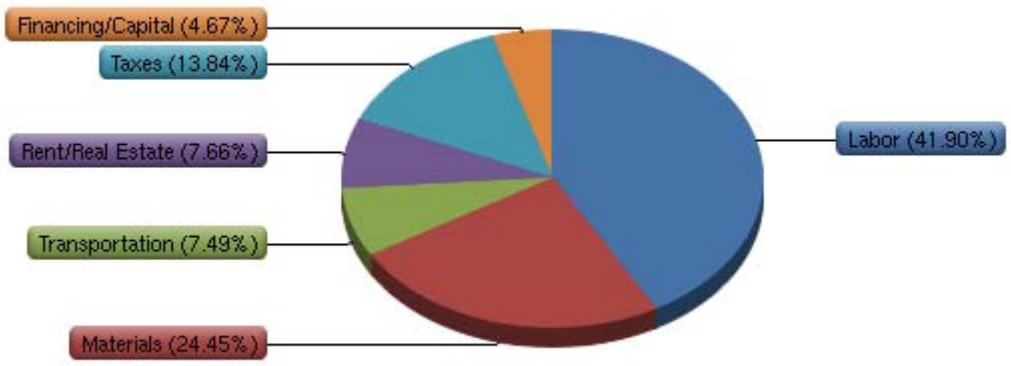
Table 11: Estimated annual gross revenue growth over the past 5 years

#	Answer		%
1	Negative		4%
3	1-10%		41%
4	11-20%		48%
5	20-50%		7%
7	Greater than 50%		0%
	Total		100%

Seattle have experienced strong gains in annual gross revenue growth, with 96% of those surveyed experiencing positive gross revenue growth over the period.

In order to understand the components of maritime firm expenditures, the survey asked firms to estimate the percentage contribution of various elements to their overall expenses. Figure 8 below shows that maritime firms surveyed have relatively significant labor costs, with nearly 42 percent of expenses flowing to labor.

Figure 8: Cost structure of maritime firms



The survey also sought to understand the reasons why firms in the maritime industry located in Seattle. To address this, respondents were asked to rank the factors (1 being the most important), the results of which are shown in Table 12 below. Two important facets are drawn out from the responses to this question. First, proximity to the maritime industry was far and away the most-oft cited rationale for location in Seattle. This speaks to the strength of the local maritime cluster. Second, the three top cited factors -- proximity to the maritime industry, proximity to market, and location near or on water -- were far more important than the other choices.

Table 12: Importance of location-specific factors

#	Answer	Average Value
1	Proximity to maritime industry	1.77
2	Proximity to market	2.86
3	Location near or on water	3.18
4	Proximity to labor/employee residences	4.91
5	Proximity to residence of primary owner(s)	5.09
6	Proximity to key transportation corridors	5.23
7	Need to have a presence in Seattle for reputation	5.45
8	Special zoning districts	7.50

The question addressed in Table 13 below was generated to gain a sense of where firms see themselves in the years to come, in terms of location. It is noteworthy that no firm stated an expectation to move in the next five years, while 12 percent characterized their expectation of moving as either "highly likely" or "moderately likely". Perhaps also worthy of note, however, is that only about one-third of firms responded to this question "no". Nearly half of respondents characterized their likelihood of moving as "unlikely", indicating that many of these firms have some level of uncertainty in their future location decisions.

Table 13: Likelihood of moving from Seattle

#	Answer		%
1	Yes		0%
2	Highly Likely		4%
3	Moderately Likely		8%
4	Unlikely		48%
5	No		36%
6	Unsure		4%
	Total		100%

To address the importance of transportation to maritime firms, the survey asked about the relative shares of modes of transportation to overall transportation usage. This question was asked both for inbound inputs and supplies, as well as outbound products and services. Figure 9 below shows the composition of transportation usage for inbound inputs and supplies for Seattle maritime firms. It shows that 2/3 of inbound inputs and supplies are brought to the firms by trucks, with 1/6 by marine and small fractions (roughly 5%) being brought by the other modes, including air, automobile, and rail.

Figure 9: Transportation usage by maritime firms: inbound/inputs

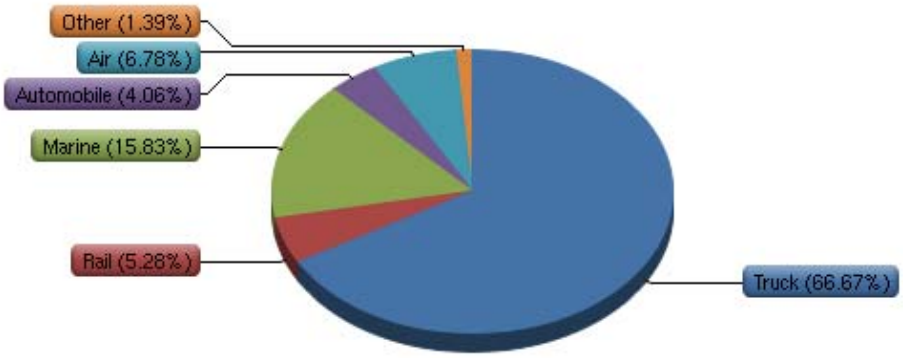
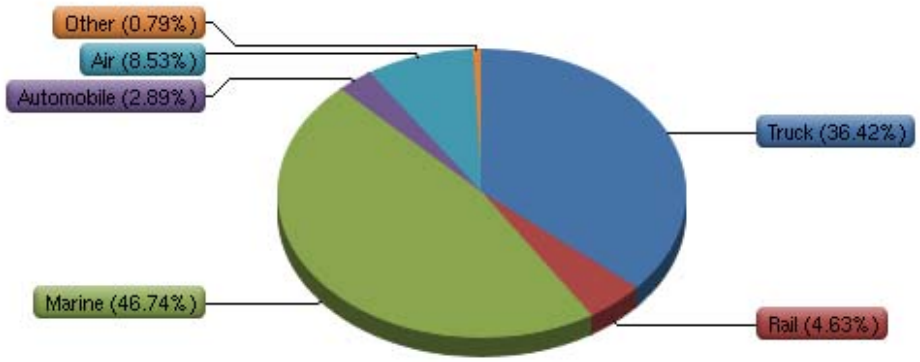


Figure 10 shows the same chart for outbound products and services. These outbound shipments are largely conducted through marine transportation, with a significant share also via truck. Air transportation garners a modestly higher share of outbound transportation than inbound. Most importantly, note the very different manner in which outbound products and services from maritime firms in Seattle are shipped. Figure 2 and 3 indicate that Seattle maritime firms to a significant degree receive inputs and supplies by truck and send outbound products and services by both marine and trucking modes of transportation. This is likely due in part to the strong shipbuilding and marine construction components in the industry.

Figure 10: Transportation usage by maritime firms: outbound/goods



The importance of marine transportation to the industry in Seattle is shown in Table 14, which summarizes the findings from a question which asked respondents to rate the quality of transportation in the Seattle region relative to other regions in the United States. As shown below, the quality of marine transportation and air transportation are

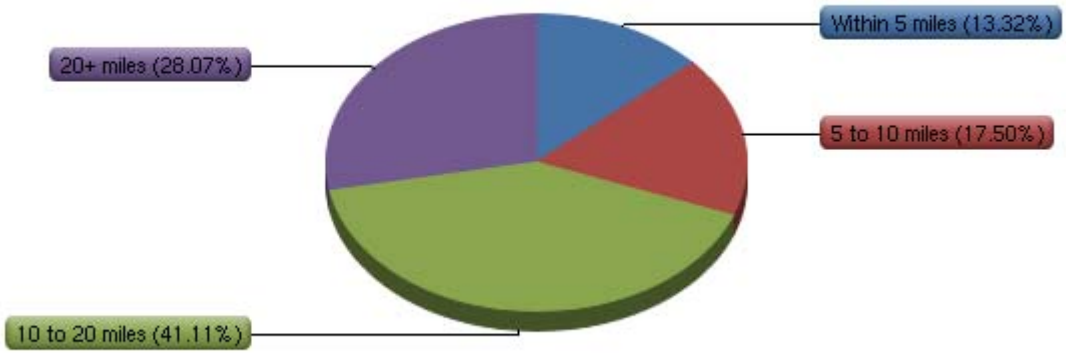
rated especially highly by respondents, while other forms of transportation received substantially lower mean ratings.

Table 14: Quality of Seattle transportation relative to other regions

#	Question	Poor	Deficient	Fair	Good	Excellent	Mean
3	Marine	0.0%	0.0%	9.1%	31.8%	59.1%	4.5
5	Air	0.0%	0.0%	14.3%	52.4%	33.3%	4.2
2	Rail	0.0%	23.5%	35.3%	35.3%	5.9%	3.2
1	Truck	0.0%	33.3%	23.8%	38.1%	4.8%	3.1
4	Automobile	4.8%	57.1%	19.0%	14.3%	4.8%	2.6
6	Other (describe)	0.0%	100.0%	0.0%	0.0%	0.0%	2.0

Figure 11 shows the location of employees relative to firms in the Seattle maritime cluster. From the focus groups, it was clear that high costs of living and difficulty finding affordable housing in the Seattle area is a challenge for maritime business owners, frequently leading to pressure to increase wages. As shown below, a significant percentage of employees in these firms live some distance away, with 69% living greater than 10 miles from work.

Figure 11: Employee residences in relation to maritime firm location



Tables 15 and 16 provide critical insights into the importance and condition of key demographic and transportation factors affecting maritime firms. This provides a yardstick, so to speak, in understanding the specific issues which are most affecting maritime firms. Table 16, sorted by mean rating, shows the distribution of responses in assessing these factors. It shows the tremendous importance of the Alaskan Way Viaduct to maritime firms, which was repeated as a critical factor in nearly all of the focus group meetings as well. Also rating especially highly in importance was the quality and

availability of labor, marine transportation, interstates and highways, and zoning supportive of business.

Table 16 presents the same set of factors as shown previously in Table 15, but asks respondents to evaluate the current conditions of these factors for their businesses. Rated very highly were non-highway transportation and business factors such as proximity to customers and suppliers. Major highways and surface streets were rated very low, especially Highways 167 and 520, Interstate 5, and surface streets in both the Ballard-Interbay and the Duwamish/SODO (South of Downtown) regions.

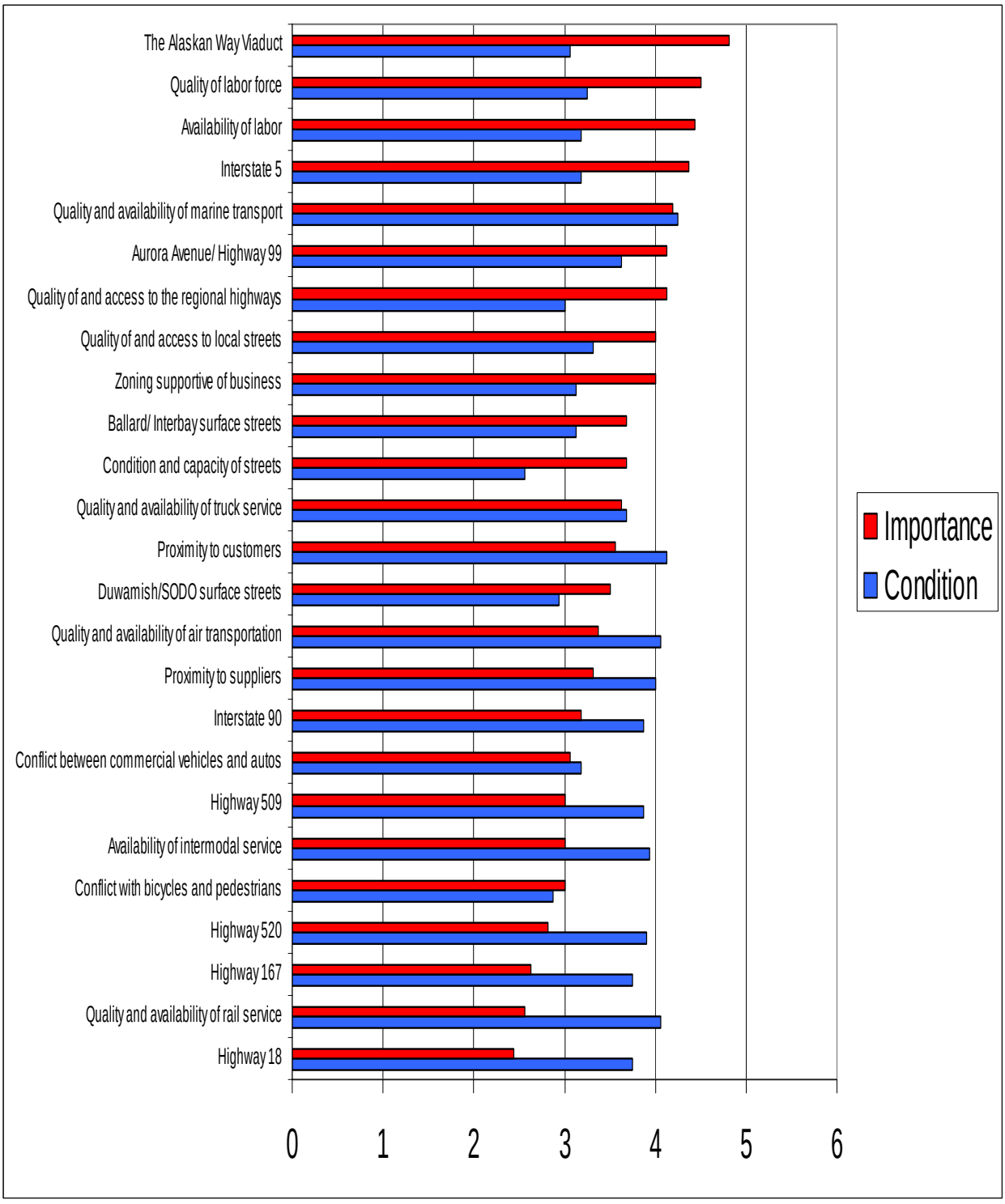
Table 15: Relative importance of key factors to Seattle maritime firms

#	Question	Not Important	Slightly Important	Somewhat Important	Important	Extremely Important	N/A	Mean
18	>The Alaskan Way Viaduct	0.0%	0.0%	4.3%	21.7%	69.6%	4.3%	4.7
4	Quality of labor force	0.0%	0.0%	13.0%	21.7%	65.2%	0.0%	4.5
3	Availability of labor	0.0%	0.0%	13.0%	34.8%	47.8%	4.3%	4.4
11	Quality and availability of marine transport	4.8%	0.0%	9.5%	33.3%	52.4%	0.0%	4.3
19	>Interstate 5	0.0%	0.0%	8.7%	56.5%	30.4%	4.3%	4.3
17	Quality of and access to the regional highways	0.0%	4.3%	26.1%	26.1%	43.5%	0.0%	4.1
5	Zoning supportive of business	4.5%	0.0%	18.2%	40.9%	36.4%	0.0%	4.0
24	>Aurora Avenue/ Highway 99	0.0%	17.4%	8.7%	30.4%	43.5%	0.0%	4.0
14	Quality of and access to local streets	0.0%	4.8%	28.6%	42.9%	23.8%	0.0%	3.9
6	Condition and capacity of streets	8.7%	4.3%	21.7%	39.1%	26.1%	0.0%	3.7
15	> Ballard/ Interbay surface streets	9.1%	4.5%	22.7%	40.9%	22.7%	0.0%	3.6
12	Quality and availability of air transportation	4.5%	13.6%	36.4%	22.7%	18.2%	4.5%	3.5
9	Quality and availability of truck service	13.0%	8.7%	17.4%	39.1%	21.7%	0.0%	3.5
16	>Duwamish/SODO surface streets	4.8%	19.0%	23.8%	33.3%	19.0%	0.0%	3.4
20	>Interstate 90	8.7%	17.4%	26.1%	21.7%	26.1%	0.0%	3.4
1	Proximity to customers	13.0%	21.7%	8.7%	26.1%	30.4%	0.0%	3.4
13	Availability of intermodal service	9.1%	18.2%	45.5%	13.6%	9.1%	4.5%	3.1
2	Proximity to suppliers	13.0%	26.1%	8.7%	47.8%	4.3%	0.0%	3.0
8	Conflict between commercial vehicles and autos	21.7%	13.0%	26.1%	26.1%	8.7%	4.3%	3.0
23	>Highway 509	18.2%	22.7%	18.2%	31.8%	9.1%	0.0%	2.9
7	Conflict with bicycles and pedestrians	34.8%	8.7%	21.7%	13.0%	17.4%	4.3%	2.8
25	>Highway 520	20.0%	33.3%	20.0%	13.3%	13.3%	0.0%	2.7
21	>Highway 167	22.7%	31.8%	22.7%	18.2%	4.5%	0.0%	2.5
10	Quality and availability of rail service	30.4%	30.4%	17.4%	4.3%	13.0%	4.3%	2.5
22	>Highway 18	22.7%	31.8%	31.8%	4.5%	4.5%	4.5%	2.5

Table 16: Relative ratings of key factors to Seattle maritime firms

#	Question	Poor	Deficient	Fair	Good	Excellent	Mean
11	Quality and availability of marine transport	0.0%	0.0%	22.7%	36.4%	40.9%	4.2
1	Proximity to customers	0.0%	0.0%	14.3%	66.7%	19.0%	4.0
2	Proximity to suppliers	0.0%	0.0%	22.7%	63.6%	13.6%	3.9
12	Quality and availability of air transportation	0.0%	0.0%	33.3%	47.6%	19.0%	3.9
10	Quality and availability of rail service	0.0%	11.1%	16.7%	72.2%	0.0%	3.6
13	Availability of intermodal service	5.3%	0.0%	31.6%	52.6%	10.5%	3.6
9	Quality and availability of truck service	4.8%	4.8%	28.6%	61.9%	0.0%	3.5
20	>Interstate 90	0.0%	15.8%	42.1%	31.6%	10.5%	3.4
4	Quality of labor force	8.7%	8.7%	21.7%	52.2%	8.7%	3.4
3	Availability of labor	8.7%	21.7%	8.7%	56.5%	4.3%	3.3
23	>Highway 509	0.0%	5.6%	61.1%	27.8%	5.6%	3.3
14	Quality of and access to local streets	0.0%	4.3%	65.2%	30.4%	0.0%	3.3
24	>Aurora Avenue/ Highway 99	4.8%	9.5%	52.4%	23.8%	9.5%	3.2
18	>The Alaskan Way Viaduct	18.2%	9.1%	31.8%	22.7%	18.2%	3.1
17	Quality of and access to the regional highways	0.0%	15.0%	65.0%	20.0%	0.0%	3.1
22	>Highway 18	0.0%	11.8%	70.6%	17.6%	0.0%	3.1
8	Conflict between commercial vehicles and autos	0.0%	20.0%	60.0%	20.0%	0.0%	3.0
5	Zoning supportive of business	0.0%	18.2%	63.6%	18.2%	0.0%	3.0
19	>Interstate 5	4.3%	13.0%	60.9%	21.7%	0.0%	3.0
15	> Ballard/Interbay surface streets	4.8%	9.5%	66.7%	19.0%	0.0%	3.0
25	>Highway 520	9.1%	9.1%	63.6%	18.2%	0.0%	2.9
16	>Duwamish/SODO surface streets	4.8%	14.3%	66.7%	14.3%	0.0%	2.9
21	>Highway 167	5.9%	11.8%	64.7%	17.6%	0.0%	2.9
7	Conflict with bicycles and pedestrians	0.0%	45.0%	35.0%	20.0%	0.0%	2.8
6	Condition and capacity of streets	4.3%	39.1%	43.5%	13.0%	0.0%	2.7

Table 17: Importance and condition of transportation and regional infrastructure



Advisory Committee Members

Warren Aakervik Jr. Ballard Oil
Rich Berkowitz, Transportation Institute
Darrell Bryan, Victoria Clipper
Kevin Clark, Argosy Cruises
David Harsila, Alaska Independent Fishermen's Marketing Association
Steve Hughes NRC Corporation
Stephen Isaacson, GE Capital
Lise Kenworthy, Attorney
Bruce King, Attorney
John Lockwood, Todd Pacific
Pat McGarry, Manson Construction
Mike Moore, Pacific Maritime Shipping Association
Kris Mullan , Alaska Frontier
Peter Philips, Philips Publishing Group
Rick Shrew, Western Towboat
Kim Suelzle, City Ice
Bruce Sunhholm, Harris Electric
Brian Thomas, Kvichak Marine Industries
Sue Williams, Jensen Maritime
Jan Jacobs, American Seafoods