



Washington State Maritime Sector Economic Impact Study

2017 Update | April 2017

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EXECUTIVE SUMMARY

The Washington Maritime Sector's origins can be traced back to early timber production in the region, the discovery of rich fisheries, and the state's location as a regional trade hub. Today, maritime activities are diverse, extending across multiple corners of the state economy. Leading subsectors include:

- Boat and ship building, repair and maintenance;
- Recreational boat construction and recreational boating;
- Commercial fishing and seafood processing;
- Maritime Logistics and Shipping;
- Passenger Water Transportation; and
- Maritime Support Services.

In 2015, 2.2% of jobs in Washington were directly in the Maritime Sector. Factoring in supply chain linkages and maritime-supported disposable income expenditures, an additional 3.8% of jobs in Washington were supported by the state's Maritime Sector.

Washington's Shipbuilding, Repair and Maintenance industry includes the both commercial and federal operations. The Puget Sound Naval Shipyard employed nearly 13,400 civilian workers in 2015, as well many other private sector contractors hired for non-nuclear-related maintenance on naval vessels. Private sector shipyards across the state engage in the manufacture and maintenance of tugs, ferries, other federal vessels, and commercial fisheries.

The state is also home to many recreational boat manufacturers, ranging in expertise from yachts to kayaks. Recreational boating building and recreational boating includes these activities, in addition to sport fishing, marinas, and maritime-related tourism. Recreational boat manufacturers are also an important source of exports for the state.

Washington's commercial fishing and seafood processing subsector employed 15,900 total workers in 2015, including both covered and self-employed workers. This subsector includes the many jobs tied to the North Pacific Fishing Fleet, homeported in Seattle. Washington state is a significant beneficiary of the Alaskan fisheries, and many of these jobs are high paying, of which a large share of income is spent within the Greater Seattle region. Deep sea fishing operations, at-sea processors and shore-based processors, wholesalers, and retailers constitute this subsector.

Maritime Logistics and Shipping employed an estimated 22,300 workers in 2015. These activities represent a system for moving cargo, ranging river barges, from rail and truck operations (including trans-loading), port and harbor management, stevedoring, and freight logistics. This maritime logistics and shipping subsector is a critical asset to the state's trade-dependent economy, especially for many rural

commodity producers that rely on efficient movement of cargo to export terminals. The Northwest Seaport Alliance, which includes the cargo handling activities of the ports of Seattle and Tacoma, moved 3.5 million twenty-foot-equivalent units (TEUs) in 2015, making it the fifth-largest North American port.¹ Washington serves as one of the United States’ gateways to Asia, making it both a major import and export point.

Passenger Water Transportation primarily includes Washington’s ferries and cruise industry. Together, ferries in Washington transported more than 23 million passengers on the Puget Sound and Washington’s inland waterways in 2015. Cruise ships are an important component of Washington’s tourism industry. Washington’s cruise industry is heavily focused in Seattle, with cruise ships departing from and arriving at Piers 66 and 91 at the Port of Seattle. The industry is also a relatively young one in Washington, growing from just 7,000 passengers in 1999 to a forecasted million-plus passengers in 2017.

The Maritime Support Services subsector is composed of business associations, naval architects, marine construction firms, maritime law and accounting firms, and environmental and geotechnical services. This subsector accounted for 7,900 Maritime Sector jobs in 2015.

Key Metrics

In 2015, Washington’s Maritime industry supported 69,500 jobs, \$4.7 billion in wages, and \$21.4 billion in business revenue. (**Exhibit E-1**)

Exhibit E-1. Maritime Sector Employment, Revenue, and Wages by Subsector, 2015

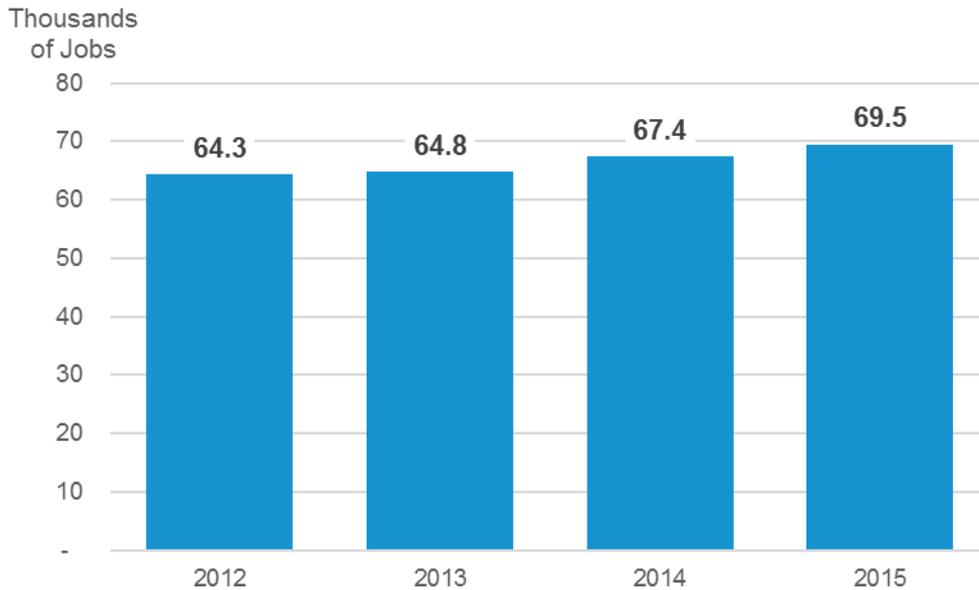
Category	Employment	Wages (Millions)	Revenue (Millions)
Commercial Fishing and Seafood Products	15,900	\$1,075	\$9,428
Maritime Logistics and Shipping	22,200	\$1,479	\$5,212
Maritime Support Services	8,000	\$569	\$3,942
Recreational Boating and Boat Building	4,000	\$169	\$1,561
Shipbuilding, Repair and Maintenance	17,000	\$1,226	\$900
Passenger Water Transportation	2,300	\$138	\$394
Total	69,500	\$4,656	\$21,436

Sources: Washington State Employment Security Department, 2016; United States Census Bureau, 2014; Washington State Department of Revenue, 2016; Community Attributes Inc., 2016.

¹ “NAFTA Container Port Ranking 2015,” American Association of Port Authorities, 2016.

Taken together, Maritime’s six core subsectors directly supported an estimated 69,500 jobs in 2015, including covered and self-employed workers. Based on the same industry definition applied to 2012, employment in the industry increased by 2.6% per year, or a net increase of 5,300 jobs (**Exhibit E-2**).

Exhibit E-2. Maritime Sector Employment, Washington State, 2012-2015



Sources: Washington State Employment Security Department, 2016; United States Census Bureau, 2014; Community Attributes Inc., 2016.

Maritime Sector wage disbursements during the same period reflect a similar trend, growing from \$4.5 billion in 2012 (in 2015 \$) to \$4.7 billion in 2015, or a compound annual growth rate of 1.4% per year. The average wage was \$67,000 in 2015. (**Exhibit E-3**)

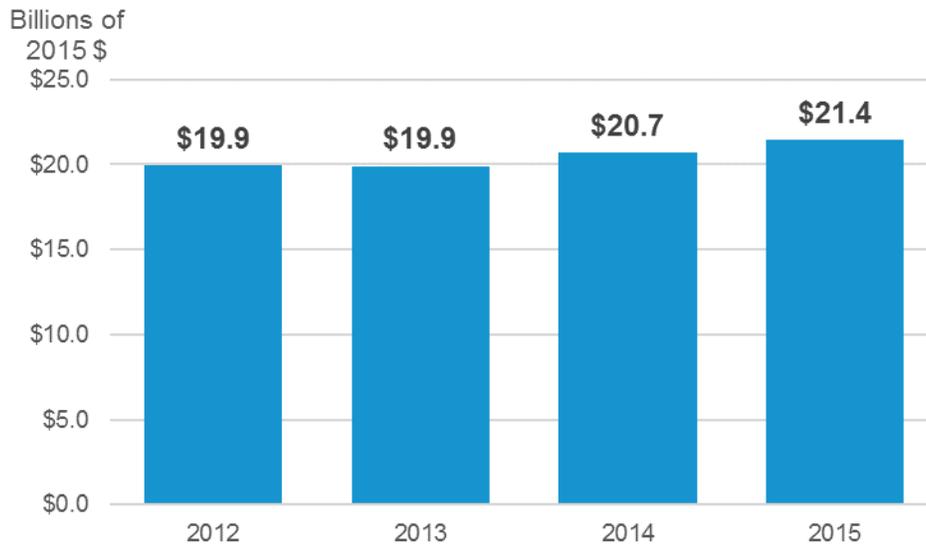
Exhibit E-3. Maritime Sector Wages, Billions of 2015 Dollars, Washington State, 2012-2015



Sources: Washington State Employment Security Department, 2016; United States Census Bureau, 2014; Community Attributes Inc., 2016.

Business revenue in Washington’s Maritime Sector grew by \$1.5 billion from 2012 to 2015. This metric does not include state, local, or federal government activities like the Puget Sound Naval Shipyard or ferries. (Exhibit E-4)

Exhibit E-4. Maritime Sector Business Revenue, Billions of 2015 Dollars, Washington State, 2012-2015



Sources: Washington State Employment Security Department, 2016; United States Census Bureau, 2014; Washington State Department of Revenue, 2016; Community Attributes Inc., 2016.

Economic Impacts

In 2015, Washington's Maritime Sector supported 69,500 direct jobs. Factoring in upstream support chain transactions (indirect effects) and maritime-related income expenditures (induced effects), the industry supported an additional 121,600 jobs elsewhere in the state economy; for every direct job in maritime, an additional 1.8 jobs were supported through secondary impacts. At the same time, every direct dollar in wages was associated with an additional \$1.1 in wages elsewhere in Washington. Maritime Sector activities also supported, through multiplier effects, \$37.8 billion business revenues across Washington. For every million dollars in industry revenue, the sector supported a total of 11 jobs throughout the state economy. (**Exhibit E-5**)

Exhibit E-5. Maritime Sector Economic Impacts, Washington State, 2015

	Direct	Indirect	Induced	Total
Jobs	69,500	44,500	77,100	191,100
Labor Income (mils 2015 \$)	6,097.4	2,554.3	3,882.4	12,534.1
Revenue (mils 2015 \$)	17,142.1	8,707.6	11,967.3	37,817.1

Sources: Washington State Employment Security Department, 2016; United States Census Bureau, 2014; Washington State Department of Revenue, 2016; Community Attributes Inc., 2016.

Note: Total revenue used for economic impact estimates includes an adjustment to wholesale industry revenue. This adjustment uses gross margins, which prevents the value of goods sold through wholesale from being counted more than once.

Washington's Maritime Sector is also an important contributor to state taxes. In 2015, the Maritime Sector paid \$119.3 million in direct state taxes. State taxes supported by secondary economic impacts, i.e., taxes based on business revenues supported through multiplier effects throughout the state economy, totaled an additional \$252.9 million in 2015. (**Exhibit E-6**)

Exhibit E-6. Maritime Sector Fiscal Impacts, Washington State, Millions, 2015

	Direct	Secondary	Total
B&O	\$46.5	\$78.2	\$124.7
Sales & Use Taxes	\$72.8	\$147.2	\$220.0
Other	\$0.0	\$27.4	\$27.4
Total	\$119.3	\$252.9	\$372.2

Sources: Washington State Employment Security Department, 2016; United States Census Bureau, 2014; Washington State Department of Revenue, 2016; Community Attributes Inc., 2016.

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INTRODUCTION

Background and Purpose

Maritime has long been a core component of Washington's economy. The industry's origins in Washington date back to the pioneering of the Columbia River, the construction of early 20th century industrial shipyards, and the opening and growth of northwest and Alaskan fisheries.

Maritime activities are diverse and cover a wide spectrum of skills and labor force needs. Activities within Washington include commercial and government shipbuilding, maintenance, and repair; recreational boating; Maritime Logistics and Shipping; Passenger Water Transportation; fishing and seafood processing; and Maritime Support Services, such as naval architecture and training.

The Washington Maritime Federation commissioned this update to the 2013 Maritime Sector Study. The purpose of this update was to: 1) refine the definition of the Maritime Sector in Washington; and 2) use this refined definition to provide updated data analytics and quantification of the industry through year 2015. Among the improvements to this study, the updated industry definition includes new detailed breakouts for recreational boating and recreational boat construction and new components added to the Maritime Logistics and Shipping subsector.² Analytics are intended to help stakeholders and the broader public learn about the breadth and economic impacts of maritime activities to the state economy, leveraging public data, interviews, and third party resources.

All time series data relating to the Maritime Sector illustrated in this report uses the updated 2015 sector definition.

Methodology

Analytics in this study rely on a variety of sources, ranging from state and federal datasets, interviews and small group industry leader discussions, existing reports, and news sources.

Data reported and the sources of information are as follows:

- Information on maritime firms, jobs, occupations and wages from the Washington State Employment Security Department (ESD) Quarterly Census of Employment and Wages (QCEW) dataset, including custom data summaries provided by ESD.
- Business revenue data from the Washington State Department of Revenue.

² For the complete 2013 and 2015 cluster definitions, please see the appendix.

- U.S. Census Bureau data on non-employers and imports and exports state of original and trade flows data for Washington state.
- Economic impacts are developed through use of the Washington State Input-Output Model, including estimates of the indirect and induced impacts of maritime activities to the state economy, reported as jobs, labor income, and business revenues.

Organization of Report

The report is organized as follows:

- **Sector Metrics.** An analysis of the jobs, employer establishments, revenue, and wages directly associated with maritime activities in Washington.
- **Maritime Subsectors.** A detailed investigation of maritime subsectors, including key metrics and the history of Washington's maritime subsectors.
- **Economic Impacts.** A discussion of the economic and fiscal impacts of Washington's maritime sector.
- **Conclusion.** Summary of key findings.

SECTOR OVERVIEW

Washington's Maritime Sector can be segmented into six key subsectors as illustrated in the industry map in **Exhibit 1**.

Shipbuilding, Repair and Maintenance. This category covers all commercial and federal boat and ship building, repair and maintenance activities. Washington manufacturers produce ferries, work boats, small craft, barges, and a wide array of specialized vessels. This category also covers activities at the Puget Sound Naval Shipyard (PSNS) and other government shipbuilding, repair and maintenance. PSNS leads federal employers in Washington state, with more than 13,000 people employed in 2015.

Recreational Boating and Boat Building. This subsector includes charter fishing activities around the state, recreational marinas, recreational boat manufacturing, retail boat dealers, and other related activities.

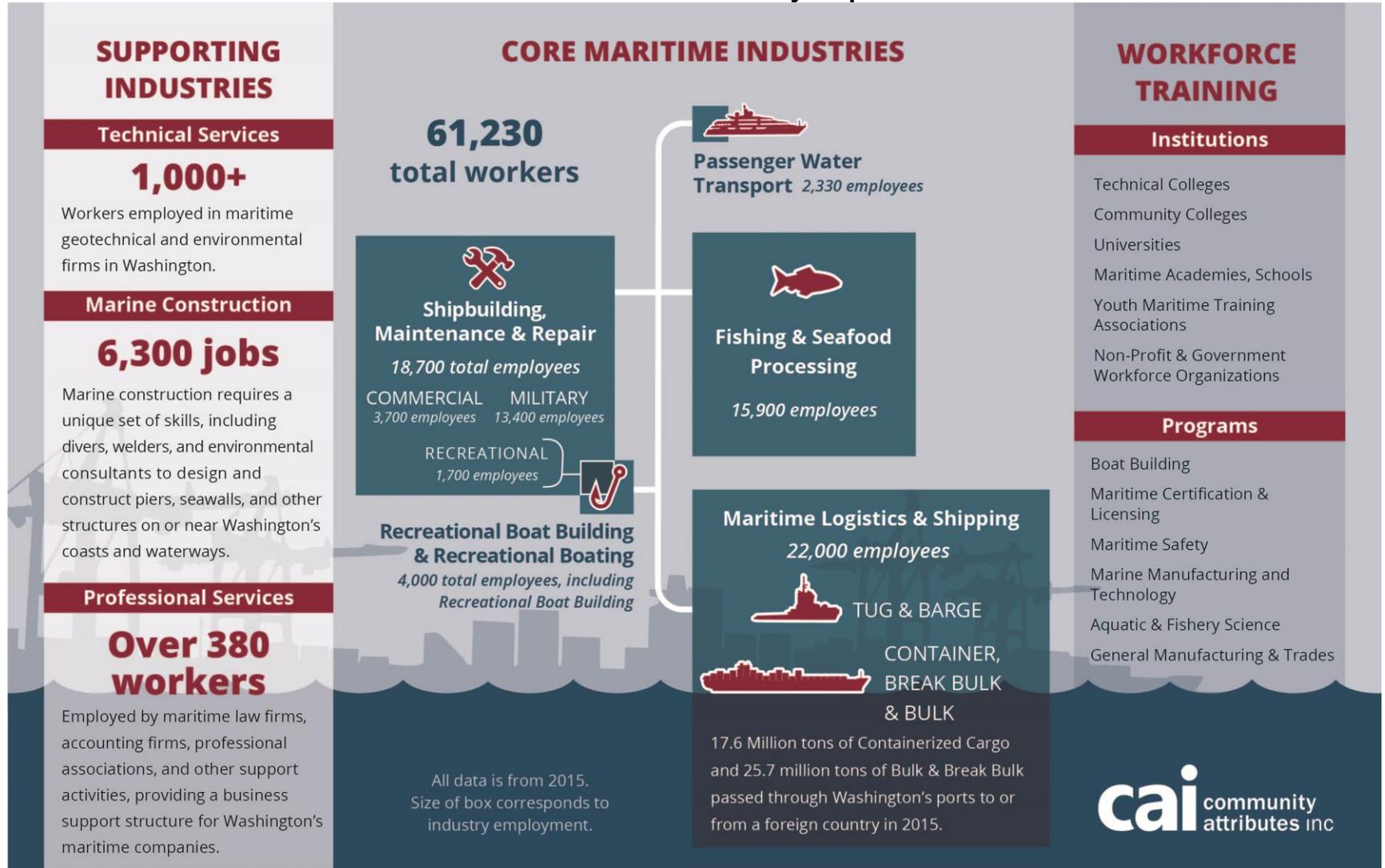
Commercial Fishing and Seafood Products. This category includes all activity related to the catching and processing of fish, including both finfish and shellfish. As fishing vessel owners continue to shift toward at-sea primary processing, this subsector continues to become more integrated. This category includes fishing and seafood processing that occurs on Washington vessels operating in Alaskan waters.

Maritime Logistics and Shipping. This subsector includes all activity related to the shipping of goods by water, including container and bulk goods. Trans-ocean, shoreline, and river freighting are included in this category, as is direct transportation by land to the state's ports for exports via water. For example, this category includes grain that is trucked to Tri-Cities for shipment via barge down the Columbia River. This category also includes tug operations and piloting services.

Passenger Water Transportation. This subsector includes all Passenger Water Transportation, including recreational transportation. This covers Washington's ferries as well as economic activities related to cruise ships. River and harbor cruises and boat tours are included in this category, as is most other scenic and sightseeing water transportation. The notable exception to this is charter fishing activities, which are included under the Recreational Boating and Boat Building category.

Maritime Support Services. Support services covers technical and professional maritime services, such as engineering and naval architecture, as well as business support, such as legal and accounting businesses and industry associations. Washington's maritime education organizations are also included in this subsector.

Exhibit 1. Maritime Sector Industry Map



Sources: Washington Maritime Federation, 2016; Community Attributes Inc., 2016.

Washington's maritime sector is primarily clustered around the Puget Sound, but with important nodes of activities across the state and along the Snake and Columbia rivers. Boat and Ship Building, Repair and Maintenance activities are centered in Kitsap, King, Pierce, Skagit, and Whatcom counties, with the largest number of workers based at the Puget Sound Naval Shipyard in Bremerton. Recreational Boat Building and Recreational Boating activities are also centered in King County, but also spread across the state's inland water resources as well as the Columbia River. Commercial Fishing and Seafood Processing activities are clustered primarily in the Greater Seattle area, but smaller seafood processing and aquaculture activities can be found elsewhere in the state.

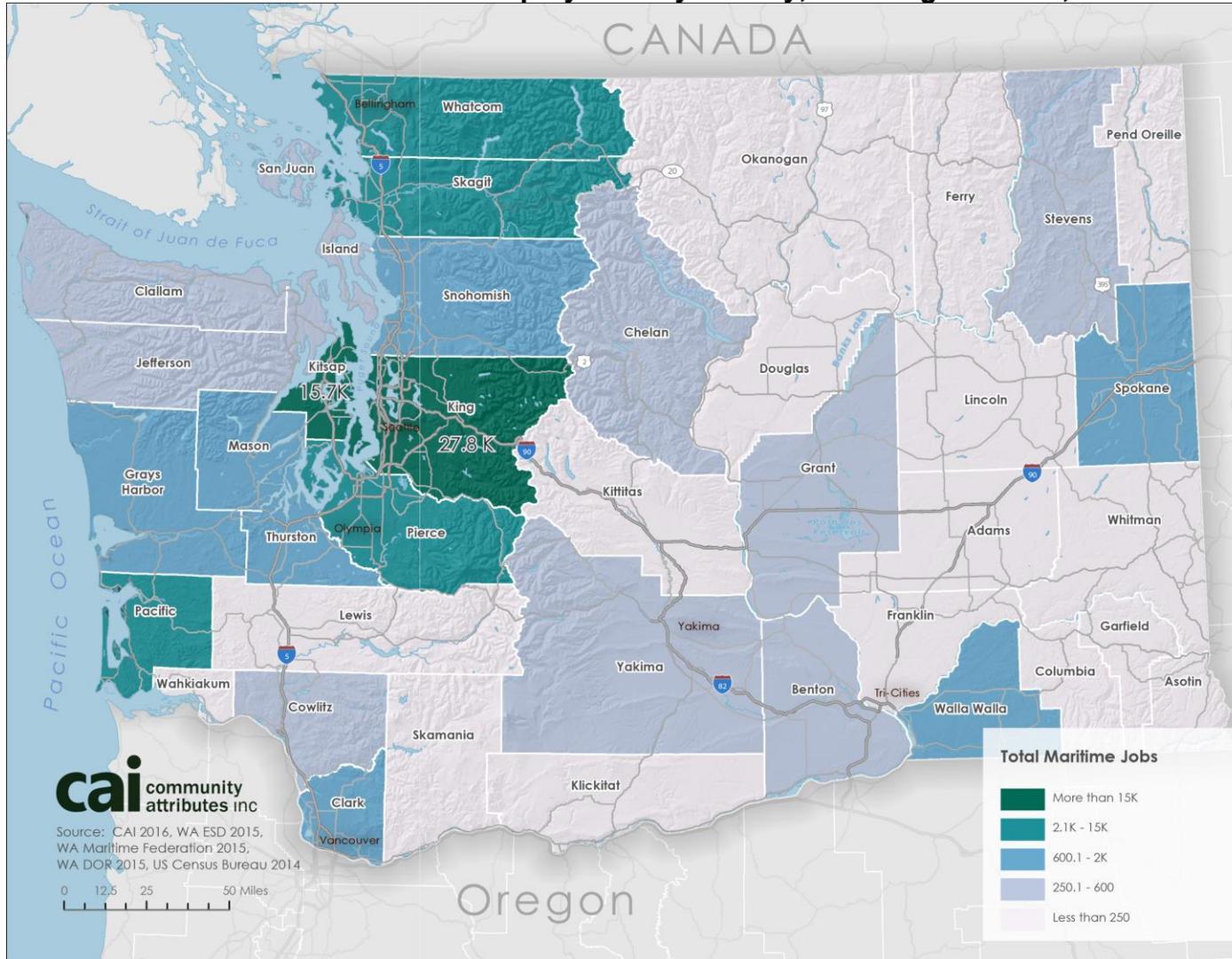
The Maritime Logistics and Shipping subsector extends into Eastern Washington with employment in rail and trucking activities directly related to the maritime sector. Rail networks extend across the state, with major railyards in Seattle, Tacoma, Centralia, Pasco, and Spokane. Rail is an essential component of Maritime Logistics and Shipping, facilitating the movement of marine cargo to and from the state's seaport terminals.

The Northwest Seaport Alliance—representing Washington's two major containerized ports—manages the movement of discretionary cargo traffic, i.e., imported containers destined for locations in the Midwest and elsewhere. Handling of this cargo supports many jobs and businesses within Washington, including among terminal operators, rail yards, and freight logistics businesses.

Passenger Water Transportation activities are concentrated in King and Kitsap Counties, and include the daily movement of Seattle area commuters by ferry as well as cruise ships embarking from Seattle. Maritime Support Services are a broader category that covers naval architecture, marine construction, geotechnical and environmental analysis, marine education, and associations. These businesses are spread across the state, though a large number are located in proximity to the maritime businesses they serve, e.g., maritime insurance brokers in Seattle.

(Exhibit 2)

Exhibit 2. Maritime Sector Employment by County, Washington State, 2015



Sources: Washington State Department of Revenue, 2015; Washington State Employment Security Department, 2015; United States Census Bureau, 2014; Washington Maritime Federation, 2016; Community Attributes Inc., 2016

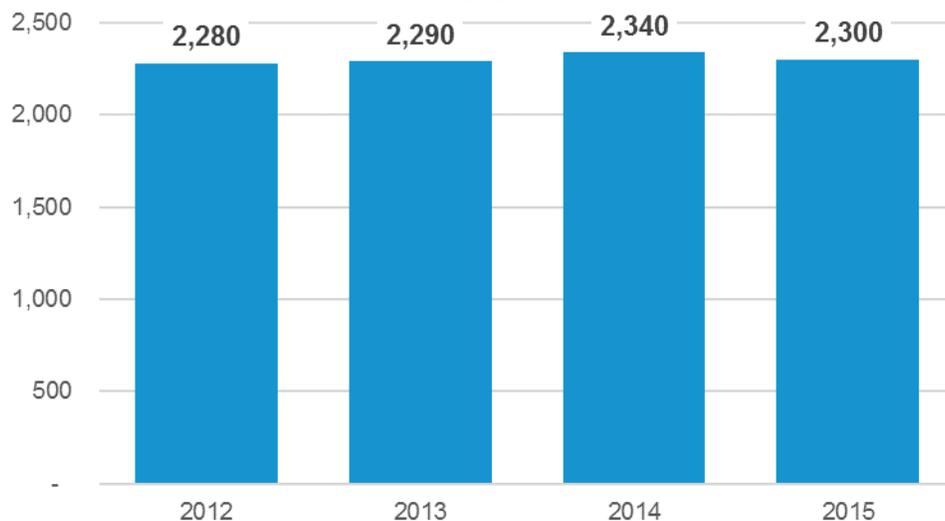
SECTOR METRICS

Washington's Maritime Sector is measured across the following metrics: 1) business establishments; 2) jobs, including covered workers (i.e., workers covered by the unemployment insurance system) and the self-employed; 3) wages; and 4) business revenues generated from maritime activities. This section presents key data summaries, both for 2015 and previous years to allow for historical comparisons.

Establishments

The total number of sector employer establishments have been relatively level since 2012, stabilizing between 2,280 (2012) to 2,340 (2014); establishments in 2015 fell slightly, to 2,300. While total employment in Washington's Maritime Sector has grown at a compound annual growth rate (CAGR) of 2.6%, the number of employer establishments in the industry has grown at a CAGR of 0.3%. This indicates that sector growth is primarily due to growth within existing maritime companies and not due to new entrants into the Maritime Sector. (Exhibit 3)

Exhibit 3. Maritime Employer Establishments, Washington State, 2012-2015

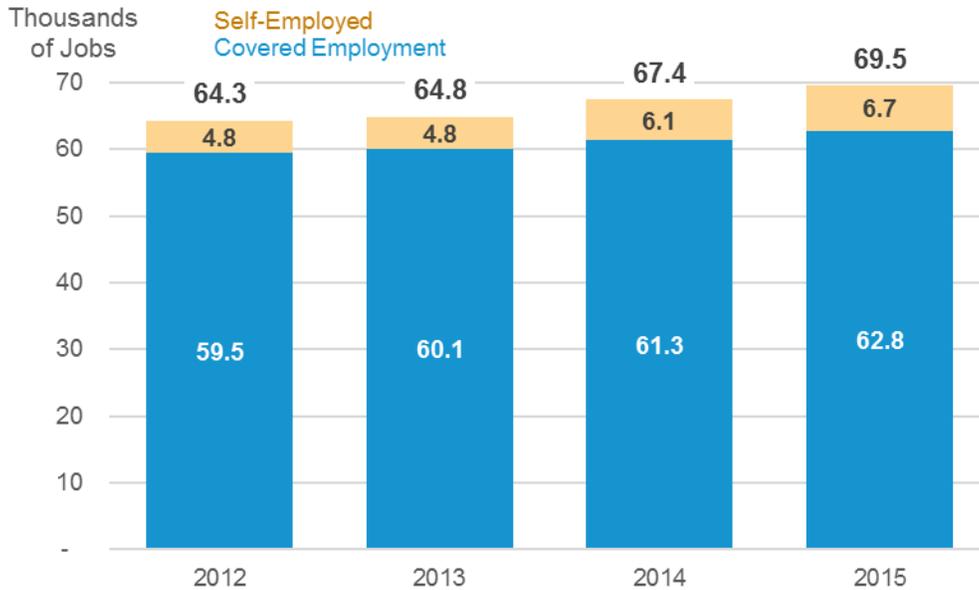


Sources: Washington State Employment Security Department, 2016; Community Attributes Inc., 2016.

Jobs

From 2012 to 2015, total employment in Washington’s Maritime Sector grew by 5,200 jobs, or approximately 2.6% per year over this period. A large share of this growth occurred through the addition of 1,900 self-employed workers from 2012 to 2015. Most of these self-employed workers were in the Commercial Fishing and Seafood Processing subsector.³ (Exhibit 4)

Exhibit 4. Maritime Employment and Self-Employed, Washington State, 2012-2015



Sources: Washington State Employment Security Department, 2016; United States Census Bureau, 2014; Community Attributes Inc., 2016.

In 2015, Washington’s largest maritime subsector by total employment was the Maritime Logistics and Shipping subsector, with 22,200 jobs, including 1,200 self-employed workers. This subsector grew at a CAGR of 1.3% from 2012 to 2015. Shipbuilding, Repair and Maintenance was the next-largest subsector. In 2015, the subsector employed 17,000 workers in commercial and federal activities, not including recreational boat builders (an additional 1,700 jobs in 2015). There are

³ From 2012 to 2015, 1,860 more finfish and shellfish fishing workers were classified as self-employed. This is not necessarily due to the addition of new workers, and may be caused by an exemption from Unemployment tax for fishing vessel crew wages that went into effect July 27, 2013. Under the law, an employer that operates a boat with fewer than 10 workers who are paid by receiving a share of the boat’s catch, then that employer does not have to report these employees for Unemployment Insurance Tax purposes unless they voluntarily elect to do so. These workers may then be classified as self-employed workers instead of covered employees after the law went into effect.

fewer than 100 self-employed workers in the Shipbuilding, Repair and Maintenance subsector. (**Exhibit 5**)

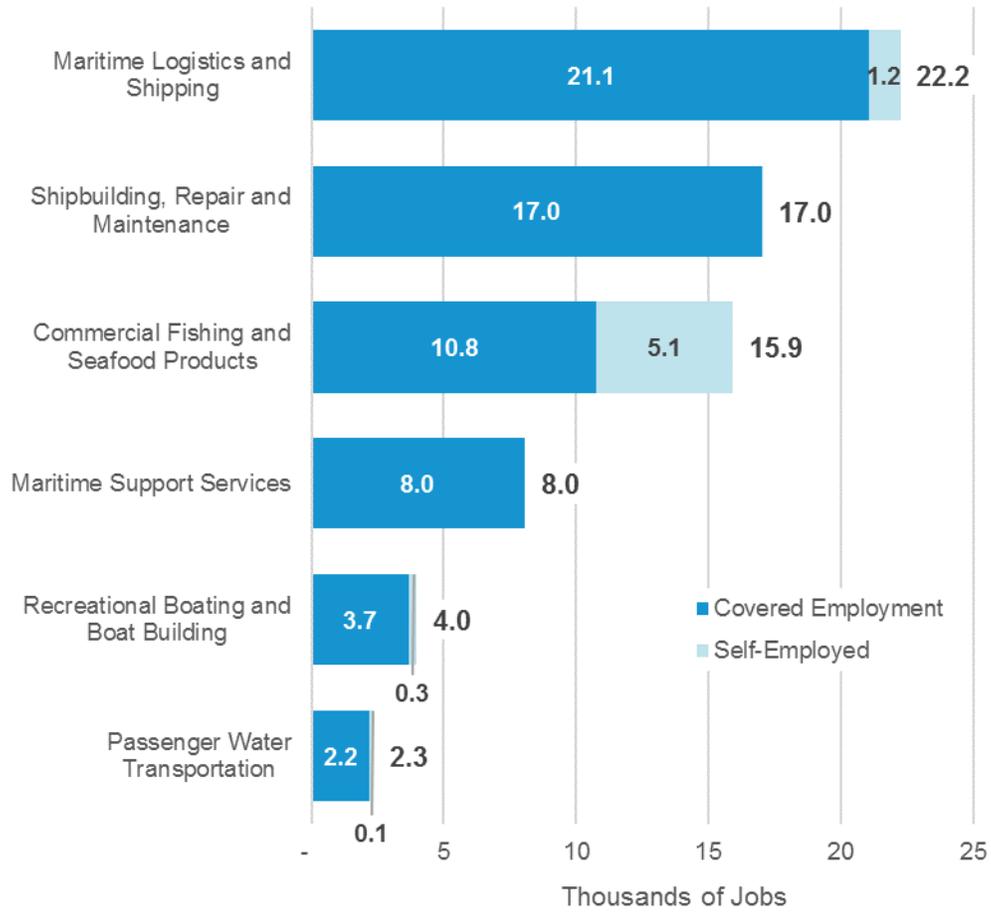
The Commercial Fishing and Seafood Products subsector had the highest number of self-employed workers in 2015 with more than 5,100. Together with 10,800 covered employees, the subsector counted 15,900 total workers in 2015. Maritime Support Services is a broad category that covers geotechnical and environmental firms, maritime education and training, naval architecture, and other support activities. In 2015, this subsector employed 8,000 workers, less than 100 of which were self-employed.

Recreational Boat Building and Recreational Boating includes recreational boat builders (1,700 workers in 2015), chartered fishing, recreational marinas, retail boat dealers, and scenic and sightseeing transportation. This subsector employed 4,000 workers in 2015, 300 of whom were self-employed.

Passenger Water Transportation is the smallest maritime subsector by total employment, but is a critical asset for both tourism and daily commuting for many workers within the Puget Sound region. The category includes the state's ferries, which constitute the state's water highway for commuters.

The subsector also includes deep sea passenger transportation, which is primarily cruises. In 2015, just under one million cruise passengers visited Seattle, many of whom were from outside the state and spent disposable income hotels, restaurants, and other services in Seattle either before or after their cruise embarkations. (**Exhibit 5**)

Exhibit 5. Maritime Subsector Employment and Self-Employed, Washington State, 2015



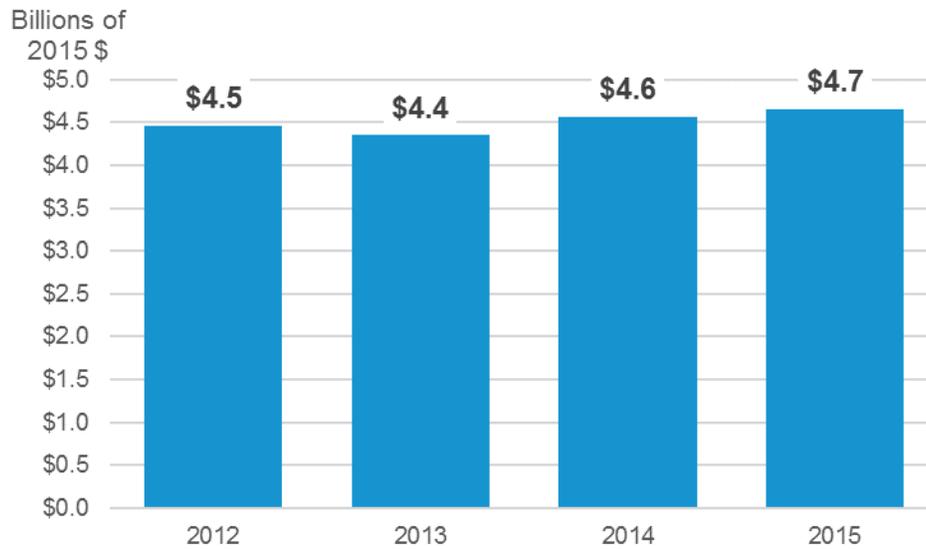
Sources: Washington State Employment Security Department, 2016; United States Census Bureau, 2014; Community Attributes Inc., 2016.

Note: Maritime Support Services and Shipbuilding, Repair and Maintenance each had fewer than 100 self-employed workers in 2015.

Wages

From 2012 to 2015, industry wage and salary outlays increased, in inflation-adjusted terms (2015 \$), by \$200 million, from \$4.5 billion to \$4.7 billion. This increase represents a compound annual growth rate (CAGR) of 1.4%. (**Exhibit 6**)

Exhibit 6. Maritime Wages, Billions of 2015 Dollars, Washington State, 2012-2015

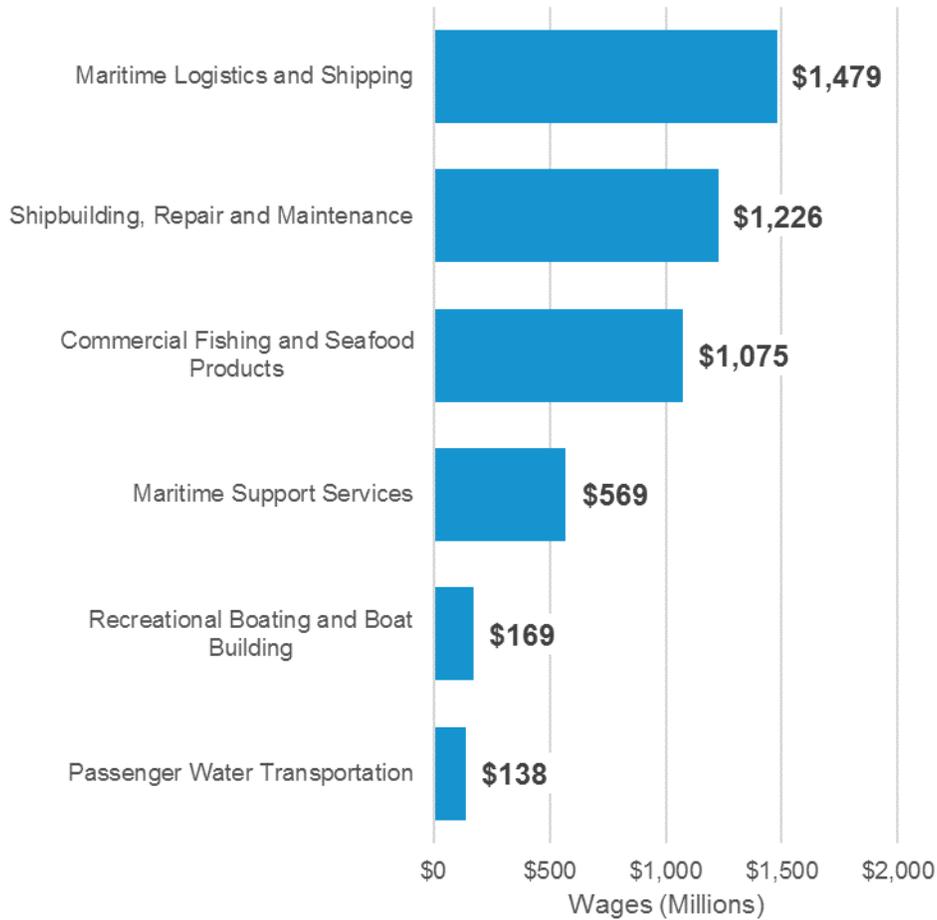


Sources: Washington State Employment Security Department, 2016; United States Census Bureau, 2014; Community Attributes Inc., 2016.

The largest source of wage and salary outlays in 2014, due its size, was the Maritime Logistics and Shipping, with wage disbursements of than \$1.5 billion. The Shipbuilding, Repair and Maintenance subsector paid more than \$1.2 billion in wage and salary outlays. The Commercial Fishing and Seafood Products subsector also paid more than \$1.0 billion in wages, including income to self-employed workers in this category. While most these jobs occur at sea for up to 10 months throughout the year, many of these workers operate on vessels based out of Seattle and spend a large share of their income locally after returning from a fishing season.

Maritime Support Services paid \$569 million in 2015. Maritime law and accounting firms, geotechnical experts, and naval architecture companies were the largest sources of income this category. The Recreational Boat Building and Leisure Services subsector paid \$169 million in wages in 2015, and the Passenger Water Transportation subsector paid \$138 million. (**Exhibit 7**)

Exhibit 7. Maritime Wages, Millions of Dollars, Washington State, 2015



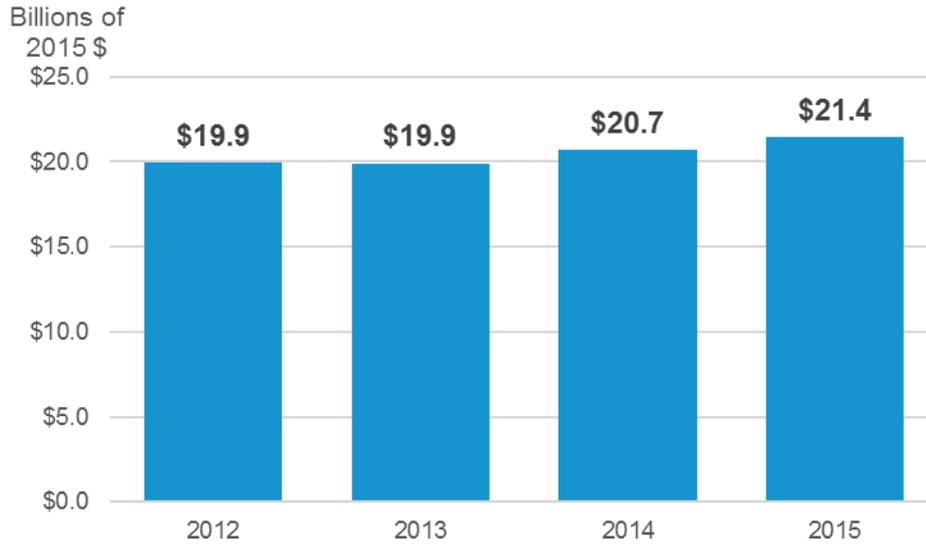
Sources: Washington State Employment Security Department, 2016; United States Census Bureau, 2014; Community Attributes Inc., 2016.

Business Revenue

Businesses revenues reflect output generated by private sector operations, both among employers and sole proprietorships. Estimates therefore do not include the economic value of federal and state activities, most notably the Puget Sound Naval Shipyard and Washington's ferry system. However, they are important measure of the wealth generated by the industry, and an important input into subsequent economic impact modeling later in this report.

From 2012 to 2015, statewide Maritime Sector business revenue increased by \$1.5 billion, adjusted for inflation, from \$19.9 billion (2015 \$) in 2012 to \$21.4 billion in 2015, representing a CAGR of 2.4%. (**Exhibit 8**)

Exhibit 8. Maritime Business Revenue, Billions of 2015 Dollars, Washington State, 2012-2015

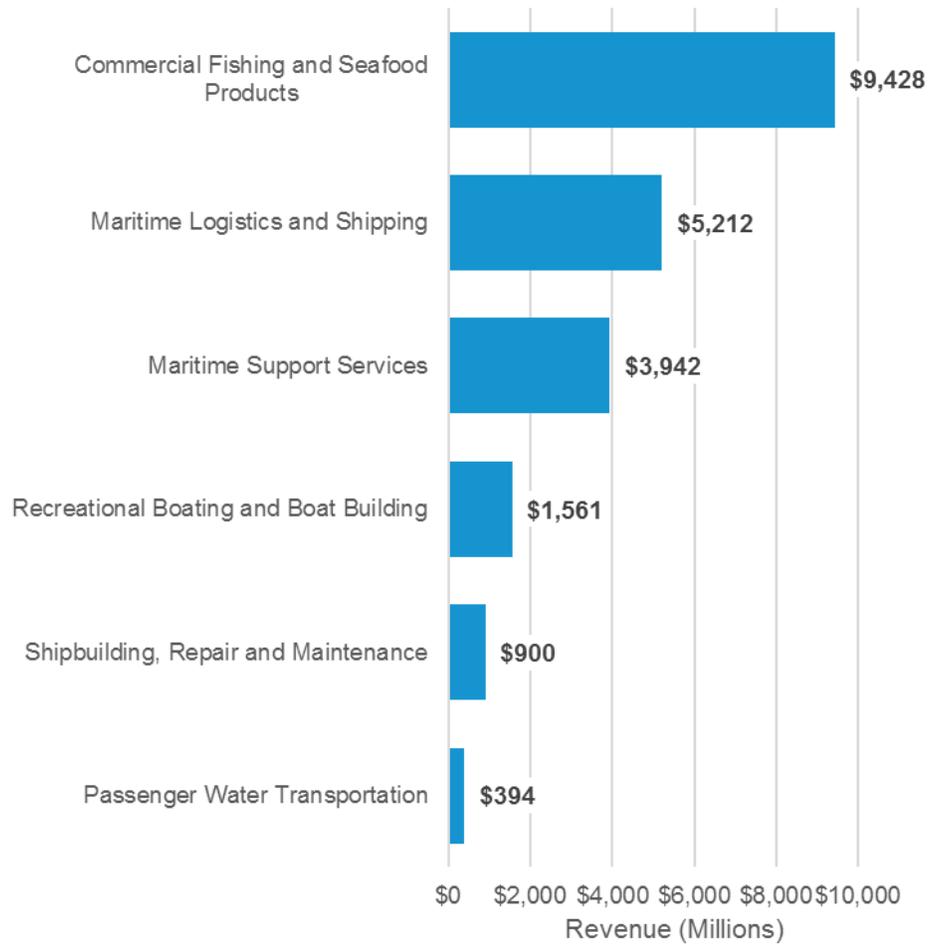


Sources: Washington State Department of Revenue, 2016; Washington State Employment Security Department, 2016; United States Census Bureau, 2014; Community Attributes Inc., 2016.

Business revenues by maritime subsector business revenue are presented in **Exhibit 9** below. As discussed above, the Shipbuilding, Repair and Maintenance revenue estimate does not reflect the value of shipbuilding activities at the Puget Sound Naval Shipyard, which employs 79% of the subsector’s workforce. Additionally, Washington’s Ferries, which are included under Passenger Water Transportation, do not support business revenues, as they are run by the government. These entities do not receive business revenue, but do receive funding from public sources.

From 2012 to 2015, the subsector with the fastest revenue growth rate was Maritime Logistics and Shipping, which grew at a CAGR of 5.2% (adjusted for inflation). The subsector with the second-fastest growth rate was Recreational Boat Building and Leisure Services, which increased at a CAGR of 4.6%.

Exhibit 9. Maritime Business Revenue, Millions of Dollars, Washington State, 2015



Sources: Washington State Department of Revenue, 2016; Washington State Employment Security Department, 2016; United States Census Bureau, 2014; Community Attributes Inc., 2016.

MARITIME SUBSECTORS

Shipbuilding, Repair and Maintenance

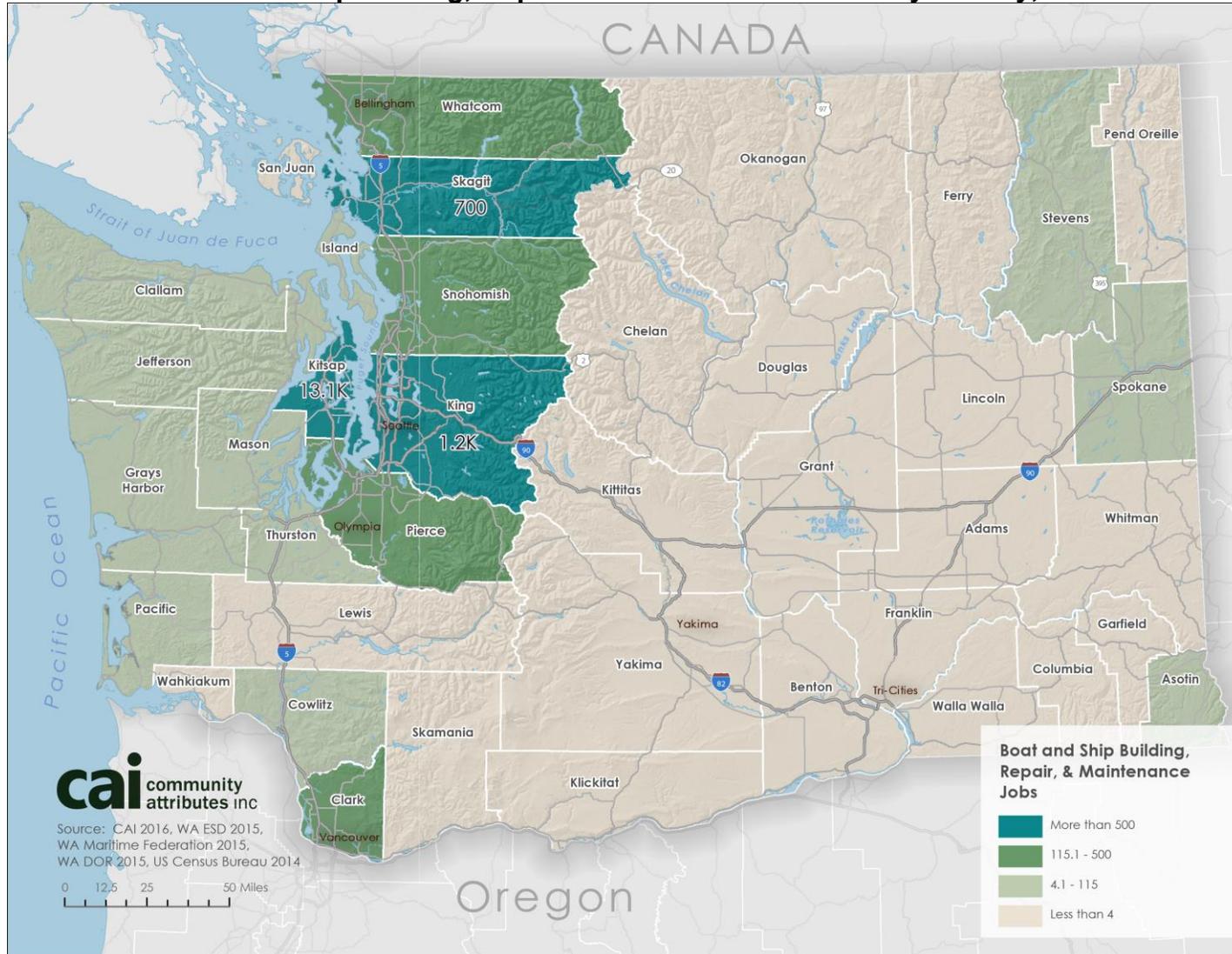
Shipbuilding, Repair and Maintenance covers new construction of commercial and government vessels as well as maintenance and repair of existing vessels. This category does not include recreational boat manufacturers, which are included under Recreational Boat Building and Recreational Boating and employed a total of 1,700 workers in 2015. Commercial & Federal Shipbuilding, Repair and Maintenance accounts for an additional 17,000 jobs. Together, the two categories of boat and ship building, repair and maintenance total 18,700 employees.⁴

Kitsap County, home of the **Puget Sound Naval Shipyard**, had the highest Shipbuilding, Repair and Maintenance subsector employment in 2015, totaling more than 13,400 jobs. King County had the second-highest employment in this category, 1,200 employees. King County is home to a large number of commercial boat and ship manufacturers as well as repair and maintenance activities.

However, boat manufacturing activities can be found outside of the Puget Sound, as far east as Stevens and Spokane Counties. Colville-based **Raider Boats** manufactures small fishing boats and sea touring guide boats, and Spokane-based **Metalite Marine** manufactures work platforms, barges, maintenance boats, work boats, and pin barges. (**Exhibit 10**)

⁴ Recreational boat builders are primarily discussed in the Recreational Boating and Sport Fishing subsector; the 1,700 recreational boat building jobs are not included in subsequent job totals in the Shipbuilding, Repair and Maintenance subsector section.

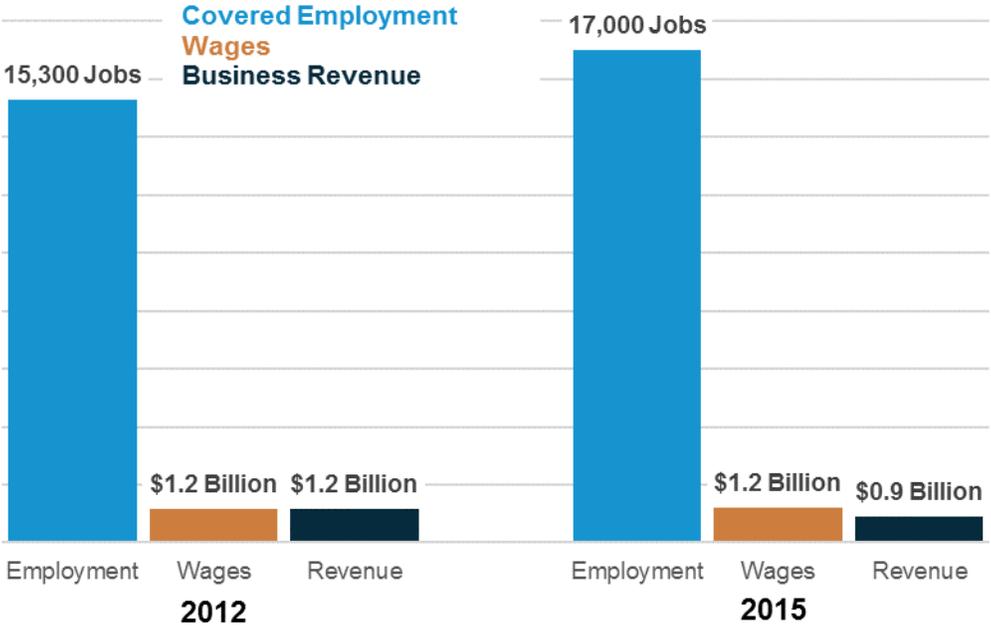
Exhibit 10. Shipbuilding, Repair and Maintenance Jobs by County, 2015



Sources: Washington State Department of Revenue, 2015; Washington State Employment Security Department, 2015; United States Census Bureau, 2014; Washington Maritime Federation, 2016; Community Attributes Inc., 2016.

Overall, the Shipbuilding, Repair and Maintenance subsector employed a total of 17,000 people, paid wages totaling \$1.2 billion, and supported \$0.9 billion in business revenues in 2015. Based on the number of people employed at the Puget Sound Naval Shipyard in 2015, if the shipyard was a private operation it would generate the equivalent of approximately \$4.6 billion in business revenues. (Exhibit 11).

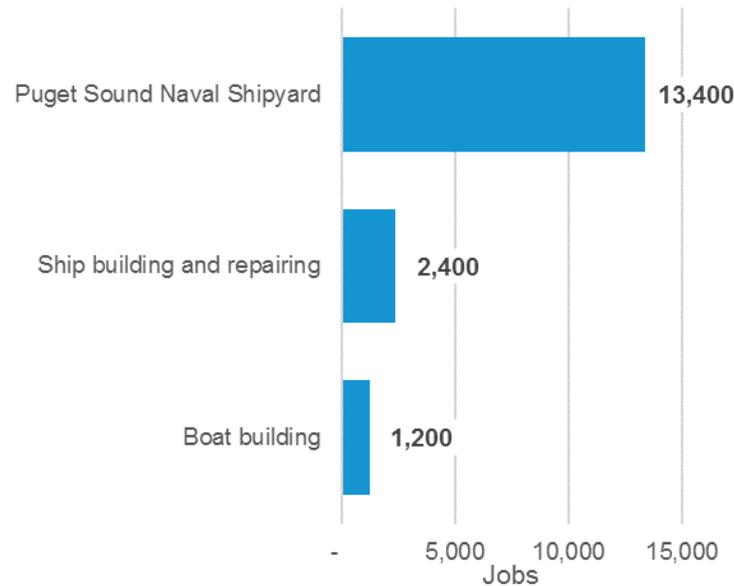
Exhibit 11. Shipbuilding, Repair and Maintenance Jobs, Business Revenue (2015\$), and Wages (2015\$), 2012 and 2015



Sources: Washington State Department of Revenue, 2016; Washington State Employment Security Department, 2016; United States Census Bureau, 2014; Community Attributes Inc., 2016.

The Puget Sound Naval Shipyard is the largest single source of employment in this subsector, with 13,400 employees in 2015. Ship building, the next-largest category, employed 2,400 people in 2015. Boat building employed an additional 1,200 people in 2015. As discussed previously, recreational boat builders are counted in the Recreational Boat Building and Leisure Services category, and totaled 1,700 employees in 2015. (Exhibit 12)

Exhibit 12. Shipbuilding, Repair and Maintenance Subsector Employment, 2015



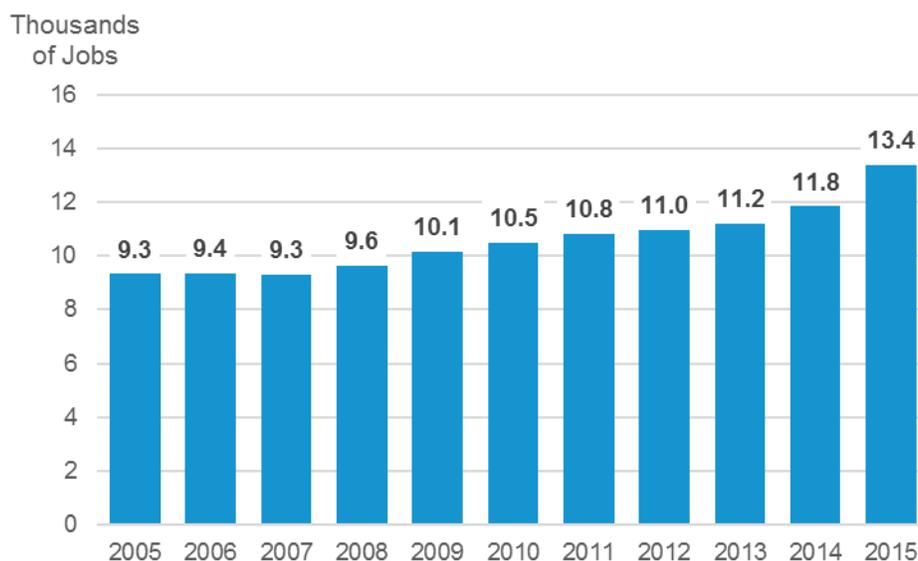
Sources: Washington State Department of Revenue, 2016; Washington State Employment Security Department, 2016; United States Census Bureau, 2014; Community Attributes Inc., 2016.

Puget Sound Naval Shipyard

Puget Sound Naval Shipyard (PSNS) is an important economic contributor to the Puget Sound region. The shipyard can trace its history back 125 years to a 145-acre shipyard established in 1891. Since then, the shipyard has experienced several boom cycles, including a major expansion at the onset of WWII. At the height of WWII, the shipyard employed more than 30,000 workers in support of the war effort. In 2015, PSNS employed just under 13,400 people and paid more than \$1 billion in wages (Farley & Friedrich, 2016).

From 2005 to 2015, the shipyard has grown from 9,300 to roughly 13,400 civilian Department of Defense workers, representing a CAGR of 3.7% (**Exhibit 13**).

Exhibit 13. Federal Civilian Ship & Boat Building Employment in Washington, 2005-2015



Source: Bureau of Labor Statistics, 2016.

Today, the 179-acre site is one of Washington’s largest industrial complexes. PSNS houses repair and maintenance sites for nuclear aircraft carriers and has the capabilities to perform maintenance on nearly every class of active U.S. Navy vessel. In addition to federal employees, the shipyard also works with many of the region’s defense contractors. These contractors provide material shipbuilding supplies and engage in direct maintenance on non-nuclear systems, such as on vessel superstructures (including aircraft carriers).

PSNS is not the only government ship building, repair and maintenance entity. Washington’s ferry system is a public transportation option essential to many of the state’s workers. The state’s ferries also require upkeep like any other ship, undergoing regular maintenance, refueling, engine lubrication, marine painting, and other essential upkeep tasks. In 2015, Washington’s fleet of ferries transported 23.9 million passengers.⁵

Commercial and Industrial

Washington is also home to numerous commercial shipbuilding, repair and maintenance companies. These businesses construct and repair ferries, tugboats, fireboats, barges, and fishing vessels. These firms are primarily concentrated in the Puget Sound region, with several major builders in Seattle and Tacoma. Companies that are primarily involved in recreational boat manufacturing, such as yacht builder Westport Yachts, are included later in this report. In 2015,

⁵ For more information on the state’s ferries, please see the Passenger Water Transportation Section.

recreational boat builders employed approximately 1,720 workers. Examples of leading commercial and industrial builders in this subsector include:

- **Vigor Industrial** employs more than 2,500 workers in the Pacific Northwest and Alaska. The company builds fishing boats, tugs, ferries, barges, fireboats, naval craft, and aluminum workboats for commercial and government clients. With 12 locations, Vigor is one of the Pacific Northwest's largest boat builders. In addition, Vigor is equipped to engage in maintenance, repair, and overhaul activities. Vigor's footprint in Washington is significant: the company has locations in Seattle, Tacoma, Everett, Vancouver and Port Angeles.
- Anacortes-based **Dakota Creek Industries** is a shipbuilding and repair company equipped to accommodate vessels up to 450 feet in length and 9,000 metric tons. The company was founded in 1975 in Blaine and moved to its current location at the Port of Anacortes in 1977. The company is currently building a 161.8-foot fishing vessel for Fisherman's Finest. The vessel is designed for catching and producing frozen-at-sea white fish products and it will operate in the North Pacific Gulf of Alaska, Chukchi Sea, and Bering Sea.
- **SAFE Boats International** manufactures aluminum boats to military, federal, state and local law enforcement, and fire and rescue agencies. The company was founded in 1997, and has since developed and marketed vessels with durability and safety as its main goal. SAFE Boats uses a proprietary foam collar system on its small craft, making them more durable than comparable rubber or aluminum air collar vessels. Today, SAFE Boats' crafts serve the U.S. Coast Guard, U.S. Border Patrol, U.S. Navy, law enforcement agencies, and foreign nations.
- Arlington-based **Harman Canoe & Boat Building** is a small canvas-covered canoe builder. All the boats and canoes from Harman are handmade to order, and the firm also repairs other wooden boats and canoes.

Boat and Ship Building Exports

In 2015, \$403.0 million worth of Washington-manufactured boats and ships were exported across the globe. Washington's top export market for this category of products in 2015 was Singapore, due to a single large purchase of a floating or submersible drilling or production platform. From 2012 through 2014, exports of Washington-manufactured boats and ships averaged \$112.5 million per year.

(Exhibit 14)

Exhibit 14. Boat and Ship Building Exports from Washington, Millions of Dollars, 2015



Sources: U.S. Census Bureau, 2015; Community Attributes Inc., 2016.

Impacts of Maritime in the Ballard-Interbay Industrial Area

Seattle’s maritime businesses are heavily concentrated around the Port of Seattle’s marine freight terminals, but a large number of maritime companies can also be found in the Ballard-Interbay area. Fishing vessels pass through the Chittendon Locks and reach the Port of Seattle’s Fisherman’s Terminal in Salmon Bay. The bay is home to a number of maritime businesses, including fuel providers, shipyards and boatyards, supply companies, and seafood processors.

Many of these businesses have been part of the area’s business landscape for many years, such as **Ballard Oil**. Ballard Oil has been a home heating oil and marine fuel provider since 1937. The company’s location on the Lake Washington Ship Canal allows it to serve fishing vessels on their way out to sea, providing diesel fuel, lubricants, hydraulic oils, and filters to much of the region’s fishing fleet.

Covich-Williams Co. is another marine fuel provider in Ballard. Covich-Williams also provides lubricants, filters, and sorbents—materials that soak up oil, typically used after an oil spill—for commercial marine operators.

The **Lake Union Drydock Company (LUDD)** is another example of a maritime business in the Ballard-Interbay area. LUDD is a shipyard specializing in ship

repair. The business' 12-acre facility can drydock vessels up to 6,000 tons and roughly 420 feet in length. LUDD's technical ship repair services include welding, pipe systems repair, sandblasting and pressure washing, propeller system repair, hydraulic repair, electrical installations and repair, among others.

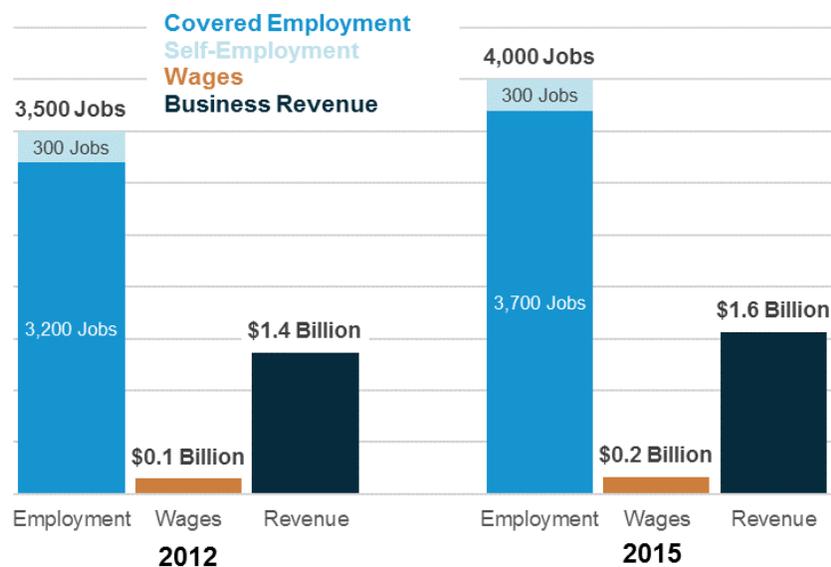
CSR Marine has two full-service boatyards: one in the Seattle Ballard-Interbay area and one in Des Moines. The company provides haul-out services for vessels up to 75 feet and 70 tons and full service vessel repair. Recent projects include pleasure craft restoration, collision repair on a sailboat, and thruster repair.

Recreational Boating and Boat Building

The state's recreational boat manufacturing, maintenance, and repair companies are supported by the same ecosystem of suppliers and professional services that benefit Washington's commercial and military boat builders; in many cases, firms participate in both recreational and commercial manufacturing. Recreational marinas, retail boat dealers, and waterborne scenic and sightseeing companies are also included in this category. In 2015, there were more than 400 employer establishments directly involved in the Recreational Boating and Boat Building subsector.

From 2012 to 2015, this subsector added roughly 500 jobs, growing from 3,500 to 4,000 employees. At the same time, subsector revenue increased from \$1.4 billion to \$1.6 billion. The subsector's growth from 2012 to 2015 was one of the fastest in the Maritime Sector, with a compound annual employment growth rate of 4.1% compared to 2.6% for the sector as a whole. (Exhibit 15)

Exhibit 15. Recreational Boat Building and Leisure Services Jobs, Business Revenue, and Wages, 2012 and 2015



Sources: Washington State Department of Revenue, 2016; Washington State Employment Security Department, 2016; United States Census Bureau, 2014; Community Attributes Inc., 2016.

Ways of Measuring Recreational Boating

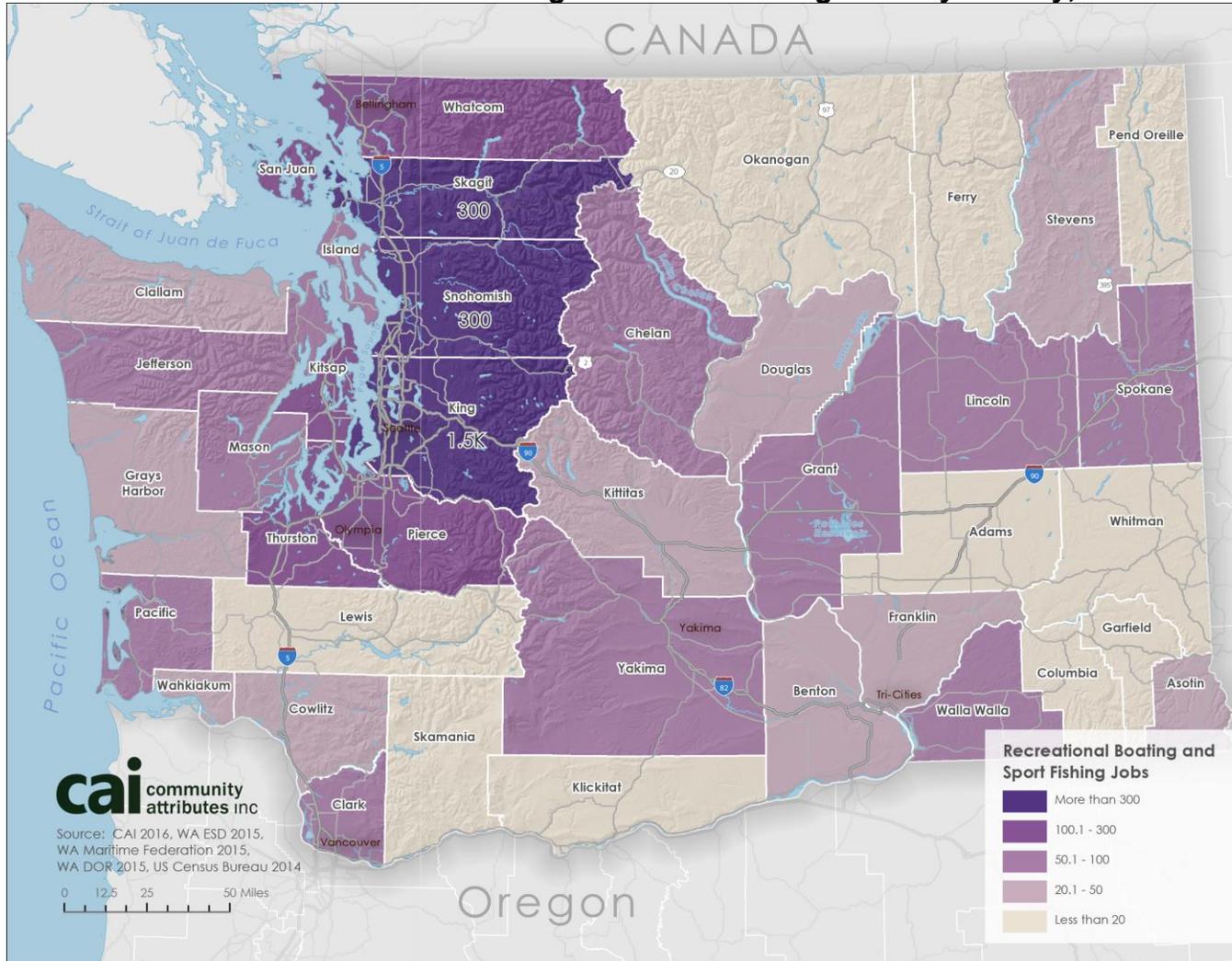
Recreational boating and boat building is an important industry in Washington. This report focuses on recreational boating and boat building industry activities, i.e., the activities of businesses in the recreational boating and boat building subsector. However, there are alternative ways to quantify this subsector.

A 2012 study published by the National Marine Manufacturers Association (NMMA) found that recreational boating supported **12,600 direct jobs** in Washington, based on a broader definition. The NMMA study considers the impacts of recreational boaters, rather than the stricter industry-based definition in this report that focuses on the hiring and direct spending of recreational boating and boat building businesses. As a result, the NMMA study reports wider impacts of this subsector, such as boat owner spending at local retail businesses and includes some upstream suppliers in its direct impacts, such as engine manufacturers. For a complete review of the differences between this analysis and the broader NMMA study, please see the appendix. (National Marine Manufacturers Association, 2013)

Examining the secondary economic impacts of the Recreational Boating and Boat Building subsector in detail, every direct job in the subsector supports an additional 1.1 jobs in other industries across the state. Total employment impacts for the subsector were 8,300 jobs in 2015, or 4,000 direct subsector jobs and 4,300 indirect and induced jobs. The subsector's revenue impacts in 2015 were also significant, supporting a total of \$725.3 million in business revenue in other industries across Washington. Recreational Boating and Boat Building businesses in Washington have secondary impacts in the state's construction, wholesale and retail trade, finance and petroleum products industries, among others.

Recreational Boating and Boat Building subsector jobs are concentrated in King County. The county is home to a large number of boat dealers, including like Seattle Boat Company, Waypoint Marine Group, and Seattle Water Sports; scenic and sightseeing water transportation; and recreational boat building, repair and maintenance firms like Delta Marine, Olsson Manufacturing, and Jensen Motor Boat Company. Recreational marinas and boat dealers extend across Puget Sound, with additional employment located on the Olympic Peninsula. (**Exhibit 16**)

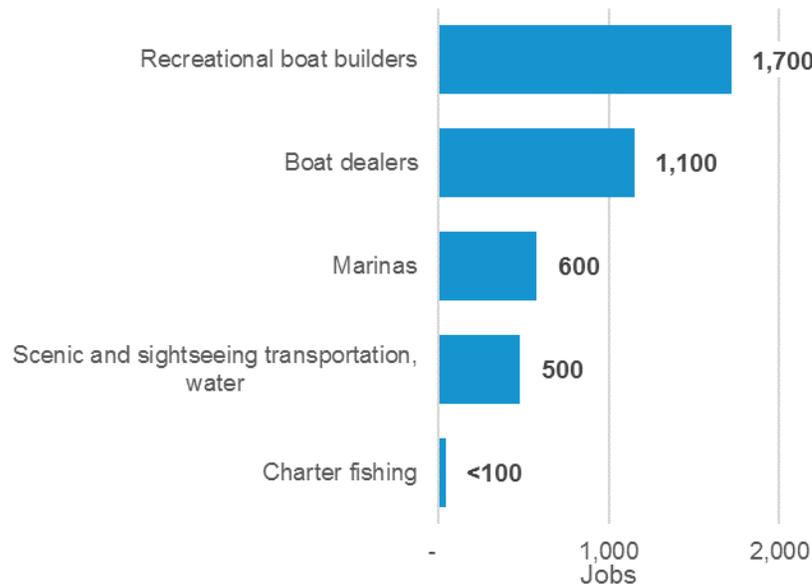
Exhibit 16. Recreational Boating and Boat Building Jobs by County, 2015



Sources: Washington State Department of Revenue, 2015; Washington State Employment Security Department, 2015; United States Census Bureau, 2014; Washington Maritime Federation, 2016; Community Attributes Inc., 2016.

Recreational boat builders constitute the largest share of this subsector with 1,700 jobs in 2015. Boat dealers, retail companies that sell boats ranging from small fishing boats to yachts, employed approximately 1,100 workers in 2015. Recreational marinas across the state accounted for an additional 600 workers, and Washington’s charter fishing companies employed fewer than 100 workers⁶. (Exhibit 17)

Exhibit 17. Recreational Boating and Boat Building Subsector Employment, 2015



Sources: Washington State Department of Revenue, 2016; Washington State Employment Security Department, 2016; United States Census Bureau, 2014; Community Attributes Inc., 2016.

Yacht Manufacturing and Support

Washington is home to many recreational boat manufacturers, including several yacht manufacturers. Westport Yachts, Delta Marine, and the Nordlund Boat Company are three of the state’s largest yacht builders, producing yachts for clients across the globe. Industry stakeholders indicated that global demand for yachts has increased dramatically in the past 10 years, especially for large vessels. This increased demand has resulted in full build schedules and waitlists for several of Washington’s yacht builders, and—according to stakeholder feedback—outlook for the coming years is reportedly very strong. Examples of recreational boat builders in Washington include the following:

⁶ Notably, companies that engage in charter fishing and scenic and sightseeing water transportation may be recorded in either category; the charter fishing category alone does not describe the full range of charter fishing activities in Washington

- **Westport Yachts** is a custom yacht builder with facilities in Westport and Port Angeles. The company is the largest yacht builder in North America with more than 100 recreational yachts manufactured to date. Westport Yacht's luxury vessels range in size from 34 to 50 meters in length. The company has also produced a variety of commercial vessels, including 170 fishing vessels and 35 commercial passenger vessels.
- Located in Seattle, **Delta Marine** constructs custom luxury yachts in its covered manufacturing facility. The company also offers engineering and design services, providing the full range of support for the company's clients.
- Tacoma-based **Nordlund Boat Company** is a family-owned-and-run boatyard that constructs custom yachts. Over the past two years, the company has launched two 106-foot vessels, one 111-foot vessel, and one 115-foot vessel.

Case Study: LaCasse Maritime

Washington has many yacht manufacturers, but the state is also home to a global yacht support agency. **LaCasse Maritime** is a Washington-based company that provides a full range of support for the world's yachts, including:

- **Global crew agency.** LaCasse draws from a database of 40,000 qualified yacht crew globally to help staff vessels in any major port in the world.
- **Fueling.** Fueling a yacht can cost anywhere from \$6,000 for a small vessel to \$650,000 for some of the world's largest yachts. A smaller vessel can take on 4,000-5,000 gallons of fuel and a large yacht can take up to 200,000 gallons in a single port call. LaCasse handles the purchasing and logistics involved in refueling a vessel, but they do not do the refueling itself.
- **Provisioning.** Provisioning a yacht can be an expensive endeavor: a 140-foot yacht, for example, can have eight to 10 crew members living on it year-round. Those crew members need to be fed, at port and at sea. When owners and guests are aboard their yachts, they also need food, wine, and other supplies. Many yachts that stop in Washington are on their way to Alaska. Due to the high cost of food in Alaska, many of these vessels will stock up on food, wine, and other supplies to last until they can return to Seattle or another major port.
- **Freight forwarding.** The company can arrange to have freight forwarded; yachts that travel frequently from port-to-port may need to have provisions and other supplies waiting for them at the next port to meet their schedules.
- **Repair.** LaCasse also arranges yacht repair and maintenance services. Industry stakeholders indicate that it is common to repair and maintain

yachts in Washington, due to the state's labor rates and deep maritime labor pool.

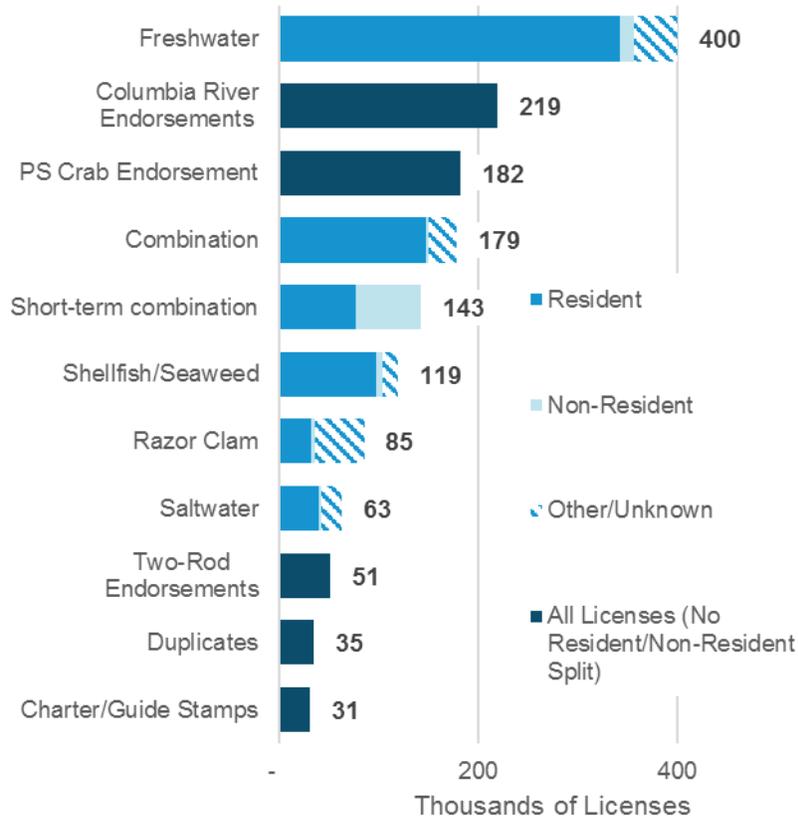
Charter and Recreational Fishing

Washington's access to water resources make it a popular state for recreational fishing, both from the state's residents and visitors to the region. One measure of the recreational fishing industry is licenses. The Washington State Department of Fish and Wildlife (WDFW) is tasked with the stewardship of Washington's fish and wildlife resources. Pursuant to this mission, WDFW issues a sustainable number of fishing licenses and endorsements to Washington residents and visitors alike.

In the April 2014 to March 2015 license year, the WDFW issued more than 1.5 million individual licenses, endorsements, and upgrades for sport and recreational fishing. For some licenses, the state offers different licenses to residents and non-residents, and many licenses are offered to the state's youth, seniors, and people with disabilities.

In the 2014-2015 license year, WDFW issued 85,200 licenses to seniors, 10,800 licenses to youth, and 15,300 licenses to disabled people. **Exhibit 18** below illustrates the breakout between resident, non-resident, and other licenses when available. Overall, the most popular license for residents was a freshwater fishing license. For non-residents, the most popular license was a short-term combination license, which lets visitors fish for a variety of species in Washington. Overall, 95,500 non-resident licenses were issued during the April 2014 to March 2015 license year.

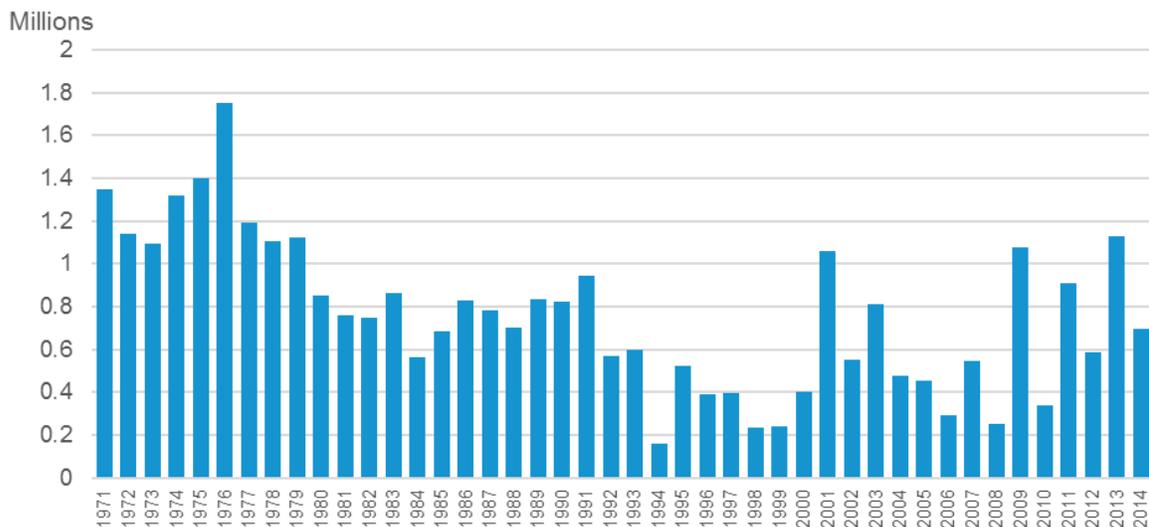
Exhibit 18. Washington Sport Fishing Licenses by Type, April 2014 - March 2015 License Year



Sources: Washington State Department of Fish and Wildlife, 2015.

Salmon is one of the most popular fish for sport anglers. In 2014, just under 700,000 salmon were caught by sport anglers in Washington. The state measures salmon catch through salmon catch punch cards. When an angler catches a salmon, that angler is required to submit a catch punch card to WDFW. Fish record cards are required for salmon, steelhead, sturgeon, and halibut. As of 2001, WDFW implemented an interactive licensing system to electronically capture licensure and catch records. In 2015, roughly half of all salmon caught by sport fishers were caught in freshwater and half were caught in marine areas. Sport salmon catch totals vary significantly from year to year, largely following the salmon life cycle in the region. **(Exhibit 19)**

Exhibit 19. Annual Sport Salmon Catch, Washington, Millions, 1971-2014



Sources: Washington State Department of Fish and Wildlife, 2015.

Washington’s charter fishing companies are concentrated in the Puget Sound, where companies like All Star Charters, All Rivers & Saltwater Charters, and Venture Charters—among many others—offer fishing trips to Washington residents and tourists alike. There are also fishing charter companies with close access to the Pacific Ocean, such as Top Notch Ocean Charters in La Push and Westport Charter in Westport.

Washington is also home to charter fishing companies located on the state’s rivers and lakes. Some examples include Rivers West Sport Fishing in West Richland, Wisdom Guide Service in Othello, STS Guide Service in Camas, and Washington Fishing Guides and Charters in Vancouver. During the April 2014 – March 2015 license year, WDFW issued 31,000 charter/guide fishing stamps.⁷

Commercial Fishing and Seafood Products

Washington’s commercial fishing and seafood processing subsector is both large and pays high wages, helping to spur economic activity along many coastal communities across the state. A critical aspect to the subsector is the homeporting of a large portion of the North Pacific Fishing Fleet. According to a 2015 study published by the Seattle Metropolitan Chamber of Commerce, nearly 1,000 commercial fishing vessels that are active in Alaska’s commercial fisheries

⁷ Charter fishing companies can purchase fishing license stamps—each good for one day of fishing—from WDFW. These companies then resell the stamps to charter fishing customers who arrive at the dock without a fishing license. This lets visitors fish in Washington without needing to apply for a fishing license ahead of time.

are owned by Puget Sound Residents (Seattle Metropolitan Chamber of Commerce, 2015).

Components of Commercial Fishing

Washington's fishing fleet is composed of several different vessel types, each with a specialized purpose and place in the region's Commercial Fishing and Seafood Products subsector. Some vessels have onboard seafood processing capabilities, while others send their catch to specialized at-sea processors or onshore processing facilities.

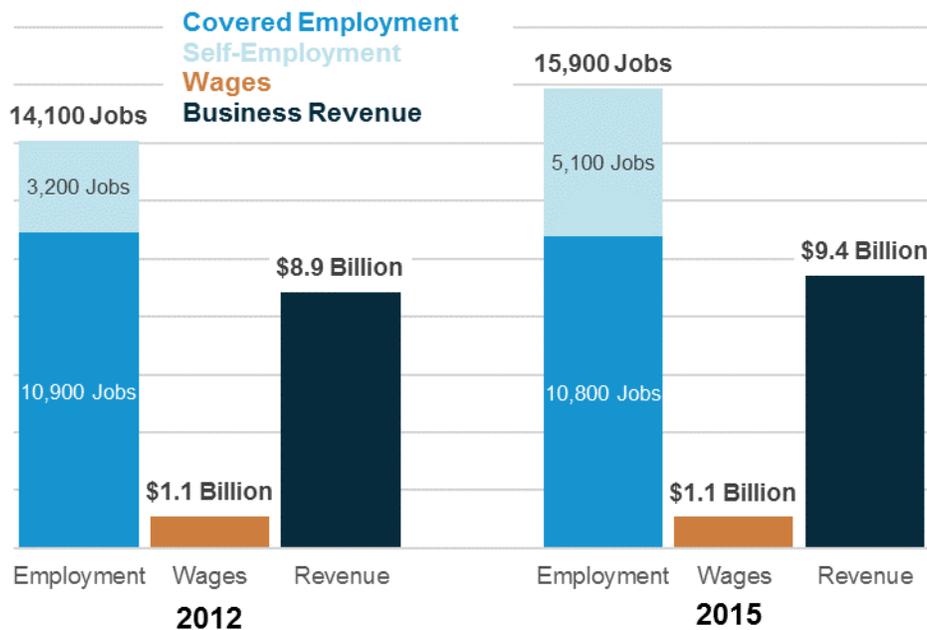
- **Longliner.** Crews on these vessels bait hooks attached to a long line, which they then place in the water. Lines can drift in the water or be anchored. Washington's longline fishing vessels primarily catch cod and some are equipped with onboard processing gear. Vessels with processing capability will often engage in primary processing—which typically involves removing the head and guts of fish—and some engage in secondary processing as well—which can include anything from producing fish meal to preparing fish fillets.
- **Trawler.** These vessels use a fishing method called trawling. This involves pulling a net through the water—sometimes near the bottom or at midwater levels—and lifting the fish back to the vessel, where they are stored or processed. Trawlers that are not equipped with processing gear will often immediately chill or freeze their catch, while trawler-processors can immediately begin processing the fish. Many of Washington's trawlers aim to catch flatfish in the Bering Sea.
- **Gillnetter.** These boats and ships catch fish in gillnets, which are large, rectangular nets that are suspended vertically in the water with floats and weights. When a fish attempts to swim through a gillnet, it gets caught by the gills, fins, or spines. Choosing specific combinations of twine strength, mesh size, overall net dimensions, and net depth allow gillnetter operators greater control over which species they catch. These vessels are not usually equipped with on-board processing gear, and will often chill or freeze their catch.
- **Purse Seiner.** Vessels that use the purse seine fishing technique take advantage of some species' tendency to aggregate in schools near the surface. Some species of tuna, salmon, herring, and mackerel are well-suited to fishing using the purse seine technique. A large rectangular net is lowered into the water close to the surface. These nets typically make use of weights and floats in a similar way to a gillnet, but float closer to the surface and are tightened at the bottom via a line strung through a series of rings. This prevents fish from escaping via the bottom of the net, and fish are bounded from above by the surface of the water. After the purse seine is closed at the bottom, it can be raised to the fishing vessel and the fish can be harvested.

- Processors and Tenders.** While some vessels are equipped with onboard processing gear, such as certain longliners and trawlers, many rely on other means to process their catch. Some vessels make use of tenders and processors. A fishing vessel offloads its catch to a tender ship, which then transports it to a larger, standalone at-sea processing ship.

Seafood that is not processed at-sea is typically transferred to an onshore processing facility when the fishing vessel makes landfall. From there, processors and packagers prepare the product for wholesale or retail. Fish that has undergone primary or secondary processing at sea requires less processing when the fishing vessel comes to port, and will sometimes just need to be cleaned and packaged.

Washington’s Commercial Fishing and Seafood Processing subsector accounted for 15,900 jobs in 2015, adding 1,800 jobs from 2012 to 2015. During the same period, the subsector saw revenues increase from \$8.9 billion to \$9.4 billion. In 2012, the subsector’s average wage was \$77,100. In 2015, the average wage decreased to \$67,600. This is primarily due to a decrease in wages reported in the finfish fishing industry. (**Exhibit 20**)

Exhibit 20. Commercial Fishing and Seafood Processing Jobs, Revenue, and Wages, Washington, 2012 and 2015



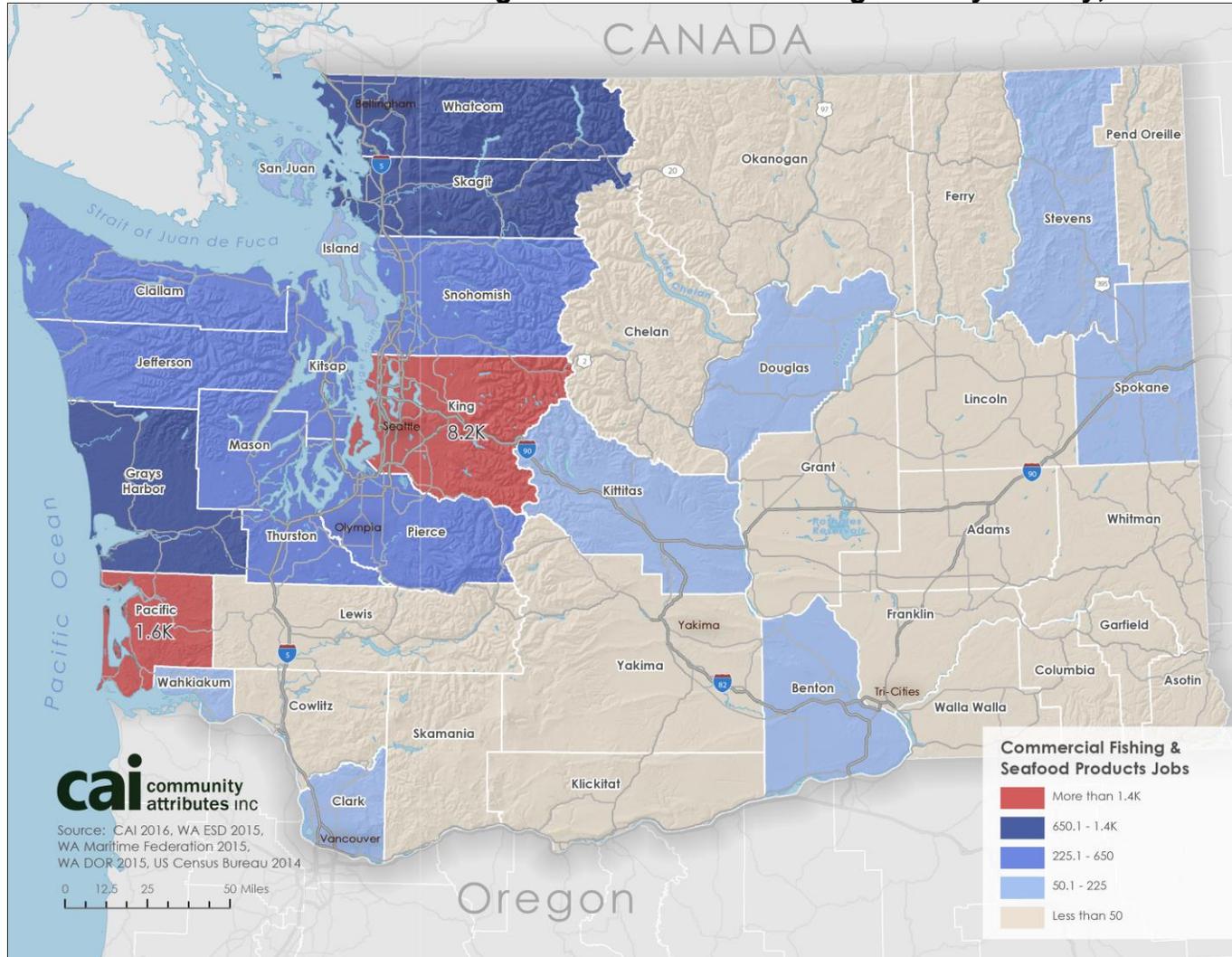
Sources: Washington State Department of Revenue, 2016; Washington State Employment Security Department, 2016; United States Census Bureau, 2014; Community Attributes Inc., 2016.

Commercial Fishing and Seafood Processing subsector jobs are heavily concentrated in the Puget Sound area, but there also jobs across other parts of the state. Seafood product wholesalers can also be found in eastern Washington,

such as Airway Heights-based seafood distributor and wholesaler Northstar Sea Foods (**Exhibit 21**). Examples of regional employers in this subsector include:

- **Trident Seafoods** is the largest seafood company in the United States. Its vertically-integrated structure means the company manages a network of fishing vessels, processing sites, and product distributors. Trident Seafoods manages roughly 20 onshore processing facilities in Alaska, Washington, and Oregon, as well as roughly 30 fishing vessels. Trident Seafoods' products include smoked, frozen, canned, and ready-to-eat seafood for the wholesale, retail, and food service markets.
- **Peter Pan Seafoods** is one of America's largest Alaskan seafood producers. The company can trace its heritage back to the Double Q brand canned salmon, first introduced in 1914. Peter Pan Seafoods' corporate office is located in Seattle, and the company has grown to four processing facilities in Alaska, in addition to five support facilities in Alaska and Oregon.
- **Swinomish Fish Company** is a tribally-owned commercial fish processing company and is a certified small business. The company processes fish and sells the resulting seafood products on the wholesale and local retail market. The company's processing facility is in La Conner. Swinomish Fish Company's main offerings include salmon products, but the business also sells Dungeness Crab, caviar, and other specialty seafood products.
- **Taylor Shellfish Farms** has been farming shellfish in the Pacific Northwest since the 1890s. Today, the shellfish aquaculture company has three oyster bars in Seattle: one each in Capitol Hill, Queen Anne, and Pioneer Square. Taylor Shellfish also sells its products at its Samish and Shelton Shellfish Markets, and the company is headquartered in Shelton. The company also operates additional hatcheries and nursery facilities in Hawaii and California.
- **Northstar Sea Foods** is a seafood wholesaler based in Airway Heights. The distributor processes their fish locally before sending them to customers including grocers, hotels, restaurants, and casinos in Spokane, Coeur d'Alene, Sandpoint, Pasco, Kennewick, and Richland.
- **Ocean Beauty Seafoods** traces its origins back to 1910, when the company started as a store on the Seattle waterfront. Since then, it has grown to two value-added seafood plants in Seattle and Monroe, nine domestic facilities and eight distribution facilities.
- **American Seafoods Company** is headquartered in Seattle. The company was established in 1987 and, together with American Marine Ingredients, forms the American Seafoods Group. American Seafoods Company manages a fleet of catcher-processor vessels that operate in the Alaskan Bering Sea.

Exhibit 21. Commercial Fishing and Seafood Processing Jobs by County, 2015



Sources: Washington State Department of Revenue, 2015; Washington State Employment Security Department, 2015; United States Census Bureau, 2014; Washington Maritime Federation, 2016; Community Attributes Inc., 2016.

Finfish fishing and seafood product preparation and packaging are the two largest components of this subsector by total employment, accounting for a combined 13,000 jobs in 2015. Today, many fishing vessels are equipped with onboard processing machinery. At the same time, several companies engage in both on-shore seafood product preparation and commercial fishing. As a result, the line between these two activities is somewhat blurred. Workers in the fishing subsector are often at sea for most of the year—in some cases, up to 10 months. These workers often send their wages back to their families on the shore, helping to drive local economic impacts.

Aquaculture activities in Washington account for a total of 1,100 jobs, 800 from shellfish farming and 300 from finfish farming and hatcheries. This subsector also includes fish and seafood markets (700 jobs) and merchant wholesalers (700 jobs). (Exhibit 22)

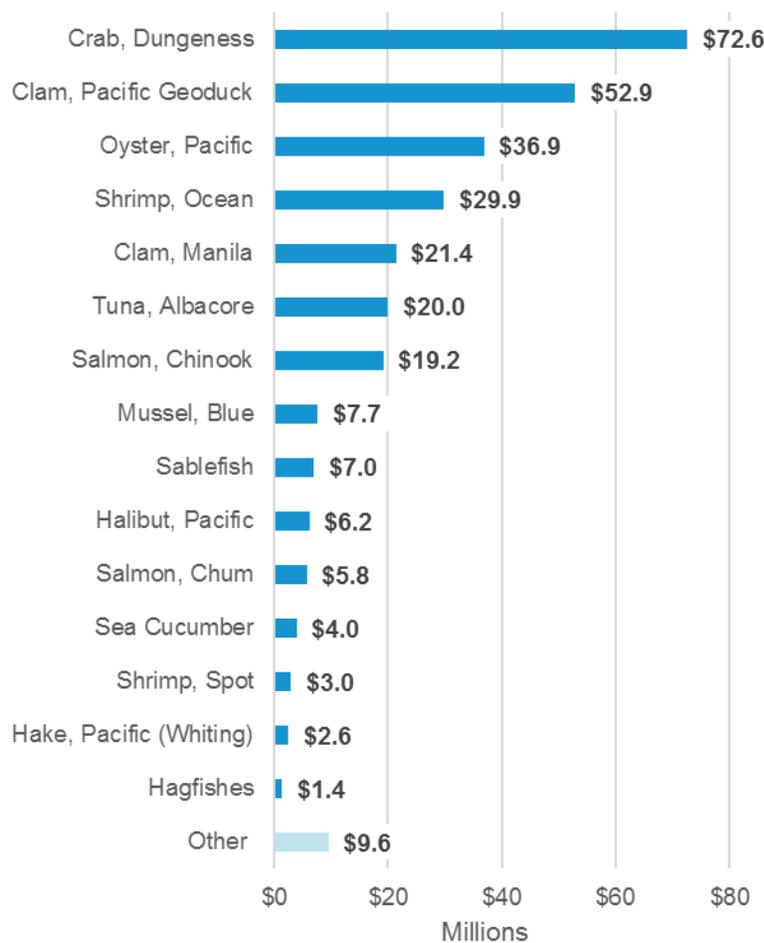
Exhibit 22. Commercial Fishing and Seafood Processing Subsector Employment, 2015



Sources: Washington State Department of Revenue, 2016; Washington State Employment Security Department, 2016; United States Census Bureau, 2014; Community Attributes Inc., 2016.

In 2015, fishing vessels brought 153 million pounds of finfish and shellfish worth a total of \$300 million to Washington ports. This includes fish harvested in other states' waters, such as fish caught in the Bering Sea. Washington-based vessels are not the only ones that fish in the Bering Sea: in 2015, more than 6 billion pounds of fish were offloaded at Alaskan ports. Vessels brought in 15 million pounds of Dungeness Crab worth a total of \$72.6 million in 2015, making it the top species harvested by total value. Pacific Geoduck was the second most-valuable species harvested and brought to Washington ports at \$52.9 million. Just over 2 million pounds of the shellfish were harvested in 2015, making Geoduck one of the highest value-per-pound shellfish species. (Exhibit 23)

Exhibit 23. Value of Harvest by Species brought to Washington State Ports, 2015

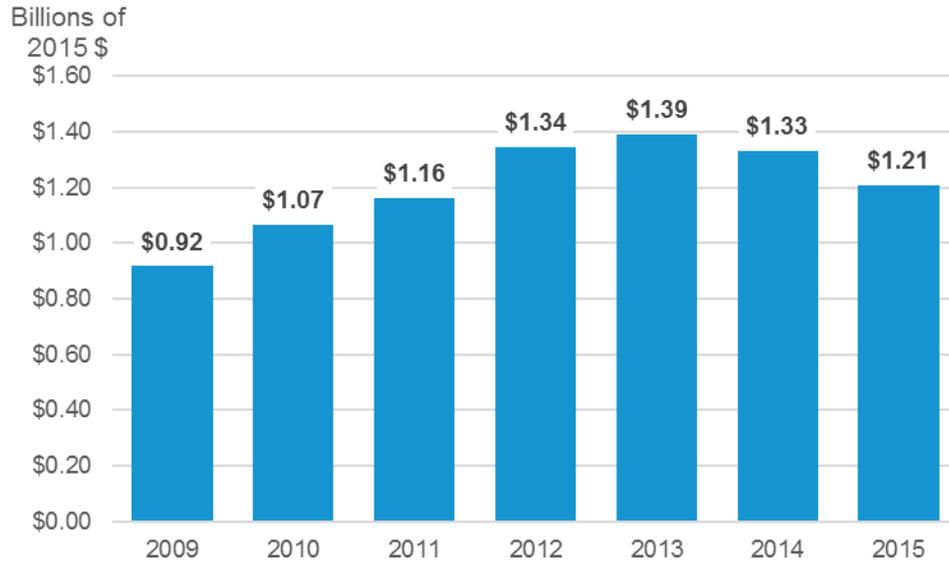


Sources: NOAA, 2016; Community Attributes Inc., 2016.

Commercial Fishing & Seafood Products Exports

The Commercial Fishing and Seafood Processing subsector is also an important contributor to Washington exports. In 2015, \$1.21 billion in fish and seafood products were exported from Washington, up from \$920 million in 2009. (Exhibit 24)

Exhibit 24. Commercial Fishing & Seafood Processing Exports, 2009-2015



Sources: United States Census Bureau, 2015; Community Attributes Inc., 2016.

Canada was the top destination by value for fish and seafood products originating in Washington. A total of \$311.6 million in commercial fishing and seafood processing products were exported from Washington to Canada in 2015. Japan (\$153.4 million) and China (\$135.8 million) were the two next-largest export markets in 2015. Together, the top 10 markets account for 77% of total exports of Washington state Commercial Fishing and Seafood Processing products. **(Exhibit 25)**

Exhibit 25. Top 10 Markets for Washington State Commercial Fishing & Seafood Processing Products, Millions of Dollars, 2015



Sources: United States Census Bureau, 2015; Community Attributes Inc., 2016.

Impacts of Maritime to Coastal Communities

Washington’s ports are important elements of the state’s economy, acting as links in state, national, and international supply chains. At the same time, ports can serve as employment centers for rural coastal communities. For these communities, ports often have disproportionate economic impacts, representing a large share of local employment and tying the local economy together. Ilwaco, Chinook, Willapa Harbor, and Westport are four examples of coastal Washington communities that have high proportions of employment directly related to maritime activities and are dependent on Washington’s water resources.

Ilwaco and Chinook

Ilwaco and Chinook are two communities located on the coast of Pacific County where the Columbia River meets the Pacific Ocean. They share a heritage as communities tied to Washington’s water resources, a heritage that can be seen in their respective economies to this day.

Ilwaco is situated on the Long Beach Peninsula, and is home to approximately 920 residents. The city was first settled in 1851, and quickly became one of the region’s foremost fishing towns, relying on rail linkages to transport fish. (United States Census Bureau, 2015)

Chinook has a similar history and was first settled around the same time. By 1870, Chinook had an established salmon cannery. The city made use of its access to both the Columbia River and Pacific Ocean, relying on water access as the main means of transport to and from the town until the first road connected the city to the rest of the region in 1891. Today, the city has approximately 470 residents. (United States Census Bureau, 2015)

Ilwaco and Chinook together are home to approximately 400 fishing industry workers, representing 2.2% of all jobs in Pacific County. These jobs illustrate how these two coastal communities rely on Washington's water resources.

In 2014, more than 27 million pounds of Albacore Tuna were unloaded at the Port of Ilwaco, making it one of the largest Albacore Tuna landing ports in the nation. Other shellfish and finfish species brought to the Port of Ilwaco include Dungeness crab, salmon, shrimp, pacific whiting, halibut, and hagfish.

The Port of Ilwaco is served by a 16-foot federal channel that leads into an 800-slip marina. The Port of Ilwaco's facilities are significant: a 50-ton travel lift, self-service boatyard and haul out facility, fuel dock, pump-out station and pump-out barge, live bait facility, dry storage, commercial seafood processors and landing, and working waterfront. The Port of Ilwaco is also essential to the city's five charter fishing businesses and 25 charter boats. (Port of Ilwaco, 2016)

Station Cape Disappointment, a Coast Guard site on Port of Ilwaco lands, engages in between 450 and 500 rescue operations annually, serving both commercial and recreational vessels alike. Station Cape Disappointment is the largest Coast Guard search and rescue station on the Northwest Coast. A total of 50 Coast Guard crewmembers are assigned to the five boats at the station, which is also the site of the oldest lighthouse on the Northwest coast of the United States. (United States Coast Guard, 2016)

The Port of Chinook serves its local community with a 300-slip marina that has room for 30 commercial and 270 recreational boats, a boat ramp, fuel dock, Chinook school event center, and Chinook County Park. There is also one seafood processing facility located at the port itself. The facility handles roughly 3.6 million pounds of crab annually. There are another 14 other businesses located on the waterfront. (Ports of Ilwaco and Chinook, 2016)

Together, commercial fishing activities at the Port of Chinook and Port of Ilwaco have economic impacts that support additional activities in Pacific County. In 2015, every direct commercial fishing job at the two ports supported an additional 0.26 jobs elsewhere in Pacific County.

Willapa Harbor

Willapa Harbor is located in Pacific County where the Willapa River meets Willapa Bay. The area is one of the few sheltered bays on the Pacific Coast north of California, earning it significant growth in the late 1800s and early 1900s.

Before rail reached the region in the late 1890s, fish and lumber had to travel to other markets by ship, usually via San Francisco.

The region's main historical products were lumber, oysters, and finfish. Today, this heritage can be seen at the Port of Willapa Harbor. Oyster and finfish fishing remain keystones of the local economy, and account for approximately 90 local jobs in the town of 233 residents, or 1.5% of jobs in Pacific County. In 2015, approximately 2.9 million pounds of fish were loaded off fishing vessels at the Port of Willapa Harbor. The fishing industry helps drive economic activity in the county through secondary impacts as well. In 2015, every direct fishing job at Willapa harbor supported an additional 0.26 jobs in other industries elsewhere in Pacific County. (United States Census Bureau, 2015)

The Port of Willapa Harbor operates commercial and recreational marinas in Raymond, Bay Center, and Tokeland. The Port is currently working on a new commercial pier moorage floats, restrooms, day use park, expanded RV facilities, and a seafood/local products retail market at the Tokeland marina. (Port of Willapa Harbor, 2016)

Westport

Westport is a city of approximately 2,100 people located on the entrance to Grays Harbor from the Pacific Ocean. The city was incorporated in 1914, and has long been a regional center of fishing, shellfish harvesting, seafood processing, and tourism activities. More recently, boat building has also become an important element of Westport's economic landscape. (City of Westport, 2016)

Today, the Westport Marina is the largest coastal marina in the Pacific Northwest, and home to Washington's largest charter fishing fleet. The marina has space for 600 charter, commercial, and sport fishing vessels. The area is also home to a seafood processing facility.

The Port of Grays Harbor is one of Washington's most export-oriented ports, with more than 95% of shipping activity at the port based on exports. The port has grain storage facilities as well as a liquid bulk facility. (Port of Grays Harbor, 2016)

The Port of Grays Harbor has four marine terminals. Terminal 1 is a barge and liquid loading facility that is used by two of the port's biggest customers, Renewable Energy Group and Westway Terminal Company. Terminal 2 is a rail-served liquid bulk facility. Terminal three is a 150-acre marine industrial site with a deep-water terminal served by rail. Terminal 4 is the port's largest marine terminal, with a 1,400-ft berth capable of handling two vessels simultaneously. The terminal has dockside warehousing and on-dock rail service. The port's four terminals are served by three stevedoring and line handling companies: Jones Stevedoring, Pasha Stevedoring and Terminals, and Stevedoring Services of America.

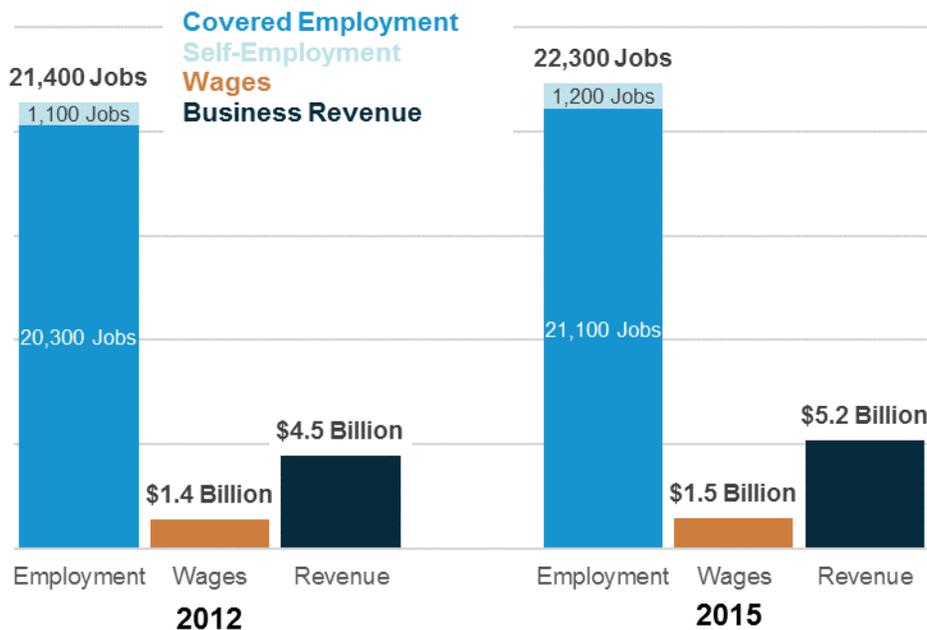
In 2015, Westport was home to just under 2,000 residents. Approximately 610 people in the city were employed in commercial fishing activities in 2015, and these activities brought in 83.5 million pounds of fish to the Port of Grays Harbor. Overall, these 610 commercial fishing workers represented 2.8% of total employment in Grays Harbor in 2015. For every direct commercial fishing job at Westport, an additional 0.33 jobs were supported in other industries through secondary economic impacts.

Maritime Logistics and Shipping

Washington’s strategic position in the Northwest contiguous United States combined with natural deep-water bays, the Puget Sound, and inland access via the Columbia River have long made the state a national and global Maritime Logistics and Shipping hub. The state has 11 deep-water ports that serve companies and individuals within Washington and outside the state. An important role of Washington’s Maritime Logistics and Shipping subsector is its place as a link in the broader transportation sector; goods shipped from Asia to the Midwestern United States often enter the nation through the Port of Seattle or the Port of Tacoma.

In 2015, the Maritime Logistics and Shipping subsector employed a total of 22,300 workers, 900 more than it did in 2012. During the same time, subsector wages grew by \$100 million and subsector revenues increased by \$0.7 billion. (Exhibit 26)

Exhibit 26. Maritime Logistics and Shipping Employment, Business Revenue, and Wages, 2012 and 2015

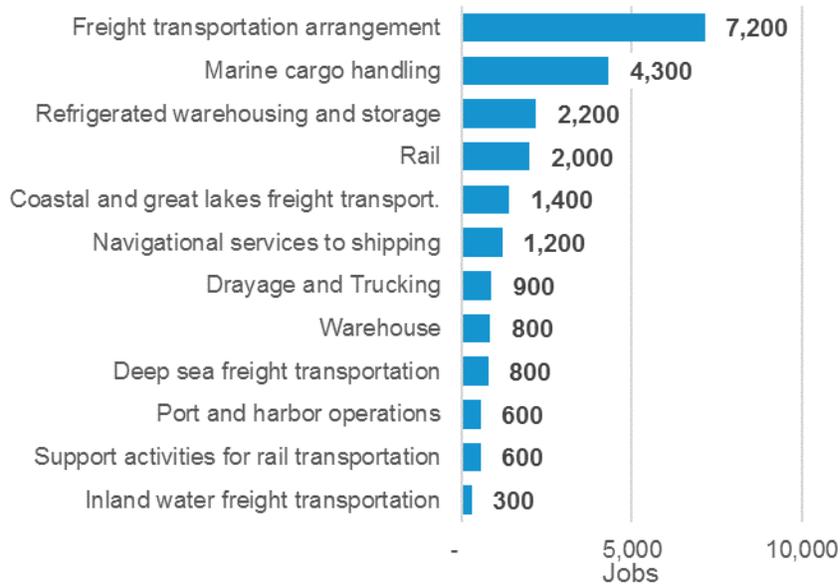


Sources: Washington State Department of Revenue, 2016; Washington State Employment Security Department, 2016; United States Census Bureau, 2014; Community Attributes Inc., 2016.

The Maritime Logistics and Shipping subsector represents a diverse range of transportation, warehousing, and service activities, including the following:

- **Freight Transportation Arrangement** is the largest category in this subsector, representing 7,200 jobs in 2015.
- **Marine cargo handling**, which covers loading cargo onto and off vessels, totaled 4,300 jobs in 2015.
- **Refrigerated warehousing and storage**—often referred to simply as “cold storage”—in the Maritime Sector largely includes cold storage for goods that will be transported through Washington ports and storage for finfish and shellfish fished, farmed, or processed in Washington. In 2015, this category covered 2,200 jobs across the state.
- **Rail** is an important link between Washington’s marine terminals and consumers and producers. Maritime-related rail totaled approximately 2,000 jobs in 2015. This category is also reliant on rail support activities, which represented an additional 600 jobs in 2015.
- **Coastal and great lakes freight transportation** in Washington refers to the waterborne movement of goods between coastal ports. A total of 1,400 jobs composed this category in 2015. Barge activities at firms that primarily operate in coastal areas are included in this category.
- **Navigational services to shipping** are an important element of the Maritime Sector. Washington requires all foreign vessels that navigate its waters to employ a pilot to berth in Washington. This component of the subsector accounted for 1,200 jobs in 2015. This category includes tugboat operations in addition to pilotage services.
- **Drayage and Trucking** (900 jobs) represent links in the maritime supply chain in a way similar to maritime-related rail activities. Maritime drayage refers specifically to short-distance shipping, often from one port terminal to another as part of a larger shipping route.
- **Warehousing** (800 jobs) in the Maritime Sector refers to warehouses directly involved in maritime logistics activities. This includes warehouses that serve marine terminals.
- **Deep sea freight transportation** is a smaller component of this subsector, accounting for roughly 800 jobs in 2015.
- **Port and harbor operations** (600 jobs) includes establishments primarily engaged in operating ports. Stevedores and other marine cargo handling activities are not included in this category.
- **Inland water freight transportation** is the smallest segment of this subsector, with 300 jobs in 2015. This component primarily includes waterborne freight transportation along the Columbia River, including transportation on barges. (**Exhibit 27**)

Exhibit 27. Maritime Logistics and Shipping Subsector Employment, 2015



Sources: Washington State Department of Revenue, 2016; Washington State Employment Security Department, 2016; United States Census Bureau, 2014; Community Attributes Inc., 2016.

Short-distance transportation is an essential component of Maritime Logistics and Shipping. Transferring freight between Washington’s rail assets, warehouses, and marine terminals requires logistical expertise and the use of drayage services. Drayage refers to transferring freight over a short distance, often less than a mile.

MacMillan-Piper is one of the Pacific Northwest’s largest drayage companies. The business has five facilities located in the region, and leverages 47 years of experience in the transloading and container freight industry to efficiently move freight for a wide variety of clients. MacMillan-Piper provides a link between Washington’s rail network and its marine terminal assets.

Washington’s Maritime Logistics and Shipping subsector is influenced by trade flows. Recent years have seen record harvests in Washington’s agricultural centers, resulting in high demand for warehousing and transportation services across the state.

Washington's Ports

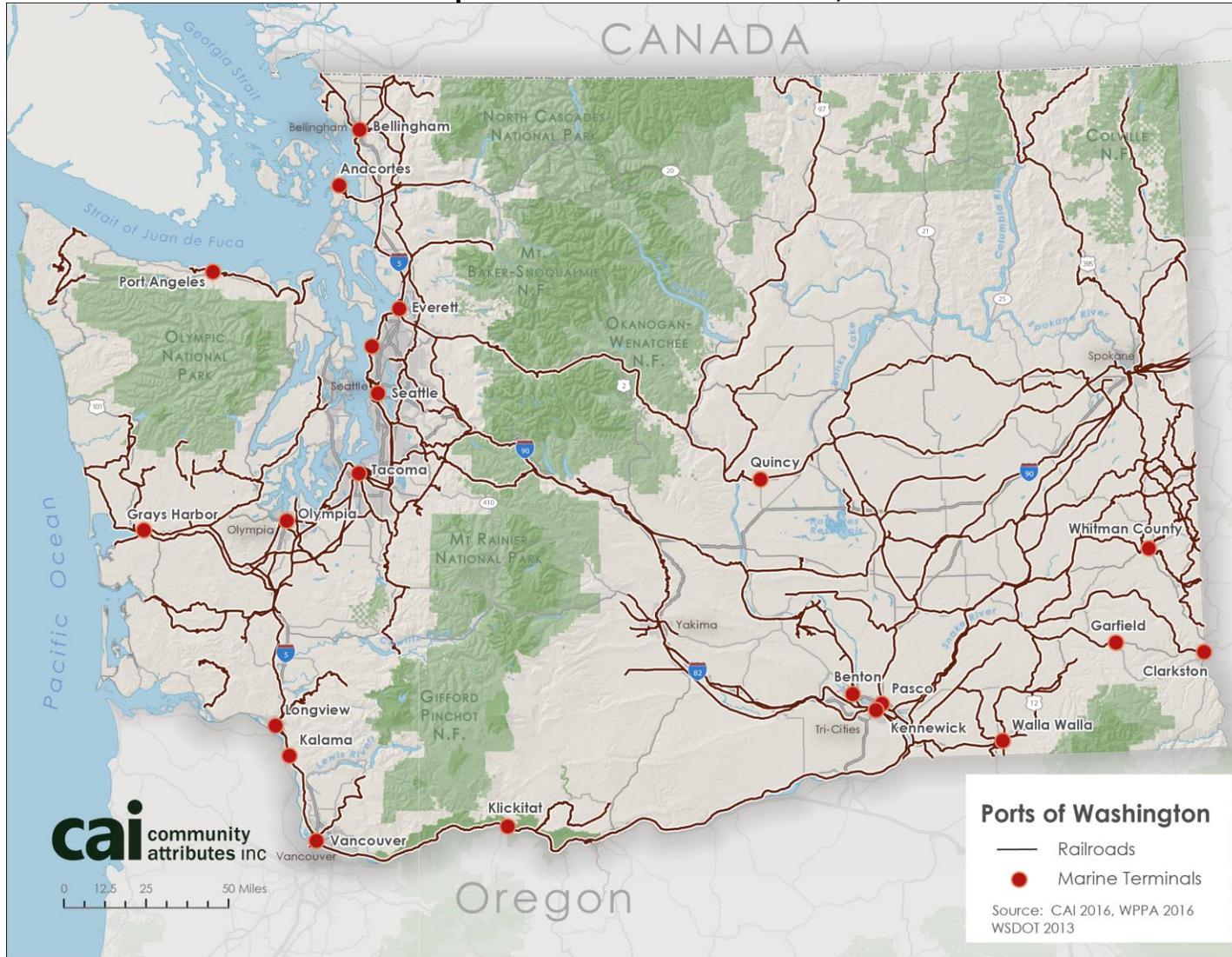
The history of Washington's ports goes back to the first settlers in the region. Washington's deep harbors and navigable rivers meant settlers could access other ports and regions, moving goods and people more easily than they could over land. In 1889, Washington's state constitution declared that the beds of navigable waters belonged to the people, and, in 1911, the state legislature passed the Port District Act, which put control over which water resources would have ports into the hands of the people. Residents would elect commissioners to govern resident-defined port districts.

This system endures to this day, and Washington state is now home to 75 port districts, 19 of which have marine terminals. Washington's marine terminal assets are located across the state, strategically located on the state's water resources. In the eastern portion of the state, terminals along the Columbia River and Snake River serve Washington's agricultural sector. Grain, apples, potatoes, and other agricultural products are often trucked or transported via rail to these terminals, where it is consolidated and transported via barge to Vancouver or Portland. From there, it can be shipped as deep sea freight overseas or to other markets in the United States.

There are seven marine terminals in the Puget Sound and Strait of Juan de Fuca. These terminals also serve Washington's agricultural sector, linked to eastern Washington by rail lines and roads. These ports serve as major import gateways, accepting freight from Asia and elsewhere. Some of these imports are transported within Washington for final use by the state's businesses and residents. For most of the state's imports, however, Washington is just one step in a global route that ends elsewhere in the nation. These goods are often transported east via Washington's rail lines and many will find their final destination in the Midwest or East Coast of the United States.

Washington's marine terminal and rail assets are illustrated in **Exhibit 28**. The two are closely linked, and together they form an essential component of the state's broader Maritime Logistics and Shipping subsector.

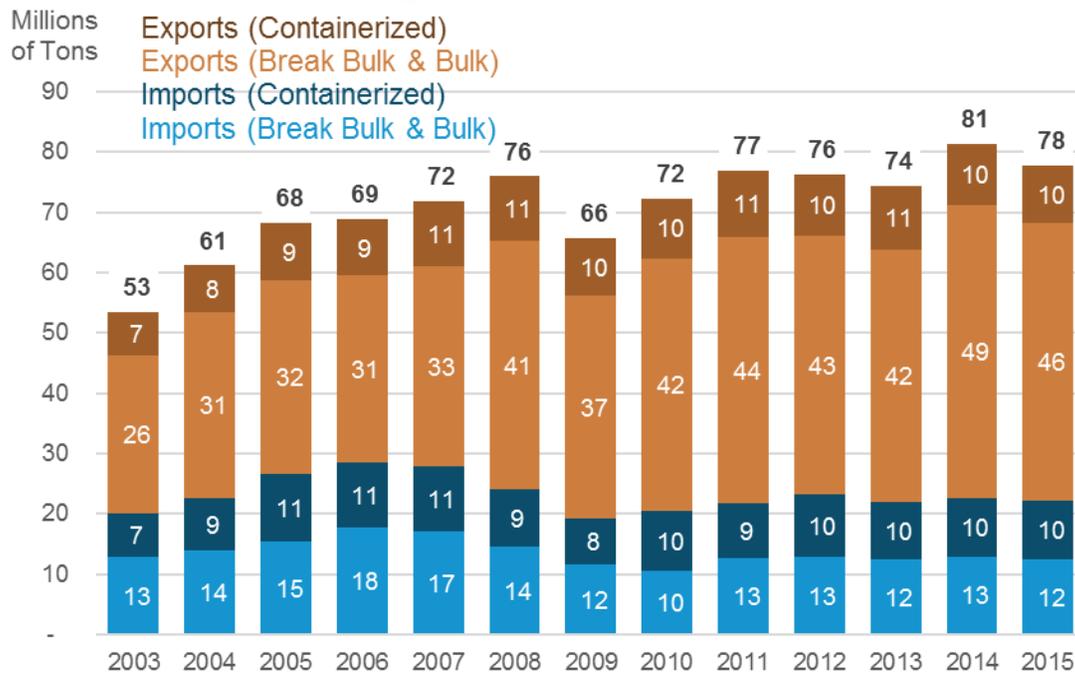
Exhibit 28. Map of Marine Terminal Assets, Statewide



Sources: Washington Public Ports Association, 2016; Washington State Department of Transportation, 2013; Community Attributes Inc., 2016.

In 2015, a total of 78 million tons of imports and exports traveled through Washington’s marine terminals. This metric describes the total volume of international trade that uses Washington’s ports, and helps illustrate the scale of marine cargo handling in Washington. Total waterborne exports and imports have increased from 53 million tons in 2003, but this growth has not been linear. Like many other trade metrics, total waterborne exports and imports that passed through Washington ports decreased at the onset of the Great Recession, but have largely recovered since then. (**Exhibit 29**)

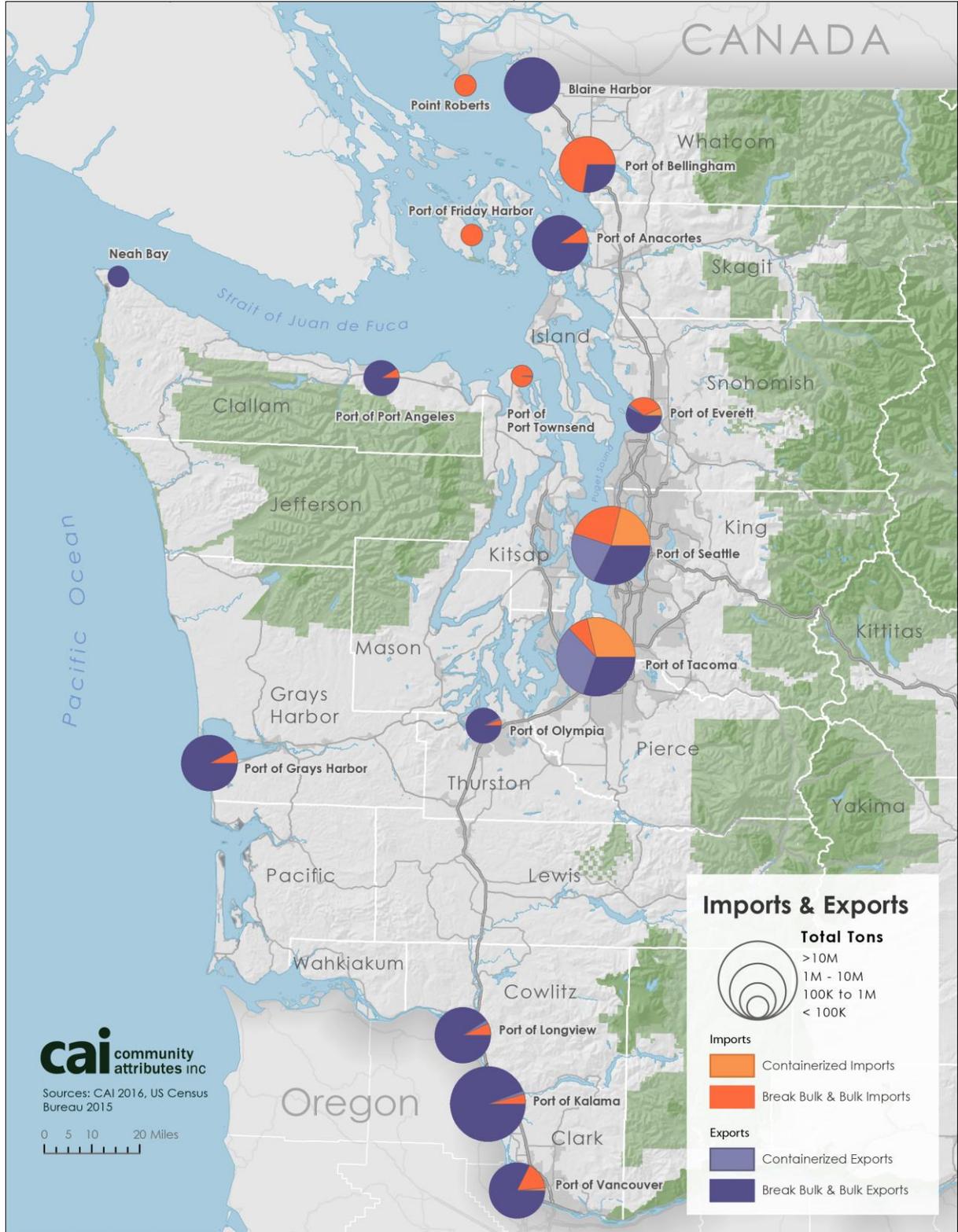
Exhibit 29. Waterborne Exports and Imports Passing through Washington State Ports, 2009-2015



Sources: United States Census Bureau, 2014; Community Attributes Inc., 2016.

In 2015, 78 million tons of waterborne freight was imported and exported through Washington’s ports. Roughly 22 million tons of this was in the form of imports and 56 million tons was in the form of exports. **Exhibit 30** illustrates the scale of trade that flowed through Washington’s ports in 2015. These foreign imports and exports were not goods that originated in Washington nor had Washington as their final destination, but rather used Washington ports to enter or exit the country.

Exhibit 30. Waterborne Imports and Exports by Port, Millions of Tons, 2015

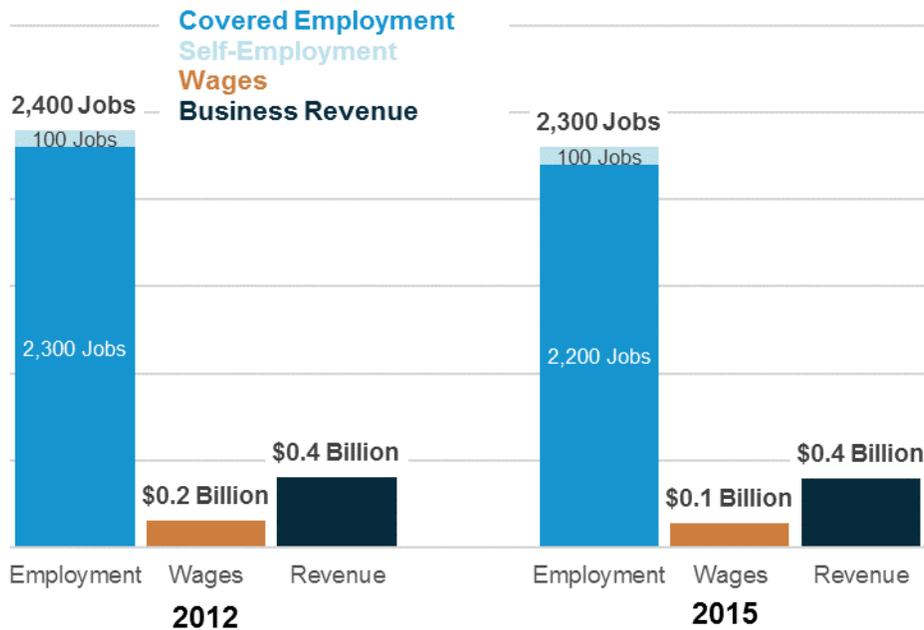


Sources: United States Census Bureau, 2015; Community Attributes Inc., 2016.

Passenger Water Transportation

The state’s waterways are highways for commercial goods, commuters, and visitors alike. Ferry activities, cruises, and water passenger support activities make up the bulk of this category. In 2015, deep sea passenger transportation businesses—primarily cruises—employed 1,670 workers. Altogether, the subsector employed 2,300 people, paid wages totaling \$138 million, and received \$394 million in business revenues in 2015. (Exhibit 31)

Exhibit 31. Passenger Water Transportation Employment, Revenue, and Wages; 2012 and 2015

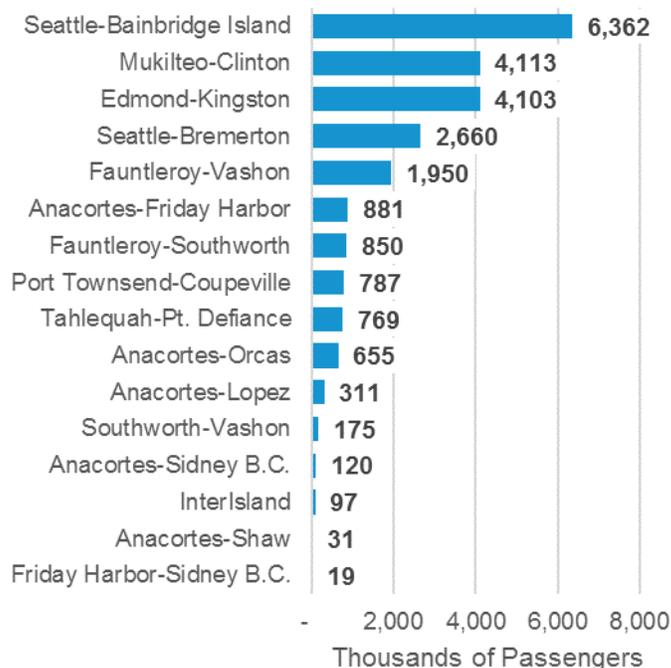


Sources: Washington State Employment Security Department, 2016; United States Census Bureau, 2014; Community Attributes Inc., 2016.

Washington State and County Ferries

The Washington State Department of Transportation operates 24 ferries in the Puget Sound and the state’s inland waterways. Taken together, Washington’s ferries moved more than 23 million passengers in 2015, transporting residents and visitors to destinations such as tourist attractions, workplaces, and commercial centers. Approximately 6.4 million visitors took the Seattle-Bainbridge Island ferry in 2015, making it the most popular ferry route. (Exhibit 32)

Exhibit 32. Washington State Ferry Ridership, Thousands of Passengers, 2015



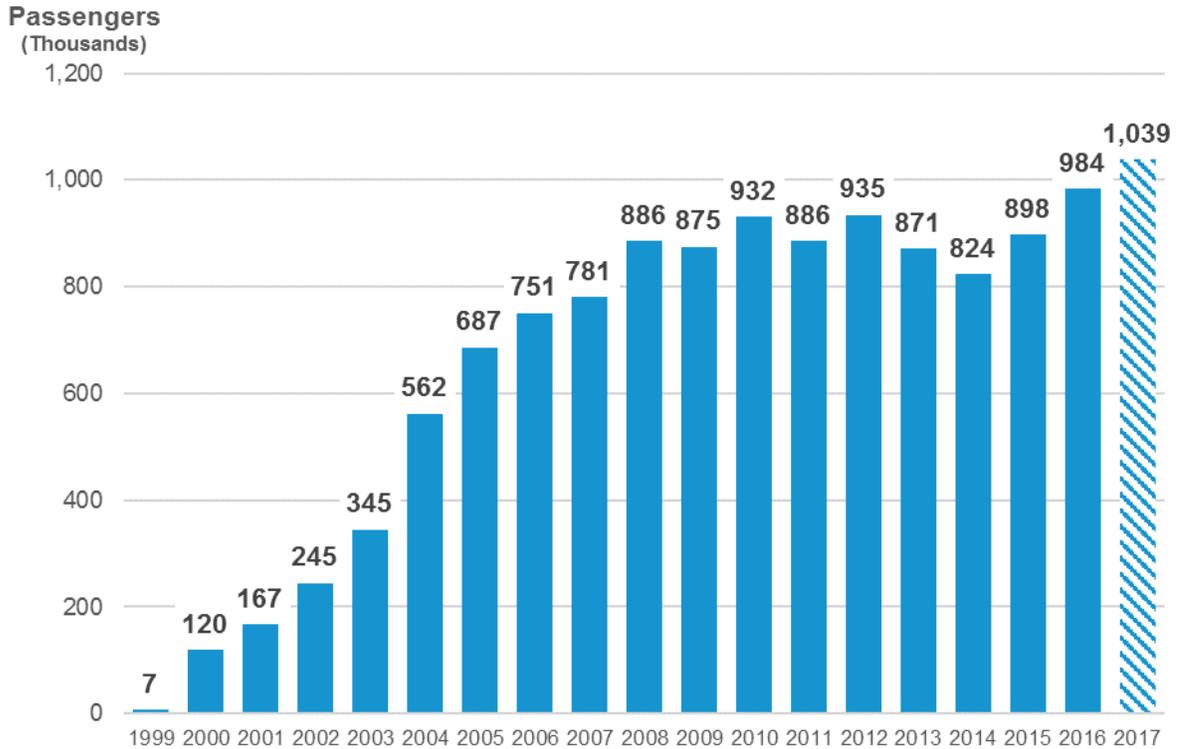
Sources: Washington State Department of Transportation, 2016; Community Attributes Inc., 2016.

Cruise Ships

Cruises are a unique component of the state’s maritime sector, driving tourist spending in the region while simultaneously generating impacts through provisioning and maintenance needs as well as cruise crew expenditures at their home ports. Washington’s cruise industry is heavily focused in Seattle, with cruise ships departing from and arriving at Piers 66 and 91 at the Port of Seattle.

The industry is also a relatively new one in the region, growing from just 7,000 passengers in 1999 to more than a million passengers forecasted for 2017. These passengers pass through the city, often taking time to explore the region and visit tourist attractions. From 1999 through 2015, the Port of Seattle and other maritime leaders attracted cruise ships to region, encouraging them to use the Port of Seattle as a home port. (Exhibit 33)

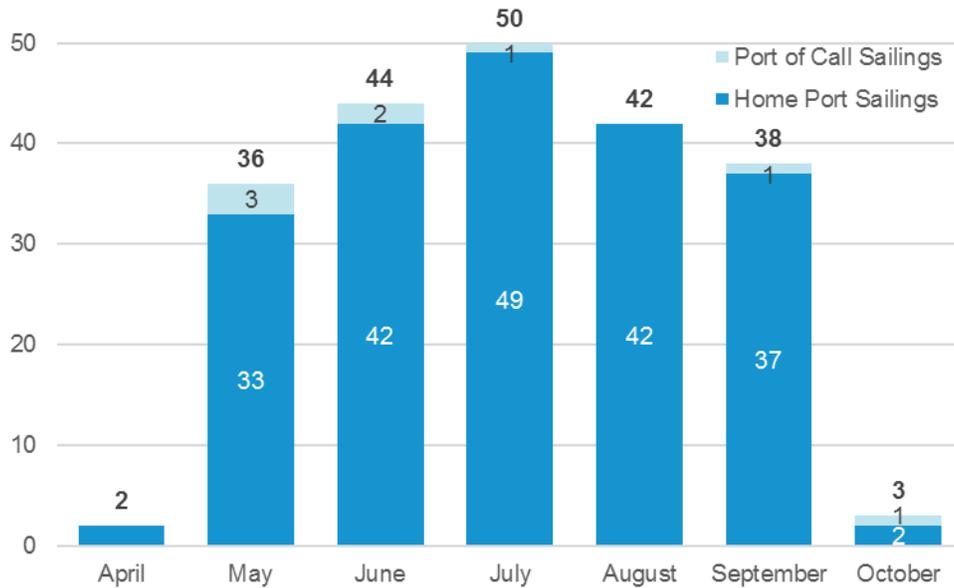
Exhibit 33. Cruise Ship Passengers, 1999-2016 (Historic) and 2017 (Forecasted)



Source: Port of Seattle, 2016.

Seattle is a very popular home port for cruise ships that travel north to Canada and Alaska. In 2017, 96% of planned cruise ship sailings are anticipated to use Seattle as their home port. The remaining 4% of planned sailings are for vessels that list Seattle as a port of call: they stop in Seattle as a part of their respective cruise routes, but do not begin their journeys in Seattle. The summer months are the most popular for cruise ships—both those that stop in Seattle as a port of call and those that use Seattle as a home port—with an average of 44 cruise ship sailings from June through August. (Exhibit 34)

Exhibit 34. Planned Cruise Ship Sailings, Port of Seattle, 2017



Source: Port of Seattle, 2016.

The majority of cruise ship visitors in Seattle take cruises on vessels that use Seattle as a home port. According to industry stakeholders, most of these visitors spend a day in Seattle before their cruise departs, driving economic impacts through spending on accommodations, food, and visitor attractions.

Cruise ships have economic impacts in Washington through two key means. First, cruise ship passengers spend additional money in Washington as tourists. This money continues through the economy as wage spending and inter-industry purchases. For every cruise ship that docks in Seattle, passengers on that ship spend an average of \$400,000 per visit in Washington at other businesses and attractions. (Exhibit 35)

Exhibit 35. Port of Seattle Cruise Passenger Spending, 2015

Category	Visitor Spending (millions)
Accommodations	\$20.2
Food and Beverage	\$17.1
Retail Sales	\$11.8
Visitor Air Transportation	\$10.9
Arts, Entertainment, and Recreation	\$8.9
Local Transportation and Gas	\$8.7
Total	\$77.5

Sources: Port of Seattle, 2016; Port of Seattle, 2013; Tourism Economics, 2015; Community Attributes Inc., 2016.

This money continues through the economy as wages spending and inter-industry purchases. This direct spending supported approximately 850 jobs at retail, accommodations, transportation, and arts and recreation businesses. An additional 510 jobs were supported through secondary impacts, including wage spending by supported workers and business-to-business transactions supported by cruise ship passenger spending. (**Exhibit 36**)

Exhibit 36. Economic Impacts of Cruise Ship Passenger Spending, 2015

	Direct	Indirect	Induced	Total
Jobs	850	160	350	1,350
Labor Income (mils 2015 \$)	31.0	8.1	17.5	56.6
Revenue (mils 2015 \$)	77.5	29.3	54.0	160.8

Sources: Port of Seattle, 2016; Washington State Office of Financial Management, 2012; Washington State Employment Security Department, 2016; Washington State Department of Revenue, 2016; Community Attributes Inc., 2016.

Second, cruise ships require maintenance, provisions, and crews to operate. Employees spend wages locally, and the cruise ships themselves buy fuel, food, and services from companies in Washington. Cruise ships earn \$3.1 million in revenue for every sailing from Seattle, and they spend a significant portion of that locally on maintenance and provisions, plus any wages spent by crew members. With approximately 1,700 workers, Seattle’s cruise industry is an important regional employer.

Taking into account the effects of business-to-business transactions (e.g. purchasing fuel and engine lubricants) and the effects of wage spending (e.g. when a cruise ship crew member shops in Seattle), the cruise industry supported an additional 3,200 jobs. The supported \$590.1 million in direct revenue and an additional \$561.6 million in indirect and induced revenue impacts. (**Exhibit 37**)

Exhibit 37. Economic Impacts of Cruise Ship Provisioning and Crew Wage Expenditures, 2015

	Direct	Indirect	Induced	Total
Jobs	1,700	1,300	1,900	4,900
Labor Income (mils 2015 \$)	141.9	71.2	95.5	308.7
Revenue (mils 2015 \$)	590.1	267.5	294.5	1,152.1

Sources: Port of Seattle, 2016; Washington State Office of Financial Management, 2012; Washington State Employment Security Department, 2016; Washington State Department of Revenue, 2016; Community Attributes Inc., 2016.

Adding together these two drivers of economic impacts, Washington’s cruise ship industry supports a total of 6,250 jobs, \$365.2 million in labor income, and \$1.3 billion in revenue in Washington through direct, indirect, and induced impacts. (Exhibit 38)

Exhibit 38. Total Economic Impacts of Cruise Ships, 2015

	Direct	Indirect	Induced	Total
Jobs	2,550	1,460	2,250	6,250
Labor Income (mils 2015 \$)	172.9	79.3	113.0	365.2
Revenue (mils 2015 \$)	667.6	296.8	348.4	1,312.9

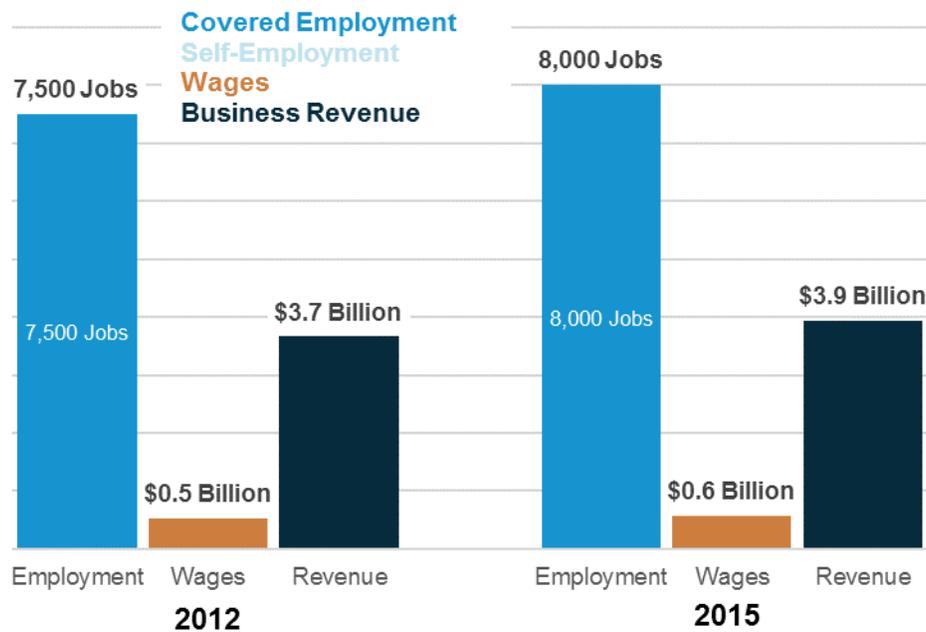
Sources: Port of Seattle, 2016; Washington State Office of Financial Management, 2012; Washington State Employment Security Department, 2016; Washington State Department of Revenue, 2016; Community Attributes Inc., 2016.

The Port of Seattle’s Bell Street Terminal 66 building is currently undergoing a \$30 million renovation targeted to wrap up in early April 2017. The renovation is part of a 15-year lease signed between Norwegian and the Port of Seattle, in which the two entities agreed to each contribute \$15 million in upgrades to facilities at Terminal 66. Norwegian will enjoy use of the facilities—though not exclusive use—which includes extensive structural renovation, development of new ticketing spaces, passenger waiting rooms, and check-in kiosks. The renovations will not add any new space to Terminal 66, instead reorganizing and renovating the existing space. (Puget Sound Business Journal, 2017)

Maritime Support Services

The Maritime Support Services subsector covers a broad range of activities, including geotechnical and environmental firms, naval architecture and marine construction firms, law and accounting firms, marine educational services, and maritime associations. Together, these diverse entities provide a support structure for the broader Maritime Sector, training new workers, and connecting the state’s maritime firms. **Exhibit 39** summarizes the key metrics across this subsector for 2012 and 2015.

Exhibit 39. Maritime Support Services Jobs, Business Revenue, and Wages, Washington State, 2012 and 2015

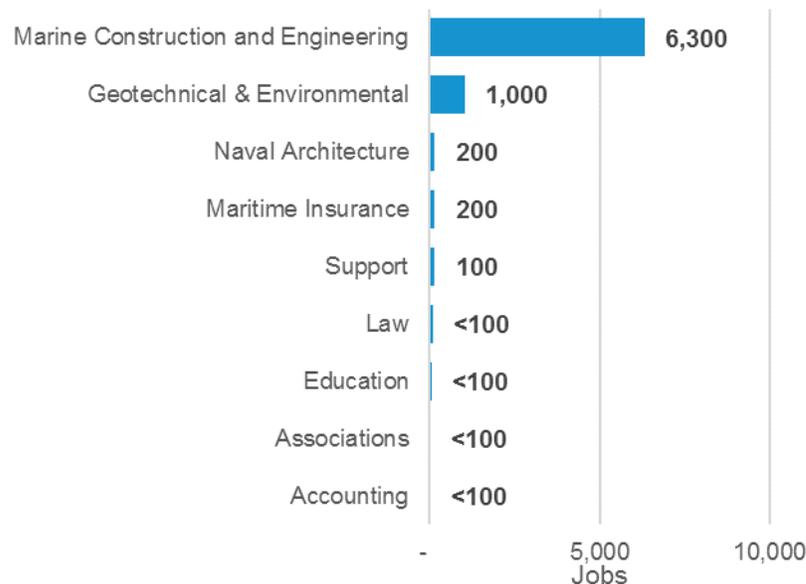


Sources: Washington State Employment Security Department, 2016; United States Census Bureau, 2014; Community Attributes Inc., 2016.

Naval engineering and marine construction is the largest Maritime Support Services category in Washington’s Maritime Sector, with 6,300 direct jobs in 2015. This category includes construction and architecture firms that specialize in designing and building structures on or near the water. There is a unique set of skills and competencies required to design safe buildings on piers or near bodies of water. The Maritime Support Services subsector also includes geotechnical and environmental services firms.

Together, these firms employed 1,000 people in 2015. Naval architects are companies that design boats and ships. In 2015, naval architecture firms in Washington employed a total of 200 people. Maritime insurance employed approximately 200 workers in 2015, insuring everything from fishing vessel hulls to the workers that tend them. Other support services like educational institutions, professional associations, law firms, and accounting firms, together employed just under 400 workers in 2015. (Exhibit 40)

Exhibit 40. Maritime Support Services Subsector Employment, 2015



Sources: Washington State Department of Revenue, 2016; Washington State Employment Security Department, 2016; United States Census Bureau, 2014; Community Attributes Inc., 2016.

Naval architecture includes boat and ship design firms like **Art Anderson Associates**, **Glosten Associate**, **Jensen Maritime Consultants**, and the **Elliot Bay Design Group**. These companies design ferries, cruise ships, tugboats, research vessels, and other ships for commercial clients, NOAA, and Washington State Ferries. Naval architecture firms also often provide engineering services and some offer transportation planning services.

Marine architecture and construction requires a different skillset from general construction, as builders must account for and address issues unique to construction on or around the water. Building on piers or close to saltwater provides unique challenges for construction firms to overcome.

Ballard Marine Construction, for example, is a marine infrastructure and utility contractor. The company's headquarters are located in Washougal, Washington, and it has satellite offices around the nation. The company has worked on waterfront and port properties, hydroelectric power plants, tunnels, water utilities systems, nuclear power systems, marine salvage projects, and industrial projects. For marine construction, the company has provided services ranging from piling repair and pile driving to underwater painting and coating.

KALM Seas Insurance is a relatively new maritime insurance company in Washington. The firm acts as an intermediary between insurance providers and customers, and provides policies on cargo insurance, hull insurance, and marine liability insurance, among others.

Geotechnical and environmental companies provide valuable services to the state's maritime sector. These services include environmental impact analysis, geotechnical analysis and engineering, and environmental remediation, among others. **Envirocon** is an international environmental remediation firm. The company has a location in Kennewick, Washington. Environmental impact analysis and remediation can have positive impacts on water-reliant communities and industries.

O'Neill Service Group also provides environmental services, focusing on marine construction and environmental compliance. The company also provides independent quality assurance and quality control services on public infrastructure projects. Recent projects include work for Sound Transit, Port of Seattle, and WSDOT.

Like any other industry, the maritime sector also relies on a supporting ecosystem of legal and accounting firms to function. Washington is home to several legal and accounting firms that specialize in serving clients in the Maritime Sector. With sector-specific legal considerations like the Jones Act, Defense Base Act, and Longshore and Harbor Worker's Compensation Act, it is no surprise that the state would be home to maritime-specific legal services. One such example is **Blue Water Legal**, an Edmonds-based law firm that serves longshoremen, boat builders, and other maritime workers.

Washington's Maritime Sector relies on a large number of specialized, technical occupations. For this reason, the state is home to many educational institutions and private educational services. These organizations train prospective maritime workers, providing a source of qualified talent to the growing Maritime Sector. **Seattle Maritime Academy**, the Ballard-based training center at Seattle Central College, is one example. The Seattle Maritime Academy offers four main programs:

- **Marine Deck Technology**, which includes shipboard and classroom experience to educate students on the theory, design, maintenance, and operation of deck equipment. This program trains prospective deckhands in navigation, marine math, vessel handling, and general seamanship.
- **Marine Engineering Technology**, which offers simulator exercises and classroom instruction on marine propulsion, electrical, and hydraulic systems to train workers for employment as ship engineers.
- **Professional Development**, which provides training to workers in private sector companies, government agencies, the military, and unions. The program is designed to help maritime workers obtain new certifications or renew existing certifications.
- **Continuing Education**, which is a certificate program that trains students in a variety of marine subjects. Examples include electricity for small boats and recreational boaters and marine diesel engine maintenance and operation for boaters.

Washington's maritime associations strengthen the links between the industry's disparate activities. The **Washington Maritime Federation** and **Washington Public Ports Association** are two examples. These groups connect industry stakeholders, advocate for the industry in public settings, and provide forums to discuss and address the industry's strengths and challenges.

ECONOMIC IMPACTS

Economic impact analysis helps describe a industry’s role in a broader economy in terms of additional jobs, wages, and business revenue in other industries supported by a industry’s direct activities. Direct impacts are employment, wage, and business revenue for a given industry. Washington’s Maritime Sector represents 69,500 direct jobs, \$5.9 billion in direct wages, and \$17.1 billion in direct revenue in 2015. The direct revenue total also reflects an adjustment of wholesale industry revenue to capture only gross margins from wholesaling activities, and not the underlying value of the good. This is common practice in economic impact modeling, as only gross margins are considered industry revenue for wholesaling activities.

Indirect and Induced impacts

The Maritime Sector has impacts that spread throughout Washington’s economy. Maritime businesses make purchases from other industries, driving indirect impacts. At the same time, wages supported by direct and indirect activities are spent by residents throughout the state of Washington, driving induced impacts. Together, indirect and induced impacts compose secondary impacts.

Factoring in secondary impacts, Washington’s Maritime Sector supported a total of 191,100 jobs throughout the state. For every direct job in the industry, an additional 1.8 jobs were supported elsewhere in the state. The industry’s labor income impacts were also significant: for every dollar in direct labor income paid to workers in Washington’s Maritime Sector, an additional \$1.06 in labor income was supported elsewhere in the state economy. In terms of revenue impacts, every dollar in revenue was associated with an additional \$1.2 in business revenue elsewhere in the state economy. (Exhibit 41)

Exhibit 41. Economic Impacts of Washington State Maritime Sector, 2015

	Direct	Indirect	Induced	Total
Jobs	69,500	44,500	77,100	191,100
Labor Income (mils 2015 \$)	6,097.4	2,554.3	3,882.4	12,534.1
Revenue (mils 2015 \$)	17,142.1	8,707.6	11,967.3	37,817.1

Sources: Washington State Office of Financial Management, 2012; Washington State Department of Revenue, 2016; Washington State Employment Security Department, 2016; United States Census Bureau, 2014; Community Attributes Inc., 2016.
 Note: Total revenue used for economic impact estimates includes an adjustment to wholesale industry revenue. This adjustment uses gross margins, which prevents the value of goods sold through wholesale from being counted more than once.

Fiscal impacts

Washington's Maritime Sector also drives fiscal impacts, directly paying state B&O taxes as well as Sales & Use taxes. In 2015, the sector paid \$119.3 million in state taxes. There are also state tax payments associated with business activity supported through secondary economic impacts. In 2015, the industry's secondary fiscal impacts totaled \$252.9 million in state taxes. (**Exhibit 42**)

Maritime state fiscal impacts include additional taxes generated from specific harvests. In many cases, these funds are used to protect maritime habitats and the sustainable vitality of these harvest grounds. For example, in fiscal year 2016 the non-tribal geoduck harvest generated nearly \$14.5 million in revenues for the state. Half of these revenues were allocated to the Aquatic Lands Enhancement Account, primarily for derelict vessel removal, the Department of Fish and Wildlife, to fund Recreation and Conservation Office grants, and the Washington State Department of Agriculture invasive species mitigation work. The remaining 50% of these funds went to the Resource Management Cost Account for aquatic lands, earmarked for Washington State Department of Natural Resources for programs such as aquatics lands management.

Exhibit 42. Direct and Secondary Fiscal Impacts of Maritime, Millions, Washington, 2015

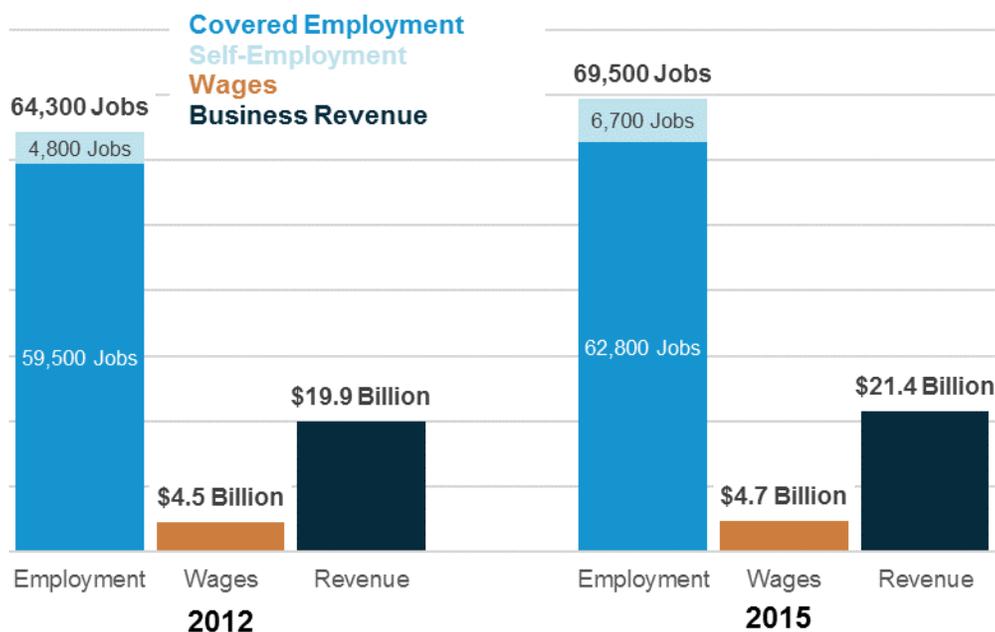
	Direct	Secondary	Total
B&O	\$46.5	\$78.2	\$124.7
Sales & Use Taxes	\$72.8	\$147.2	\$220.0
Other	\$0.0	\$27.4	\$27.4
Total	\$119.3	\$252.9	\$372.2

Sources: Washington State Office of Financial Management, 2012; Washington State Department of Revenue, 2016; Washington State Employment Security Department, 2016; United States Census Bureau, 2014; Community Attributes Inc., 2016.

CONCLUSION

Washington's Maritime Sector is an important component of the state's economy, accounting for 69,500 direct jobs in 2015, \$4.7 billion in wages, and \$21.4 billion in revenue. The Maritime Sector has grown in each of these three metrics since 2012, adding 5,000 jobs, \$200 million in wages, and \$1.5 billion in business revenue between 2012 and 2015. (Exhibit 43)

Exhibit 43. Maritime Sector Jobs, Wages, and Business Revenue, 2012 and 2015



Sources: Washington State Department of Revenue, 2016; Washington State Employment Security Department, 2016; United States Census Bureau, 2014; Community Attributes Inc., 2016.

For every dollar in direct revenue generated by the Maritime Sector, an additional \$1.2 was supported elsewhere in Washington's economy through the effects of Maritime Sector wage expenditures and business-to-business transactions.

The industry also has important impacts to jobs and wages, with each direct Maritime Sector job supporting an additional 1.73 jobs in other industries and each dollar of wages paid in the Maritime Sector supporting an additional \$1.07 in wages in other industries. (Exhibit 44)

**Exhibit 44. Washington Maritime Sector
Economic Impact Multipliers, 2015**

Type	Multiplier
Total output per \$ final demand	2.19
Total jobs per direct job	2.73
Total labor income per \$ direct income	2.07

Sources: Washington State Office of Financial Management, 2012; Washington State Department of Revenue, 2016; Washington State Employment Security Department, 2016; United States Census Bureau, 2014; Community Attributes Inc., 2016.

Overall, the Maritime Sector supported an additional 121,600 jobs, \$6.4 billion in labor income, and \$20.4 billion in business revenue throughout the Washington State economy due to secondary economic impacts. (Exhibit 45)

Exhibit 45. Washington Maritime Sector Economic Impacts, 2015

	Direct	Indirect	Induced	Total
Jobs	69,500	44,500	77,100	191,100
Labor Income (mils 2015 \$)	6,097.4	2,554.3	3,882.4	12,534.1
Revenue (mils 2015 \$)	17,142.1	8,707.6	11,967.3	37,817.1

Sources: Washington State Office of Financial Management, 2012; Washington State Department of Revenue, 2016; Washington State Employment Security Department, 2016; United States Census Bureau, 2014; Community Attributes Inc., 2016.

Note: Total revenue used for economic impact estimates includes an adjustment to wholesale industry revenue. This adjustment uses gross margins, which prevents the value of goods sold through wholesale from being counted more than once.

APPENDIX

Industry Definition

2013 Study Definition

In 2013, Community Attributes Inc., in partnership with the Economic Development Council of Seattle-King County, developed the following definition of the state's Maritime Sector (including 6-digit NAICS codes, where applicable):

- Boat Building, Repair and Maintenance
 - Ship building and repairing (336611)
 - Boat building (336612)
 - Puget Sound Naval Shipyard (Custom)
- Commercial Fishing and Seafood Products
 - Finfish farming and fish hatcheries (112511)
 - Shellfish farming (112512)
 - Finfish fishing (114111)
 - Shellfish fishing (114112)
 - Seafood product preparation and packaging (311710)
 - Older: seafood canning (311711)
 - Older: Fresh and frozen seafood processing (311712)
 - Fish and seafood merchant wholesalers (424460)
 - Fish and seafood markets (445220)
- Maritime Logistics and Shipping
 - Deep sea freight transportation (483111)
 - Coastal and great lakes freight transport. (483113)
 - Inland water freight transportation (483211)
 - Support activities for rail transportation (488210)
 - Port and harbor operations (488310)
 - Marine cargo handling (488320)
 - Navigational services to shipping (488330)
 - Freight transportation arrangement (488510)
 - Refrigerated warehousing and storage (493120)
 - Rail (custom)
 - Trucking (custom)

- Water Transportation—Passenger
 - Coastal and great lakes passenger transport. (483114)
 - Inland water passenger transportation (483212)
 - Deep sea passenger transportation (483112)
 - Scenic and sightseeing transportation, water (487210)
 - Other support activities for water transport. (488390)
- Maritime Support Services
 - Boat dealers (441222)
 - Marinas (713930)
 - Geotechnical and Environmental Engineering (custom)
 - Law and Accounting (custom)
 - Naval Architecture (custom)

2015 Study Definition

For the 2015 industry update, one of the Washington Maritime Federation’s primary goals was to realign the industry definition to better represent the broad range of maritime activities in Washington. The first main definitional change was to split out recreational boat building, sport fishing, and other leisure-related services into a new category.

The new definition also employs a more complete Maritime Support Services subsector. Custom analysis was undertaken for subsectors that were not adequately defined by NAICS codes alone. This entails assembling a list of businesses in the subsector through interviews, industry association member lists, and other supplemental sources.

CAI then submitted these lists to the state Employment Security Department for custom employment totals. CAI removed jobs from other subsectors where applicable. For example, many jobs attributed to the recreational boat building subsector were originally included in the boat building NAICS (336612) and had to be removed. The 2015 definition is as follows (including 6-digit NAICS codes, where applicable):

- Ship and Boat Building, Repair and Maintenance
 - Ship building and repairing (336611)
 - Boat building (336612)
 - Puget Sound Naval Shipyard (Custom)
- Recreational Boating and Boat Building
 - Recreational Boat Building (Custom)
 - Charter Fishing (Custom)

- Marinas (713930)
- Boat dealers (441222)
- Scenic and sightseeing transportation, water (487210)
- Commercial Fishing and Seafood Products
 - Finfish farming and fish hatcheries (112511)
 - Shellfish farming (112512)
 - Finfish fishing (114111)
 - Shellfish fishing (114112)
 - Seafood product preparation and packaging (311710)
 - Fish and seafood merchant wholesalers (424460)
- Maritime Logistics and Shipping
 - Deep sea freight transportation (483111)
 - Coastal and great lakes freight transport. (483113)
 - Inland water freight transportation (483211)
 - Support activities for rail transportation (488210)
 - Port and harbor operations (488310)
 - Marine cargo handling (488320)
 - Navigational services to shipping (488330)
 - Freight transportation arrangement (488510)
 - Refrigerated warehousing and storage (493120)
 - Rail (custom)
 - Trucking and Drayage (custom)
 - Warehousing (custom)
- Passenger Water Transportation
 - Deep sea passenger transportation (483112)
 - Coastal and great lakes passenger transport. (483114)
 - Inland water passenger transportation (483212)
 - Other support activities for water transport. (488390)

- Maritime Support Services
 - Geotechnical & Environmental (Custom)
 - Naval Architecture (Custom)
 - Law (Custom)
 - Accounting (Custom)
 - Associations (Custom)
 - Education (Custom)
 - Marine Construction and Engineering (Custom)
 - Maritime Insurance (Custom)
 - Other support (Custom)

Economic Impacts

Types of Economic Impacts

Economic impact modeling considers three types of impacts, summarized below. In this report, indirect and induced impacts are collectively referred to as **secondary impacts**.

- **Direct impacts** are the revenues, wages, and jobs directly attributable to the industry or organization. This includes revenue sources like ticket sales or donations, wages paid by the aquarium, and workers employed at the aquarium.
- **Indirect impacts** refer to additional economic activity, measured in jobs, wages, and revenues, supported by inter- and intra-industry transactions associated with the direct activities being modeled. When the Seattle Aquarium buys fish feed, for example, that transaction has indirect impacts.
- **Induced impacts** are additional revenues, wages, and jobs associated by income expenditures among employees supported through direct and indirect impacts.

Statewide

Economic impacts of Washington Maritime and related activities were calculated through use of the 2012 Washington State Input-Output Model, published by the Washington State Office of Financial Management. The I-O model is an analytic tool for assessing the intra- and inter-industry linkages and sources of final demand within a defined economy.

County

In order to provide detailed economic impacts in select counties in Washington, CAI employed location quotient adjusters. Location quotients describe an industry's concentration in an area compared to that same industry's concentration in a larger area. For example, the location quotient for deep sea freight transportation in King county would be calculated as follows:

$$\text{Location Quotient} = \frac{\frac{\text{Total Deep Sea Freight Transportation Employment in King County}}{\text{Total Employment in King County}}}{\frac{\text{Total Deep Sea Freight Transportation Employment in Washington}}{\text{Total Employment in Washington}}}$$

After developing location quotients for each industry in each select county, CAI used these coefficients to adjust inter-industry transactions down for industries in which a county had less-than-average employment concentration as represented by a location quotient less than 1.⁸

⁸ For more information on using location quotients for economic impact analysis, please see Bess, Rebecca and Zoe Ambargis. "Input-Output Models for Impact Analysis: Suggestions for Practitioners Using RIMS II Multipliers," Bureau of Economic Analysis, 2011.

CAI estimated the share of wage expenditures made by employees in a county by leveraging data from Longitudinal Employer-Household Dynamics. This data uses home and work locations of people employed in a county to estimate where spending occurs.

As a result of this analysis, impacts of maritime activities by county represent the impacts of maritime activities in that county only, and do not include additional impacts in other counties. For example, wage expenditures made by Snohomish County maritime employees in King County would not be included in Snohomish County's maritime impacts.

Fiscal Impacts

In order to arrive at estimated direct fiscal impacts for the maritime sector, CAI leveraged data from the Washington State Department of Revenue describing taxes paid by industry. Taxes by type were summed up into industries, and then effective tax rates were estimated by dividing taxes paid by total industry revenue. These rates were then applied to the relevant industry's revenue. These impacts only include taxes paid to the state and do not include local taxes.

Recreational Boating and Boat Building

In 2013, the National Marine Manufacturer's Association (NMMA) published a study on Recreational Boating for every state in the US. This study leverages 2012 data provided by Environmental Systems Research Institute (Esri) on jobs by custom industry sector as well as estimates of boater spending by state. The NMMA study has several differences from the methodology used in this report.

First, the NMMA paper uses employment estimates based on business directory data published by Esri. This data relies on survey feedback and assigns an 8-10 digit NAICS code to each business. This system adds more specificity than the official 6-digit NAICS code. This data is consistently available for all 50 states. The CAI analysis relies on data published by the Washington State Employment Security Department (ESD) for industries by 6-digit NAICS codes as well as custom employment data aggregated per special requests. For example, CAI submitted a list of recreational boat builders to ESD and received the official covered employment total for those businesses.

Second, the NMMA study considers a broader range of activities under the "Recreational Boating" industry. The NMMA definition includes spending from boaters (such as retail purchases of gasoline, food, and paint, among others) as well as direct suppliers to boat builders (such as diesel engine manufacturers). The CAI study does not consider these direct activities for economic impact modeling purposes as these businesses rely on purchases from direct industry activities. In the example of diesel engine manufacturers, the amount of diesel engine manufacturing business supported by recreational boat builders in Washington would be included under indirect impacts. For more detail on economic impact modeling, please see "Economic Impacts" in the Appendix above.

Third, some activities included in the NMMA study are included in different sectors in the CAI study. For example, the NMMA study includes dock construction in its definition of Recreational Boating. Dock construction is included under “Maritime Support Services” in the subcategory “Construction” in the CAI study because it is not directly related in recreational boating or boat building activities.

In-Depth Interviews

Interviews were completed with industry leaders from the following organizations:

- Ballard Oil
- BNSF
- Fishing Vessel Owners’ Association
- Freezer Longline Coalition
- KALM Seas Maritime Insurance
- LaCasse Maritime
- MacMillan-Piper
- Pacific Northwest Seafood Processors
- Port of Seattle

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