Port of Seattle, Port of Tacoma, and The Northwest Seaport Alliance

# ECONOMIC IMPACT ANALYSIS

*Produced By:* cai community attributes inc

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*Community Attributes Inc. tells data-rich stories about communities that are important to decision makers.*


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# ECONOMIC IMPACTS

## The Northwest Seaport Alliance (2017)

**$12.4 B**
Total Business Output

**58,400**
Total Jobs

**$4.0 B**
Total Income

**27.6 M**
Metric Tons of Cargo Handled

**3.7 M**
Twenty-Foot Equivalent Units (TEUs)

**146,900**
Autos Transported

## Port of Seattle Cruise Ship Industry (2019)

**$893.6 M**
Total Business Output

**5,500**
Total Jobs

**1.2 M**
Passengers, 2019

**13%**
Compound Annual Growth Rate of Passengers, 2000-2019

## Port of Seattle Commercial Fishing (2017)

**$1.4 B**
Total Business Output

**11,300**
Total Jobs

**300**
Fishing Vessels Utilized Port of Seattle Facilities

**1.3 M**
Metric Tons Harvested by POS Customers in North Pacific Fisheries

## Other Port of Seattle Activities Including Recreational Marinas (2017)

**$1.6 B**
Total Business Output

**8,400**
Total Jobs

**4**
Recreational Marinas

**$2.6 M**
Revenues Generated through Moorage

## Other Port of Tacoma Activities (2017)

**$1.6 B**
Total Business Output

**5,200**
Total Jobs

**$326.9 M**
Total Income

**2.3 M**
Sq Ft of Warehouses, Offices, Industrial, and Other Buildings

*Sources: Port of Seattle, 2018; Puget Sound Regional Council, 2018; Pacific Maritime Association, 2018; BNSF, 2018; Union Pacific, 2018; Washington Maritime Federation, 2018; The Northwest Seaport Alliance, 2018; Alaska Commercial Fishing Entry Commission, 2018; Washington State Office of Financial Management, 2018; Washington State Employment Security Department, 2018; Washington State Department of Revenue, 2018; Puget Sound Regional Council, 2019; Community Attributes Inc., 2019.*

Port of Seattle

Port of Tacoma

THE NORTHWEST SEAPORT ALLIANCE

# EXECUTIVE SUMMARY

The Ports of Seattle and Tacoma combined represent a core economic development asset for businesses and communities in Washington state and elsewhere in the U.S. Both ports facilitate the movement of millions of twenty-foot equivalent units (TEUs) of containerized cargo as well as millions of metric tons of breakbulk, automobiles, logs, and liquid bulk. Both ports are also host to industrial and non-industrial activities that spur job growth and economic wealth creation in the Central Puget Sound and Washington state. The Port of Seattle facilities support a large and growing cruise ship industry and serve approximately half of the North Pacific Fisheries Fleet.

**Exhibit E1. Estimated Direct Impacts of Activities at The Northwest Seaport Alliance, Port of Seattle, and Port of Tacoma, Washington, 2017 and 2019**

| | Jobs | Business Output (mils) | Labor Income (mils) |
|---|---|---|---|
| The Northwest Seaport Alliance (2017) | 20,100 | $5,858.7 | $1,902.7 |
| Containerized Cargo | 14,900 | $4,537.6 | $1,502.5 |
| Automobiles | 1,300 | $308.8 | $108.4 |
| Breakbulk, Logs and Other Cargo | 3,900 | $1,012.2 | $291.9 |
| Port of Seattle Cruise Industry (2019, 2018$) | 3,000 | $467.8 | $122.7 |
| Port of Seattle Commercial Fishing (2017) | 7,200 | $671.3 | $313.4 |
| Port of Seattle Recreational Marinas and Other Business (2017) | 3,600 | $728.8 | $357.2 |
| Port of Tacoma Tenants and Other Business (2017) | 1,500 | $852.2 | $114.3 |

*Sources: Puget Sound Regional Council, 2019; Washington State Employment Security Department, 2018; Washington State Department of Revenue, 2018; The Northwest Seaport Alliance, 2018; Port of Seattle, 2018; Port of Tacoma, 2018; Community Attributes Inc., 2019.*

**Exhibit E2. Total Economic Impacts of Activities at The Northwest Seaport Alliance, Port of Seattle, and Port of Tacoma, Washington, 2017 and 2019**

| | Jobs | Business Output (mils) | Labor Income (mils) |
|---|---|---|---|
| The Northwest Seaport Alliance (2017) | 58,400 | $12,385.4 | $4,018.5 |
| Containerized Cargo | 45,500 | $9,722.6 | $3,194.1 |
| Automobiles | 3,300 | $643.4 | $216.6 |
| Breakbulk, Logs and Other Cargo | 9,600 | $2,019.4 | $607.8 |
| Port of Seattle Cruise Industry (2019, 2018$) | 5,500 | $893.6 | $260.1 |
| Port of Seattle Commercial Fishing (2017) | 11,300 | $1,438.0 | $543.0 |
| Port of Seattle Recreational Marinas and Other Business (2017) | 8,800 | $1,618.0 | $642.0 |
| Port of Tacoma Tenants and Other Business (2017) | 8,400 | $1,552.8 | $616.5 |

*Sources: Washington State Office of Financial Management, 2018; Community Attributes Inc., 2019.*

## The Northwest Seaport Alliance

The Northwest Seaport Alliance (NWSA) represents one of the largest marine cargo gateways in the U.S. In 2017, The Northwest Seaport Alliance handled more than 3.7 million twenty-foot equivalent units (TEUs) of containerized cargo. The majority of this cargo was international, though 700,000 TEUs were shipped to and from Alaska, Hawaii, and other domestic locations. In addition to containerized shipping, The Northwest Seaport Alliance also handles non-containerized cargo, including breakbulk, liquid bulk, automobiles, and logs. In total, nearly 27.6 million metric tons of cargo was handled at The Northwest Seaport Alliance facilities in 2017.

Within the NWSA, the largest driver of economic impact was containerized cargo. The NWSA containerized cargo facilities include six properties in the South Harbor and five in the North Harbor. In 2017, the NWSA handled more than 26.1 million metric tons of containerized cargo, directly supporting an estimated 14,900 jobs, $1.5 billion in labor income (including wages and monetized benefits), and $4.5 billion in business output. (**Exhibit E-1**)

In 2017, 146,900 automobiles were handled at the Port of Tacoma, totaling 224,900 metric tons of cargo. Automobile import activities directly supported 1,330 jobs in 2017, as well as more than $108.4 million in labor income and nearly $309 million in business output. (**Exhibit E-1**)

Breakbulk cargo transported through the NWSA include agriculture and mining equipment, military hardware, as well as other cargo that can be transported via roll-on/roll-off (RoRo) vessels. Breakbulk cargo totaled nearly 211,000 metric tons in 2017. The NWSA also handled nearly 53 million board feet of logs (278,100 metric tons), 715,500 metric tons of fuel, and nearly 36,000 metric tons of molasses in 2017. Breakbulk and other marine cargo handling directly supported 3,880 jobs in 2017, nearly $292 million in labor income and more than $1 billion in business output. (**Exhibit E-1**)

Combined across all marine cargo activities, the NWSA directly supported 20,100 jobs, and $1.9 billion in labor income in 2017. The average annual wage among direct jobs supported by marine cargo through the NWSA, including benefits, was nearly $95,000. In total, the NWSA marine cargo directly supported $5.9 billion in business output in 2017. (**Exhibit E-1**)

Factoring in upstream business-to-business transactions (indirect) and worker earned income household consumption expenditures (induced), the NWSA activities supported 58,400 jobs across the state economy, or the equivalent of a job multiplier of 2.9. In other words, for every direct job, marine cargo activities through the NWSA support an additional 1.9 jobs throughout the Washington state economy.

## Cruise Ship Operations at the Port of Seattle

In 2019, the Port of Seattle will host 213 calls from ten different cruise lines and 18 ships. The industry in Seattle has grown from nearly 120,000 passengers in 2000 to an estimated 1.2 million in 2019 for a compound annual growth rate of 13%.

The cruise industry at the Port of Seattle is estimated to directly support nearly 3,000 jobs, with average annual wages including benefits of nearly $41,000. The total economic impact of cruise ships to the state economy in 2019, including direct, indirect, and induced impacts, is estimated at 5,500 jobs, $260.1 million in labor income, and $893.6 million in business output (**Exhibits E-1 and E-2**). The direct and secondary activities of cruise operations in 2019 are expected to generate $10.7 million in state sales and use taxes, and an additional $3.8 million in business and occupation taxes and other statewide taxes.

## Port of Seattle Commercial Fishing

In 2017, more than 300 fishing vessels utilized Port of Seattle facilities. Of these, 226 were identified as actively fishing in Alaskan fisheries, based on the Alaska Commercial Fishing Entry Commission licensing data. In many cases, vessels that spend more time at other locations still depend on Port infrastructure for loading and offloading, on-dock repairs and maintenance, and provisioning. These include fish processors based in Lake Union that use the Port's facilities for loading and unloading infrastructure as well as vessels based in Alaska that periodically moor at the Port of Seattle for scheduled repairs.

Fishing vessels that moored at Port of Seattle facilities operating in the Alaskan fisheries generated gross earnings of more $455.0 million. An additional $26.6 million in revenues were earned in waters outside of Alaska, such as in the Puget Sound and Washington's west coast, based on ex-vessel wholesale value. Additional revenues were generated among various support services and on-shore Port of Seattle tenants and Port of Seattle services. Factoring in all segments of commercial fishing at the Port of Seattle, these activities generated more than $671.2 million in business output in 2017.

In 2017, an estimated 7,200 jobs were directly associated with commercial fishing at the Port of Seattle. These jobs supported labor compensation of $313.4 million. Overall, direct commercial fishing jobs associated with Port of Seattle facilities had an annual average wage, including benefits, of $43,500 in 2017, in part reflecting the seasonal nature of many commercial fishing jobs.

Factoring in indirect and induced impacts, the total statewide economic impact of commercial fishing operations summed to 11,300 jobs, $543.0 million in labor income, and more than $1.4 billion in business output in 2017 (**Exhibits E-1 and E-2**). Statewide fiscal impacts summed to $13.2 million.

## Port of Seattle Recreational Marinas and Other Port Business

The Port of Seattle is home to an extensive portfolio of real estate assets and tenants, providing real estate for a wide variety of businesses outside of those that directly handle marine cargo included under The Northwest Seaport Alliance. The Port of Seattle is home to four recreational marinas: Shilshole Marina, Harbor Island Marina, Salmon Bay Marina, and Bell Harbor Marina. The Port also provides facilities and moorage for tugs and barges, as well as research vessels.

There were an estimated 200 jobs directly tied to recreational marinas, with an associated $13.9 million in labor income and $29.6 million in revenues. Other Port business directly supported an estimated 3,400 jobs, $343.3 million in labor income, and $699.2 million in business output. Recreational marinas and other Port business supported an average annual income of more than $99,200, including benefits. The total economic impact of Port of Seattle recreational marinas and other Port business, including indirect and induced impacts, summed to 8,800 jobs, $642.0 million in total compensation, and more than $1.6 billion in business output. (**Exhibits E-1 and E-2**)

## Port of Tacoma Tenants and Other Business

The Port of Tacoma has more than 2,700 acres of real estate property. Many tenants on those properties directly support the marine cargo operations of The Northwest Seaport Alliance. However, the Port of Tacoma is home to a wide range of industrial and non-industrial tenants and activities. Outside of the NWSA marine cargo operations, the Port of Tacoma also provides bulk cargo operations at the TEMCO Grain Terminal, as well as bulk gypsum operations for the wallboard manufacturing activities of Georgia Pacific Gypsum.

In 2017, Port of Tacoma tenant and bulk activities summed to 1,500 direct jobs, $849.4 million in business output, and $109.8 million in labor income. Total economic impacts from these activities summed to 5,200 jobs, $326.9 million in labor compensation, and $1.6 billion in business output (**Exhibits E-1 and E-2**). Port of Tacoma tenant activities and other Port of Tacoma business supported an average annual income, including benefits, of more than $76,000. These activities supported $15.4 million in state taxes through direct and secondary activities.

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# INTRODUCTION

## Background and Purpose

The Ports of Seattle and Tacoma combined represent a core economic development asset for businesses and communities both in Washington state and elsewhere in the U.S. The Northwest Seaport Alliance is one of the largest marine cargo gateways in the U.S. In 2017, nearly 27.6 million metric tons of cargo were handled by the NWSA at the Ports of Seattle and Tacoma. The majority of the 3.7 million TEUs of container cargo shipped through the NWSA were international, though 700,000 TEUs were shipped to and from Alaska, Hawaii, and other domestic locations. Both ports are also host to industrial activities that spur job growth and economic wealth creation in the Central Puget Sound and Washington state. The Ports of Tacoma and Seattle provide industrial land for manufacturing, warehousing, energy and resource activities, and more. Port of Seattle facilities are key assets for approximately half of the North Pacific Fisheries Fleet and support the large and growing cruise ship industry.

This report provides a comprehensive evaluation of the economic impacts of these varied activities directly tied to port operations, broken out by the following:

- **The Northwest Seaport Alliance**. Representing containerized cargo, auto imports, breakbulk, and bulk shipments across the Ports of Seattle and Tacoma.
- **Other Port of Seattle Activities and Tenants**. Including commercial fishing, recreational marinas, cruise ships, and other tenants at the Port of Seattle.
- **Other Port of Tacoma Activities and Tenants**. Including grain and gypsum cargo operations, port-based manufacturers, non-industrial tenants, and other non-NWSA activities resident at the Port of Tacoma.

Analytics include estimated direct activities—measured in jobs, income, and business output—directly supported by the above activities and associated nearby services directly tied to port operations (such as off-site transloading) and the broader economic and fiscal impacts of these activities to the state economy.

## Data and Methods

Data used in this report draw from several sources, including state and federal employment and wage files maintained by the Washington State Employment Security Department, Puget Sound Regional Council, and U.S. Bureau of Labor Statistics; gross business income published by the Washington State Department of Revenue; cargo and trade statistics

published by the U.S. Census Bureau and provided by the Ports of Tacoma and Seattle and The Northwest Seaport Alliance; and other relevant information maintained and provided by the Ports of Tacoma and Seattle and The Northwest Seaport Alliance. Direct activities were further modeled to account for missing information when necessary.

Economic impacts include additional jobs, income, and business output supported through upstream business-to-business transactions (indirect impacts) and household consumption expenditures (induced impacts). Fiscal impacts include state tax revenues derived from direct port-related activities, and through multiplier effects among other industries and regions of the state.

## Organization of Report

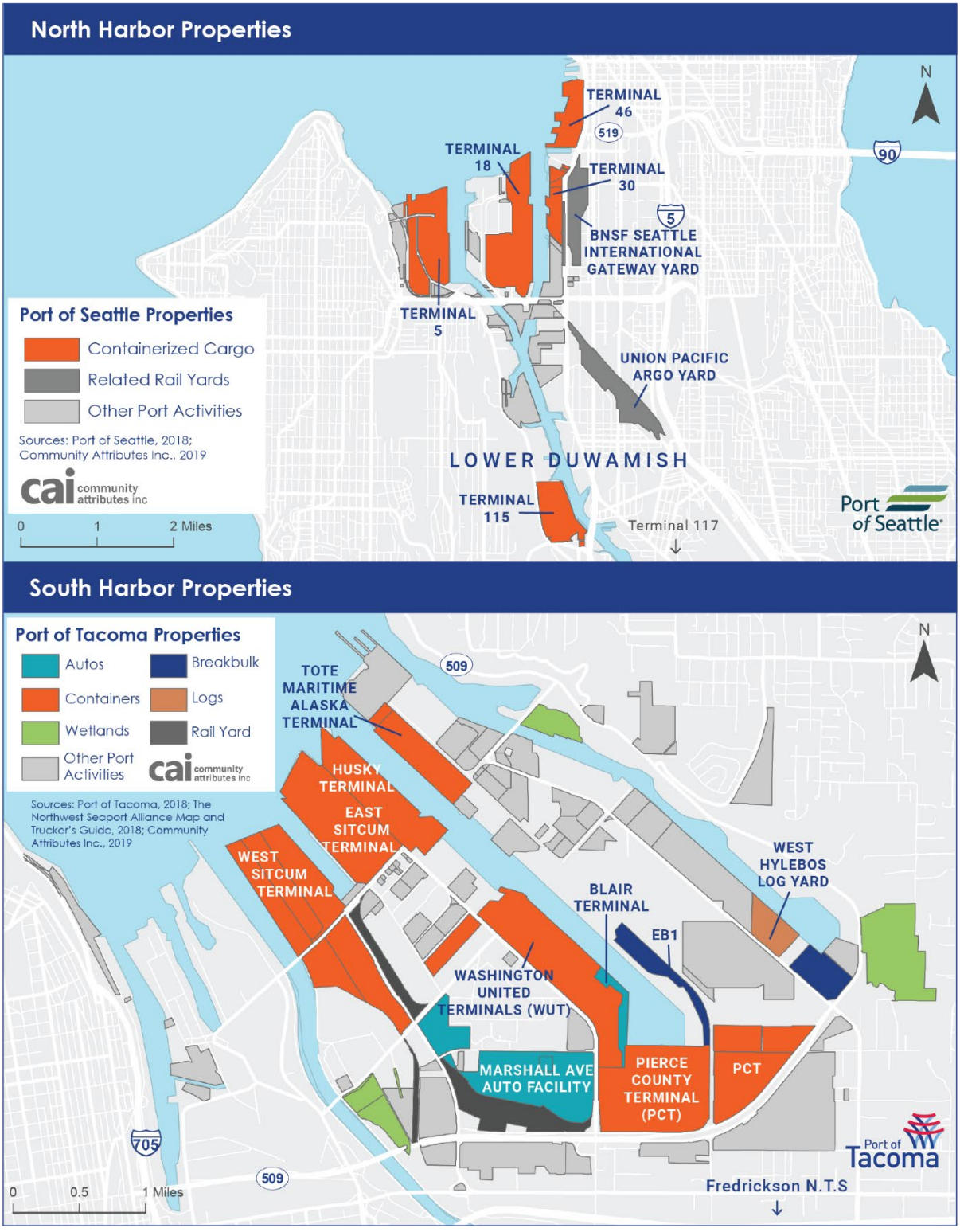
The remainder of this report is organized as follows:

- **The Northwest Seaport Alliance, Port of Seattle, and Port of Tacoma Marine Cargo Activities.** Review of key indicators, facilities, and direct and total impacts for containerized cargo managed by The Northwest Seaport Alliance. Summary of indicators and activities for auto shipping and a review of activities and indicators for breakbulk cargo, logs and lumber, and other cargo managed by The Northwest Seaport Alliance.
- **Port of Seattle Cruise Ship Industry.** Summary of projected cruise ship activities at the Port of Seattle, including homeported vessels, port of calls, passenger spending onshore, vessel and crew provisioning and payroll, and economic and fiscal impacts.
- **Port of Seattle Commercial Fishing**. Size, breadth, and impacts of commercial fishing operations tied to Port of Seattle facilities, including vessels active in the North Pacific Fisheries.
- **Port of Seattle Recreational Marinas and Other Businesses**. Port of Seattle's recreational marinas, associated marina expenses and facilities, as well as the impacts of other port businesses, such as industrial and retail tenants on Port of Seattle properties.
- **Port of Tacoma Tenants and Other Business.** Includes a review of facilities and direct and total impacts for the tenants on Port of Tacoma properties, including both industrial and non-industrial users.
- **Summary and Conclusions.** Summary of key findings.

The Northwest Seaport Alliance

# MARINE CARGO

The Northwest Seaport Alliance, the fourth-largest container gateway in North America, is a marine cargo operating partnership between the Ports of Seattle and Tacoma. The Alliance's containerized cargo operations support jobs, labor income and business output across the state of Washington.



## Organization of this Section

This section provides a detailed, data-rich discussion of the economic contributions of The Northwest Seaport Alliance (NWSA) marine cargo activities, including ongoing operations, the NWSA's role as a gateway for domestic and international trade, and economic and fiscal impacts. The Northwest Seaport Alliance has multiple lines of business. Each is examined in detail.

Findings are organized as follows:

- **Overview of The Northwest Seaport Alliance Facilities and Activities**. A discussion of operations, assets, and overall trade trends.
- **Containerized Cargo Activities**. Leading merchandise and commodity exports and imports by volume and value and economic impacts associated with the handling of this cargo, including jobs, labor income, and business output through the NWSA.
- **Automobile Imports**. The economic value and impacts associated with the handling of automobile imports through the NWSA, including the many jobs and activities involved in the movement of vehicles off roll-on/roll-off vessels to warehousing facilities and vehicle finishing activities.
- **Breakbulk, Logs, and Other Non-Containerized Cargo**. The economic value and impacts associated with the handling of various other types of marine cargo through the NWSA.
- **Summary of NWSA Marine Cargo Impacts**. A summation of impacts across all lines of business for 2017.
- **Fiscal Impacts from NWSA Marine Cargo Activities**. State taxes supported through both direct operations of the NWSA and additional tax revenues through indirect and induced taxable activities across the state economy.

## Overview of The Northwest Seaport Alliance Facilities and Activities

The Northwest Seaport Alliance (NWSA) is a marine cargo operating partnership created in 2014 between the Port of Seattle (North Harbor) and Port of Tacoma (South Harbor). The NWSA, as a combined entity, represents the fourth-largest container gateway in North America. The NWSA manages the majority of marine cargo facilities across both ports, including all containerized cargo operations, breakbulk, automobiles, project/heavy-lift cargoes, and some bulk operations.

The North Harbor has five container terminals, of which four are in use. Terminal 5 is currently vacant (**Exhibit 1**). There are a variety of properties that provide supporting activities to the containerized cargo terminals. The BNSF Seattle International Gateway Yard and the Union Pacific Argo Yard provide essential rail services for containerized cargo activities. Terminal 106, south of Harbor Island and on the east side of the Duwamish River, is used as a container support yard. Terminals 107 (west side of the Duwamish) and Terminal 108 (east side of the Duwamish), just north of Terminal 115, offer moorage for barges.

The South Harbor has six container terminals, as well as Blair Terminal where automobiles are offloaded (**Exhibit 1**). East Blair 1 (EB1) provides services for roll-on/roll-off (RoRo) vessels and the West Hylebos Log Yard provides services for log exports. Terminal 7, on the south end of East Sitcum Terminal, also provides automobile and RoRo services.

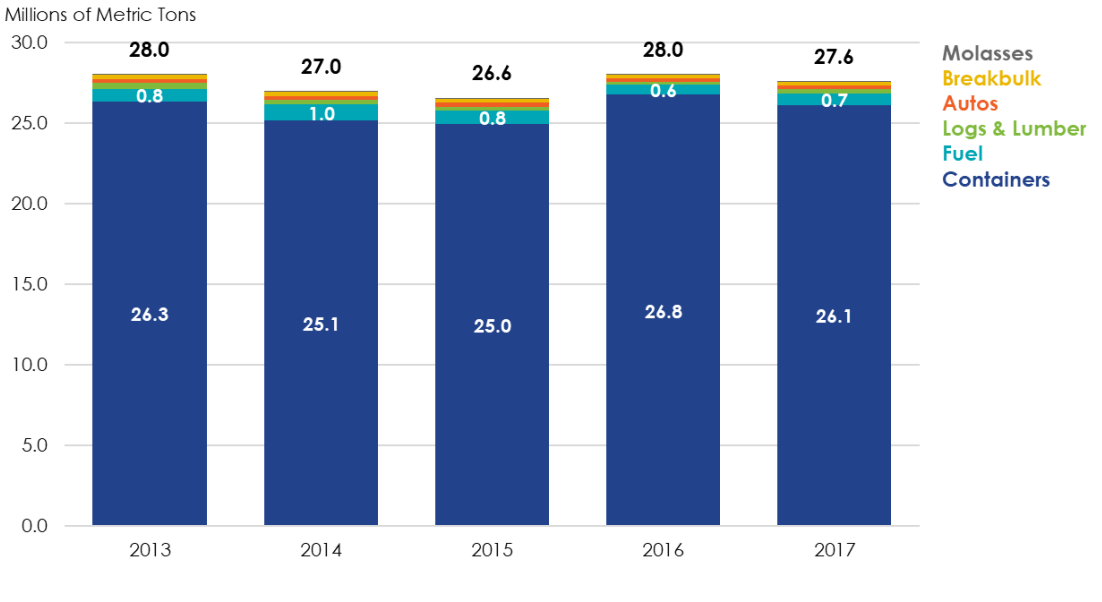
**Exhibit 1. Containerized Cargo Terminals, The Northwest Seaport Alliance**

| Terminal | Harbor | Operator |
|---|---|---|
| East Sitcum Terminal | South | Ports America |
| Husky Terminal | South | Husky Terminal and Stevedoring, Inc. |
| Pierce County Terminal | South | Everport Terminal Services Inc. |
| TOTE Maritime Alaska Terminal | South | TOTE Maritime |
| Washington United Terminals (WUT) | South | Washington United Terminals |
| West Sitcum Terminal (Formerly APM Terminals) | South | SSA Marine |
| Terminal 115 | North | Alaska Marine Lines |
| Terminal 18 | North | SSA Marine |
| Terminal 30 | North | SSA Marine |
| Terminal 46 | North | Total Terminals International |
| Terminal 5 | North | *Currently vacant* |

*Sources: The Northwest Seaport Alliance, 2018; Community Attributes, Inc., 2019.*

In total, The Northwest Seaport Alliance had nearly 1,950 vessel calls in 2017. The NWSA handled nearly 27.6 million metric tons of cargo, of which nearly 95% was containerized cargo. In 2017, the NWSA handled more than 3.7 million TEUs. Other marine cargo handled at the North and South Harbors include breakbulk, automobiles, fuel, and molasses. (**Exhibit 2**)

**Exhibit 2. The Northwest Seaport Alliance Marine Cargo by Type, 2013-2017**




*Sources: The Northwest Seaport Alliance, 2018; Community Attributes, Inc., 2019.*

## Containerized Cargo Activities

In this report, activities included under "containerized cargo activities" include all operations, services, and facilities related to the handling of 20, 40, and 45-foot ocean cargo containers, either outbound or inbound. The activities span container terminal facilities in both the ports of Seattle and Tacoma, under the auspices of The Northwest Seaport Alliance.

### Containerized Cargo Trends

Today, The Northwest Seaport Alliance manages most of the marine cargo activities at both the Ports of Seattle and Tacoma and provides a strategic partnership to work together to strengthen the gateway and attract more marine cargo business.[1] Together, as The Northwest Seaport Alliance, the Ports of Seattle and Tacoma represent the fourth-largest container gateway in North America.

[1] The NWSA does not manage the grain terminals at either Port.

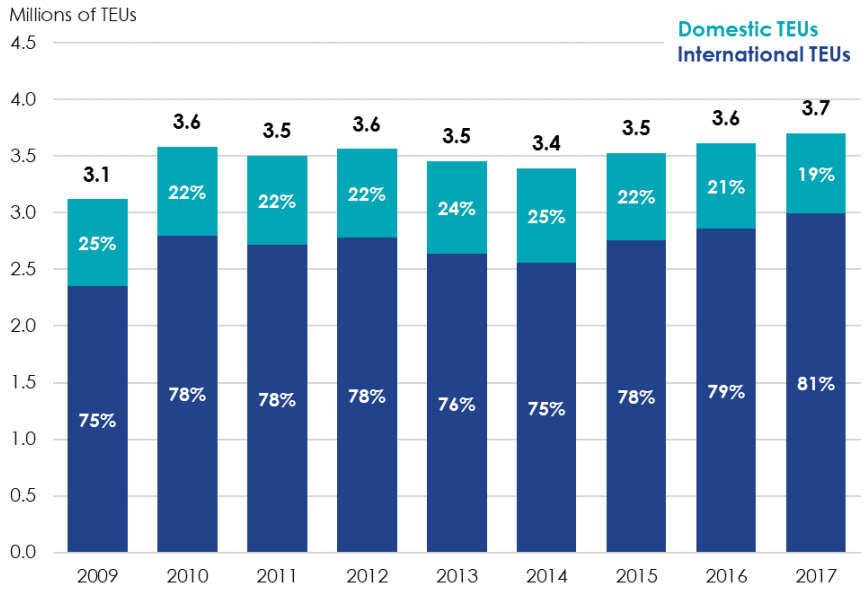
Containerized cargo represents 95% of all cargo tonnage handled through The Northwest Seaport Alliance. In 2017, 3.7 million TEUs passed through the North and South Harbors (**Exhibit 3**). International imports represent nearly 41% of all TEUs, while exports represent 40%; domestic container cargo accounted for the remaining 19%. While full containers represent more than 75% of all TEUs handled, empty containers are also an important part of activities at the NWSA. Both full and empty containers are loaded and off-loaded from vessels, requiring the expertise of a wide-range of industries and occupations, including terminal operators, longshore workers, truckers, and more. Full and empty containers both are considered in the estimation of economic and fiscal impacts generated by containerized cargo handled through The Northwest Seaport Alliance. Total TEUs through the NWSA increased from 3.4 million in 2014 to 3.7 million in 2017 (**Exhibit 4**).

**Exhibit 3. Containerized Cargo Volumes, Full and Empty TEUs by Type, The NWSA, 2017**

| | Full | Empty | Total |
|---|---|---|---|
| Imports | 1,380,785 | 132,222 | 1,513,007 |
| Exports | 964,067 | 518,237 | 1,482,305 |
| Domestic | 447,440 | 259,423 | 706,863 |
| **Total** | **2,792,292** | **909,882** | **3,702,174** |

*Sources: The Northwest Seaport Alliance, 2018; Community Attributes, Inc., 2019.*

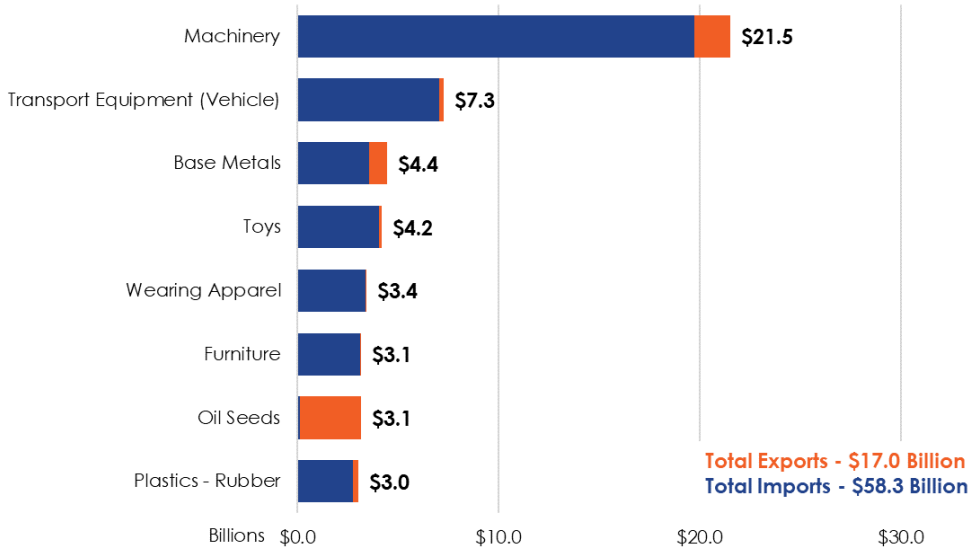
**Exhibit 4. Containerized Cargo Volumes, The NWSA, 2009-2017**




*Sources: PIERS, 2018; Community Attributes, Inc., 2019.*

In 2017, the total vessel value of containerized cargo through the NWSA was nearly $75.3 billion, with machinery accounting for approximately 29%. Vessel value is the technical term for the value of commodities within ocean containers. Imports represented 77% of total vessel value, or $58.3 billion, and exports totaled nearly $17.0 billion. Other leading commodities in 2017 were transport equipment, base metals, toys, and apparel, each representing more than 5% of total vessel value. (**Exhibit 5**)

**Exhibit 5. Containerized Cargo Commodities Each Representing More than Four Percent of Total Vessel Value, The NWSA, 2017**

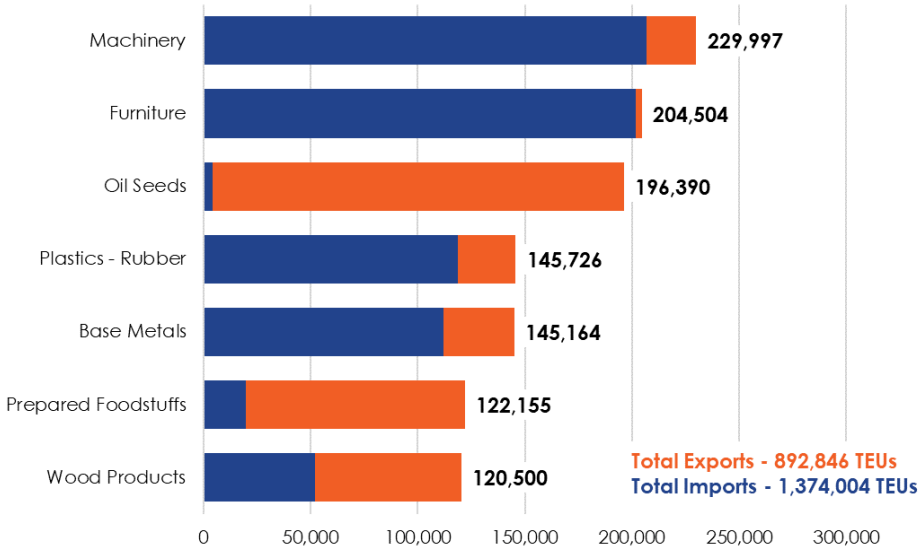



*Sources: WISER, 2018; Community Attributes, Inc., 2019.*

Machinery represents 10% of total TEUs and 29% of total vessel value. Hay, one of several commodities in the "Oil Seed" commodity grouping,[2] was the leading export handled through the NWSA, represent 4% of total vessel value, but nearly 9% of total TEUs. (**Exhibit 6**)

[2] The full name of this harmonized system (HS) code category is "Oil Seeds and Oleaginous Fruits; Miscellaneous Grains, Seeds and Fruit, Industrial Medicinal Plants; Straw and Fodder."

**Exhibit 6. Containerized Cargo Commodities Each Representing More than Five Percent of Total TEUs, The NWSA, 2017 (TEUs)**




*Sources: PIERS, 2018; Community Attributes, Inc., 2019.*

Products shipped via container require various services rendered either inbound or outbound through the NWSA, such as transportation logistics. The services required depend on the type of products shipped, distance from the NWSA facilities, among other factors. Leading import commodities include machinery, furniture, rubber plastics, base metals, and transport equipment. Leading export commodities include oil seeds/hay, prepared foodstuffs, wood pulp, and wood products. (**Exhibit 7**)

**Exhibit 7. Containerized Cargo Imports and Exports by Commodity, TEUs, The NWSA, 2017**

| | Import TEUs | Export TEUs | Total TEUs |
|---|---|---|---|
| Machinery | 206,837 | 23,160 | 229,997 |
| Furniture | 201,767 | 2,737 | 204,504 |
| Oil Seeds | 4,177 | 192,213 | 196,390 |
| Plastics - Rubber | 118,639 | 27,087 | 145,726 |
| Base Metals | 111,863 | 33,301 | 145,164 |
| Prepared Foodstuffs | 19,961 | 102,194 | 122,155 |
| Wood Products | 51,934 | 68,566 | 120,500 |
| Transport Equipment (Vehicle) | 104,580 | 6,616 | 111,196 |
| Toys | 90,755 | 7,004 | 97,759 |
| Wood Pulp | 4,071 | 84,068 | 88,139 |
| Vegetables | 2,915 | 55,193 | 58,108 |
| Other | 456,505 | 290,707 | 747,212 |
| **Total** | **1,374,004** | **892,846** | **2,266,850** |

*Sources: PIERS, 2018; Community Attributes, Inc., 2019.*

In 2017, containerized cargo was either imported or exported to 166 countries through The Northwest Seaport Alliance. The countries with the most containerized cargo moving through the NWSA include China, Japan, South Korea, Taiwan, Vietnam, and Hong Kong, which together represent more than 80% of all TEUs transported via the NWSA in 2017. Among countries with TEUs representing more than 2% of the total, TEU volume imported from and exported to Vietnam increased at a compound annual growth rate of 6% between 2013 and 2017. (**Exhibit 8**)

**Exhibit 8. Containerized Cargo Imports and Exports by Country, TEUs, The NWSA, 2017**

| | Import TEUs | Export TEUs | Total TEUs |
|---|---|---|---|
| China | 832,890 | 219,106 | 1,051,996 |
| Japan | 110,306 | 178,877 | 289,183 |
| Korea | 61,884 | 145,660 | 207,544 |
| Taiwan | 63,976 | 77,233 | 141,209 |
| Vietnam | 56,288 | 13,881 | 70,169 |
| Hong Kong | 23,463 | 32,047 | 55,510 |
| Thailand | 27,975 | 15,051 | 43,026 |
| Indonesia | 22,474 | 19,188 | 41,662 |
| India | 16,258 | 20,030 | 36,288 |
| Malaysia | 19,083 | 13,806 | 32,889 |
| Philippines | 8,610 | 18,017 | 26,627 |
| Australia | 3,488 | 16,963 | 20,451 |
| Other | 127,309 | 122,987 | 250,296 |
| **Total** | **1,374,004** | **892,846** | **2,266,850** |

*Sources: PIERS, 2018; Community Attributes, Inc., 2019.*

## Economic Impacts

Direct activities associated with the movement of ocean cargo containers, both full and empty, include on-site stevedoring operations; drayage; rail operations; tug assists for container cargo vessels; barges that convey containerized cargo to domestic ports in Alaska and Hawaii; off-site transloading facilities; warehousing and distribution centers; non-drayage trucking; local and federal government personnel supporting or regulating containerized cargo; and various support services.

Containerized cargo activities directly supported 14,900 jobs in 2017. The average annual income, including benefits, across all direct jobs supported by containerized cargo activities in 2017, was more than $100,800. The largest source of employment was trucking, logistics, and warehousing, representing drayage, short- and long-haul trucking, transloading, and warehousing and distribution operations (8,510). Many firms operate across each of these areas, such as large transloading and logistics companies that retain their

own truck fleets, operate their own warehouses and distribution centers and provide logistics support for incoming and outgoing cargo.

Terminal operations include administrative and back-office staff, on-site stevedoring personnel, and longshoremen, and supported 3,550 jobs in containerized cargo in 2017 across both harbors. An estimated 1,290 workers in the rail industry were supported through containerized cargo shipments, including at rail switching yards, maintenance facilities, and back office planning across Washington. Additional services supporting the movement of containerized cargo through The Northwest Seaport Alliance include the transport of containerized cargo on barges; maritime support services such as maritime insurance and law; and navigational services including tug assists and pilots. (**Exhibit 9**)

**Exhibit 9. Estimated Direct Impacts of Containerized Cargo Activities by Economic Activity, Washington, 2017**

| Activity | Jobs | Business Output (mils 2017 $) | Labor Income (mils 2017 $) |
|---|---|---|---|
| Truck Transportation, Logistics & Warehousing | 8,510 | $2,328.8 | $813.4 |
| Terminal Operations, Stevedoring, and Longshoremen | 3,550 | $1,163.1 | $409.6 |
| Rail Transportation | 1,290 | $660.9 | $105.1 |
| Government | 530 | $194.0 | $62.7 |
| Barge and Tug Transport | 400 | $61.3 | $45.3 |
| Maritime Support Services | 350 | $51.3 | $33.0 |
| Navigational Services | 260 | $78.2 | $33.4 |
| **Total** | **14,890** | **$4,537.6** | **$1,502.5** |

*Sources: Port of Seattle, 2018; Puget Sound Regional Council, 2018; Pacific Maritime Association, 2018; BNSF, 2018; Union Pacific, 2018; Washington Maritime Federation, 2018; Washington State Department of Revenue, 2018; Washington State Employment Security Department, 2018; Community Attributes Inc., 2019.*

Factoring in indirect and induced economic impacts, containerized cargo operations supported a total of 45,500 jobs, $3.2 billion in labor income, and $9.7 billion in business output in 2017. Containerized cargo shipping through the NWSA supports 1.2 jobs per 100 TEUs and more than $2,620 in total business output per TEU. (**Exhibit 10**)

**Exhibit 10. Economic Impacts from Containerized Cargo Shipping through The Northwest Seaport Alliance, Washington, 2017**

| | Direct | Indirect | Induced | Total |
|---|---|---|---|---|
| Jobs | 14,900 | 11,900 | 18,700 | 45,500 |
| Total Compensation (mils 2017 $) | $1,502.5 | $703.1 | $988.6 | $3,194.1 |
| Business Output (mils 2017 $) | $4,537.6 | $2,267.7 | $2,917.3 | $9,722.6 |

*Sources: Washington State Office of Financial Management, 2018; Community Attributes Inc., 2019.*

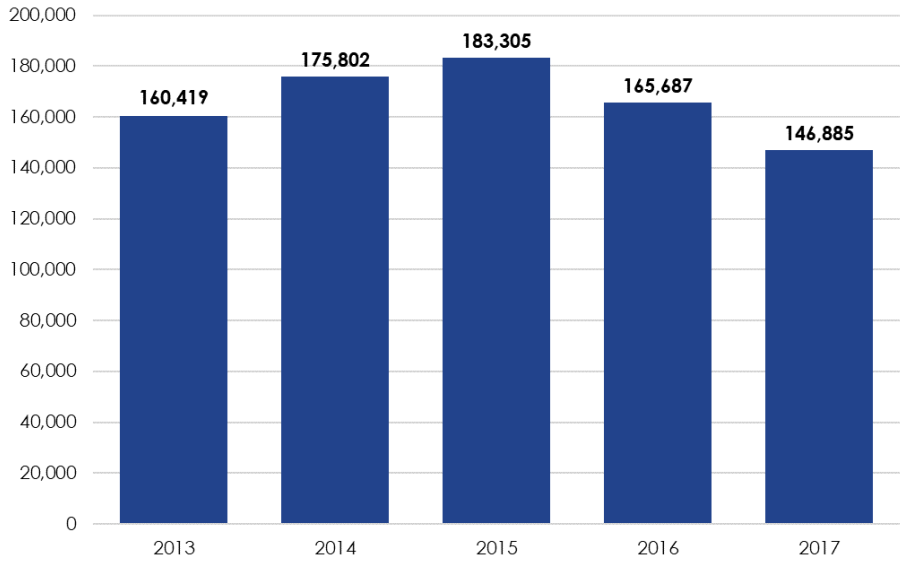
## Automobile Imports

The Northwest Seaport Alliance also handles automobile imports. In 2017, 146,900 automobiles were handled at the Port of Tacoma, totaling 224,900 metric tons of cargo (**Exhibit 11**). Automobiles are offloaded at the Blair Terminal, Terminal 7 and East Blair One at the South Harbor. With its headquarters at the Marshall Avenue Auto Facility in Tacoma, Auto Warehousing (AWC) provides a variety of vehicle processing services, including logistics and accessory installation, to support auto imports at The Northwest Seaport Alliance. Customers served by AWC include Kia, Mazda, BMW, Mitsubishi, Isuzu, and Fuso Trucks.

In early 2018, the Port of Tacoma announced a 30-year lease with Wallenius Wilhelmsen Logistics for the development of a new auto processing facility. This new facility will not only expand auto import facilities at the Port of Tacoma and for The Northwest Seaport Alliance, but also expands the marine cargo business of WWL with The Northwest Seaport Alliance. Currently, WWL transports roll-on/roll-off cargo through the NWSA. The new operation is expected to create 100 new jobs and process in excess of 100,000 auto units per year.[3]

[3] Port of Tacoma, 2018, https://www.portoftacoma.com/news-releases/2018-02-14/port-tacoma-leases-former-kaiser-site-wwl-auto-processing-facility.

**Exhibit 11. Automobile Units, The Northwest Seaport Alliance, 2013-2017**




*Sources: The Northwest Seaport Alliance, 2018; Community Attributes, Inc., 2019.*

Direct activities supported by the movement of automobiles at the Port of Tacoma include on-site stevedoring operations; trucking; auto accessory installation services; tug assists for car carriers; rail operations; local and federal government personnel supporting or regulating automobile imports; and various supporting services.

Automobile import activities directly supported 1,330 jobs in 2017. The average annual income, including benefits, across all direct jobs supported by automobile import activities in 2017 was nearly $83,400. Trucking, logistics, and warehousing, including both short- and long-haul trucking, was the largest source of employment, with 480 direct jobs. Terminal operations includes the activities of Auto Warehousing, providing both logistics and accessory installation services, as well as on-site stevedoring personnel and longshoremen, totaling 380 jobs supported by automobile imports through the NWSA in 2017. Additional services supporting the movement of automobiles through the NWSA include rail transportation; maritime support services such as maritime insurance and law; navigational services including tug assists and pilots; and government personnel overseeing the movement of automobiles through the NWSA. (**Exhibit 12**)

**Exhibit 12. Estimated Direct Impacts of Automobile Imports by Economic Activity, Washington, 2017**

| Activity | Jobs | Business Output (mils 2017 $) | Labor Income (mils 2017 $) |
|---|---|---|---|
| Truck Transportation, Logistics & Warehousing | 480 | $131.5 | $45.9 |
| Terminal Operations, Stevedoring, and Longshoremen | 380 | $43.5 | $17.5 |
| Rail Transportation | 150 | $76.2 | $12.1 |
| Maritime Support Services | 140 | $20.9 | $13.4 |
| Navigational Services | 110 | $32.5 | $13.9 |
| Government | 70 | $4.3 | $5.5 |
| **Total** | **1,330** | **$308.8** | **$108.4** |

*Sources: Port of Seattle, 2018; Puget Sound Regional Council, 2018; Pacific Maritime Association, 2018; BNSF, 2018; Union Pacific, 2018; Washington Maritime Federation, 2018; Washington State Department of Revenue, 2018; Washington State Employment Security Department, 2018; Community Attributes Inc., 2019.*

The total economic impact of automobiles handled through the NWSA in Washington is more than $643 billion in business output in 2017, composed of direct ($308.8 million), indirect ($136.8 million), and induced ($197.8 million) impacts. Automobile shipping supported 3,300 total jobs in the state and nearly $217 million in labor income including wages and benefits. (**Exhibit 13**)

**Exhibit 13. Economic Impacts of Automobile Shipping through The Northwest Seaport Alliance, Washington, 2017**

| | Direct | Indirect | Induced | Total |
|---|---|---|---|---|
| Jobs | 1,300 | 700 | 1,300 | 3,300 |
| Total Compensation (mils 2017 $) | $108.4 | $41.2 | $67.0 | $216.6 |
| Business Output (mils 2017 $) | $308.8 | $136.8 | $197.8 | $643.4 |

*Sources: Washington State Office of Financial Management, 2018; Community Attributes Inc., 2019.*

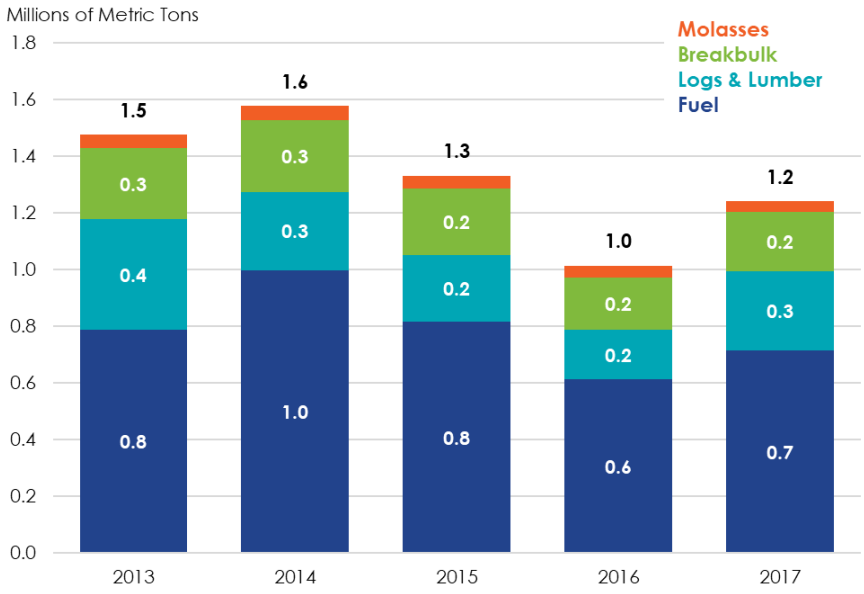
## Breakbulk, Logs, and Other Non-Containerized Marine Cargo

The Northwest Seaport Alliance manages the flow of a wide variety of marine cargo beyond containerized cargo and automobiles. In total, containers represented nearly 95% of total metric tons of cargo handled by the NWSA. Other marine cargo includes breakbulk, logs, fuel, and molasses. Breakbulk cargo transported through the NWSA includes agriculture and mining equipment, military vehicles and other cargo that can be transported via roll-on/roll-off (RoRo) vessel, and other types of machinery. Breakbulk cargo totaled nearly 211,000 metric tons in 2017, and as of November 2018

breakbulk cargoes have increased 20.5% year-over-year.[4] Breakbulk cargoes are transported through East Blair One, Terminal 7, and Husky Terminal in the South Harbor, and T115 (and to a lesser extent among other container terminals) in the North Harbor.

Fuel and molasses are both transported as liquid bulk at the Port of Seattle. Combined, fuel and molasses cargo handled through the NWSA totaled nearly 752,000 metric tons in 2017. The NWSA additionally handles logs at the West Hylebos Log Facility. In 2017 more than 52.7 million board feet of logs and lumber was transported through the Port of Tacoma, representing more than 278,000 metric tons of cargo. (**Exhibit 14**)

**Exhibit 14. Breakbulk, Logs, and Other Non-Containerized Marine Cargo, The NWSA, 2013-2017**




*Source: The Northwest Seaport Alliance, 2018; Community Attributes, Inc., 2019.*

Breakbulk, logs, and other non-containerized marine cargo handled through The Northwest Seaport Alliance directly support a wide variety of jobs. In total these activities directly supported 3,880 jobs in 2017. The average annual income, including benefits, among all direct jobs supported by breakbulk, logs, and other non-containerized marine cargo was more than $74,800 in 2017. Rail and truck transportation and logistics represent the largest portion of direct jobs, with a combined total of 2,790 jobs. Additional services supporting the movement of breakbulk, logs, and other non-containerized marine cargo are maritime support services and navigational services including tug assist and pilots (780 jobs); government personnel (200

[4] The Northwest Seaport Alliance 5-Year Cargo Volume History, November 2018.

jobs); and terminal operations, on-site stevedoring, and longshore workers (110 jobs). (**Exhibit 15**)

**Exhibit 15. Estimated Direct Impacts of Breakbulk, Logs, and Other Non-Containerized Marine Cargo by Economic Activity, Washington, 2017**

| Activity | Jobs | Business Output (mils 2017 $) | Labor Income (mils 2017 $) |
|---|---|---|---|
| Rail Transportation | 1,690 | $470.4 | $74.8 |
| Truck Transportation, Logistics & Warehousing | 1,100 | $300.9 | $105.1 |
| Maritime Support Services | 440 | $65.3 | $42.0 |
| Navigational Services | 340 | $101.6 | $43.3 |
| Government | 200 | $12.6 | $16.2 |
| Terminal Operations, Stevedoring, and Longshoremen | 110 | $61.4 | $10.4 |
| **Total** | **3,880** | **$1,012.2** | **$291.9** |

*Sources: Port of Seattle, 2018; Puget Sound Regional Council, 2018; Pacific Maritime Association, 2018; BNSF, 2018; Union Pacific, 2018; Washington Maritime Federation, 2018; Washington State Department of Revenue, 2018; Washington State Employment Security Department, 2018; Community Attributes Inc., 2019.*

The direct economic activities supported by the transport of breakbulk, logs, and other non-containerized marine cargo through The Northwest Seaport Alliance lead to upstream supply chain activities and the spending of worker income. The companies supplying goods and services to businesses working with marine cargo operations at the NWSA make their own purchases, stimulating indirect activity. Workers directly supported by marine cargo operations at the NWSA and at business throughout the supply chain spend their earnings on various goods and services generating induced effects.

The total economic impact of breakbulk, logs, and other non-containerized marine cargo shipments handled through the NWSA represents the sum of direct, indirect, and induced effects. **Exhibit 16** summarizes impacts to Washington state. In total, economic impact totaled more than $2 billion in business output in 2017, 3,900 jobs, and nearly $608 million in total compensation.

**Exhibit 16. Economic Impacts of Breakbulk, Logs, and Other Non-Containerized Marine Cargo Shipping through The Northwest Seaport Alliance, Washington, 2017**

| | Direct | Indirect | Induced | Total |
|---|---|---|---|---|
| Jobs | 3,900 | 2,100 | 3,600 | 9,600 |
| Total Compensation (mils 2017 $) | $291.9 | $127.8 | $188.1 | $607.8 |
| Business Output (mils 2017 $) | $1,012.2 | $452.0 | $555.1 | $2,019.4 |

*Sources: Washington State Office of Financial Management, 2018; Community Attributes Inc., 2019.*

THE NORTHWEST SEAPORT ALLIANCE

# Summary of The Northwest Seaport Alliance Marine Cargo Impacts

The Northwest Seaport Alliance cargo handling activities in 2017 had a total economic impact to the state economy of 58,400 jobs (**Exhibit 17**); this equates to a jobs multiplier, measured as total jobs (58,400) to direct jobs (20,100), of 2.9. The largest component of this impact was containerized cargo, owing to the size, breadth, complexity, and robustness of the network of services tied to moving containerized cargo, such as tug assists and towing, stevedoring, drayage, warehousing, and rail activities. Nearly $12.4 billion in business output, or revenues, were supported either directly or through multiplier effects from the NWSA activities across the state (**Exhibit 18**), and more than $4.0 billion in labor income (**Exhibit 19**).

**Exhibit 17. Total Jobs Impacts of The Northwest Seaport Alliance Marine Cargo by Segment, Washington, 2017**

| | Direct | Indirect | Induced | Total |
|---|---|---|---|---|
| Containerized Cargo | 14,900 | 11,900 | 18,700 | 45,500 |
| Automobiles | 1,300 | 700 | 1,300 | 3,300 |
| Breakbulk, Logs, and Other Cargo | 3,900 | 2,100 | 3,600 | 9,600 |
| **Total** | **20,100** | **14,700** | **23,600** | **58,400** |

*Sources: Washington State Office of Financial Management, 2018; Community Attributes Inc., 2019.*

**Exhibit 18. Total Business Output Impacts of The Northwest Seaport Alliance Marine Cargo by Segment, Mils 2017$, Washington, 2017**

| | Direct | Indirect | Induced | Total |
|---|---|---|---|---|
| Containerized Cargo | $4,537.6 | $2,267.7 | $2,917.3 | $9,722.6 |
| Automobiles | $308.8 | $136.8 | $197.8 | $643.4 |
| Breakbulk, Logs, and Other Cargo | $1,012.2 | $452.0 | $555.1 | $2,019.4 |
| **Total** | **$5,858.7** | **$2,856.6** | **$3,670.2** | **$12,385.4** |

*Sources: Washington State Office of Financial Management, 2018; Community Attributes Inc., 2019.*

**Exhibit 19. Total Labor Income Impacts of The Northwest Seaport Alliance Marine Cargo by Segment, Mils 2017$, Washington, 2017**

| | Direct | Indirect | Induced | Total |
|---|---|---|---|---|
| Containerized Cargo | $1,502.5 | $703.1 | $988.6 | $3,194.1 |
| Automobiles | $108.4 | $41.2 | $67.0 | $216.6 |
| Breakbulk, Logs, and Other Cargo | $291.9 | $127.8 | $188.1 | $607.8 |
| **Total** | **$1,902.7** | **$872.1** | **$1,243.7** | **$4,018.5** |

*Sources: Washington State Office of Financial Management, 2018; Community Attributes Inc., 2019.*

Impacts are difficult to evaluate without additional context, both in terms of the total absolute impact and a ratio of total impacts to direct activities. To build context for the NWSA impacts, several other major industries and activities are presented for comparison. The aerospace industry, including The Boeing Company, Washington's largest private sector employer, supported a total of 252,000 jobs in 2015, but with a jobs multiplier actually lower than for the NWSA (2.7 compared to 2.9). The agriculture & food processing sector, representing an extensive supply chain linking farmers, processors, wholesalers, and various equipment and seed suppliers, supported 220,600 jobs and $19.5 billion in business output across the state economy in 2013, including indirect and induced effects and a jobs multiplier of 1.7. The maritime sector, including several activities overlapping with those of the NWSA, had an estimated jobs multiplier of 2.7. **Exhibit 20** below summarizes the comparison between the NWSA and other illustrative industries and economic activities in Washington state.

**Exhibit 20. Comparison of Direct and Total Economic Impacts between The NWSA and Other Industries and Industry Clusters in Washington State, Various Years**

| | Aerospace | Agriculture & Food Processing | Maritime Sector | The NWSA |
|---|---|---|---|---|
| Study Year | 2015 | 2013 | 2015 | 2017 |
| Total Jobs | 252,800 | 220,600 | 191,100 | 58,400 |
| Direct Jobs | 93,800 | 128,900 | 69,500 | 20,100 |
| Direct Business Output (mils $) | $68,641 | $19,488 | $17,142 | $5,858 |
| Total Jobs per Direct Job | 2.70 | 1.71 | 2.75 | 2.91 |
| Jobs/$Mil Final Demand | 3.68 | 11.32 | 11.15 | 9.97 |

*Note: all studies were produced by Community Attributes Inc. on behalf of each organization. Sources: Washington Aerospace Partnership, "Washington State Aerospace Economic Impacts 2016 Update," October 2016; Washington Farm Bureau, "Washington State Agriculture & Food Processing Economic/Fiscal Impact Study," January 2015; Washington Maritime Federation, "Washington State Maritime Sector Economic Impact Study," April 2017; Community Attributes Inc., 2019.*

## Fiscal Impacts from The NWSA Marine Cargo Activities

The economic impacts of marine cargo at The Northwest Seaport Alliance support various state tax bases, which in turn yield tax revenues. The businesses that directly interact with the marine cargo generate taxes directly. The indirect and induced activities generated by both public and private sector expenditures generate additional taxable revenue. Tax impacts evaluated in this study include statewide business and occupation taxes, state sales and use taxes, and various other, albeit smaller, state taxes, such as quantity taxes.

The direct and secondary economic activities related to marine cargo at the NWSA generate nearly $136 million in Washington state sales and use taxes, Washington state business and occupation taxes and other statewide taxes (for example, public utility taxes and quantity taxes)[5]. This includes nearly $107 million generated through containerized cargo related activities or more than $28 per TEU, $8 million generated by automobile cargoes and $21 million from breakbulk, logs, and other non-containerized cargo. (**Exhibit 21 and 22**)

**Exhibit 21. Statewide Fiscal Impacts by Segment of Activity at The Northwest Seaport Alliance, Washington, Mils 2017$, 2017**

| | Direct | Secondary | Total |
|---|---|---|---|
| Containerized Cargo | $25.1 | $81.7 | $106.8 |
| Automobiles | $2.7 | $5.3 | $8.0 |
| Breakbulk, Logs, and Other Cargo | $5.5 | $15.6 | $21.1 |
| **Total** | **$33.3** | **$102.6** | **$135.9** |

*Sources: Washington State Department of Revenue, 2018; Washington State Employment Security Department, 2018; Community Attributes Inc., 2019.*

**Exhibit 22. Total Statewide Fiscal Impacts of The Northwest Seaport Alliance, Washington, Mils 2017$, 2017**

| | Direct | Secondary | Total |
|---|---|---|---|
| B&O | $12.5 | $26.8 | $39.3 |
| Sales & Use Taxes | $17.6 | $66.3 | $83.9 |
| Other | $3.2 | $9.4 | $12.6 |
| **Total** | **$33.3** | **$102.6** | **$135.9** |

*Sources: Washington State Department of Revenue, 2018; Washington State Employment Security Department, 2018; Community Attributes Inc., 2019.*

Fiscal impacts are also difficult to evaluate without additional context. The aerospace industry had a total fiscal impact of $352.2 million in 2015, adjusted to 2017 dollars. The agriculture & food processing sector supported 220,600 jobs in 2013 and had a total fiscal impact of $342.1 million. The maritime sector, which includes several overlapping activities with the NWSA had a total fiscal impact of $361 million in 2015. (**Exhibit 23**)

[5] Due to limited availability of tax data at the local level, only state tax payments were estimated for Washington state.

**Exhibit 23. Comparison of Direct and Total State Fiscal Impacts between The NWSA and Other Industries and Industry Clusters in Washington State, Various Years (mils 2017$)**

| | Study Year | Direct | Total |
|---|---|---|---|
| Aerospace | 2015 | $30.4 | $352.2 |
| Agriculture & Food Processing | 2013 | $86.4 | $342.1 |
| Maritime Sector | 2015 | $115.7 | $361.0 |
| The NWSA | 2017 | $33.3 | $135.9 |

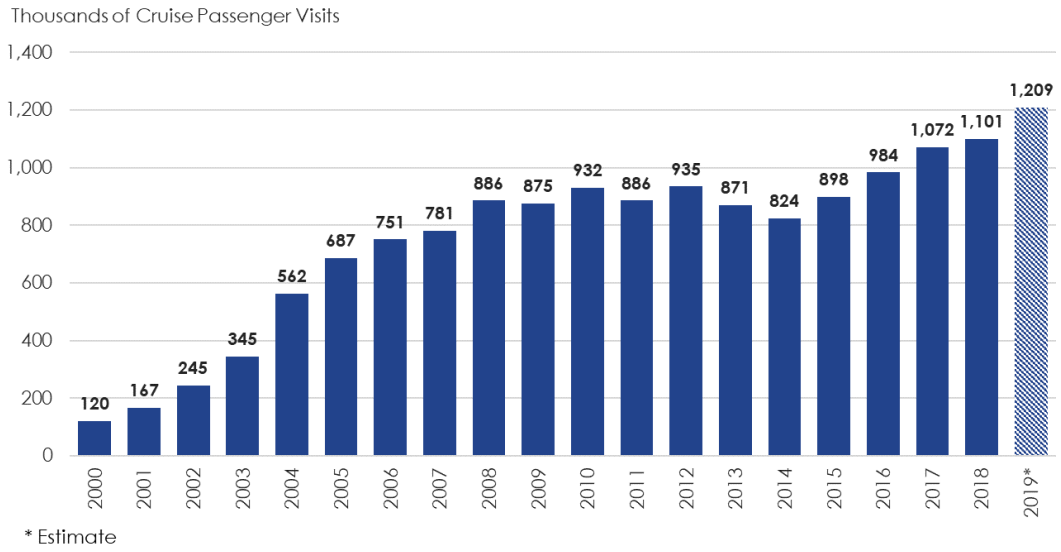
*Note: all studies were produced by Community Attributes Inc. on behalf of each organization. Sources: Washington Aerospace Partnership, "Washington State Aerospace Economic Impacts 2016 Update," October 2016; Washington Farm Bureau, "Washington State Agriculture & Food Processing Economic/Fiscal Impact Study," January 2015; Washington Maritime Federation, "Washington State Maritime Sector Economic Impact Study," April 2017; Community Attributes Inc., 2019.*

# CRUISE SHIP INDUSTRY, 2019

The cruise ship industry in Seattle has grown from nearly 120,000 passengers in 2000 to an estimated 1.2 million in 2019. Cruise lines utilizing Port of Seattle infrastructure support the state economy through visitor spending, crew expenditures and cruise operations.

In 2019, the Port of Seattle will host 213 calls from ten different cruise lines and 18 ships. The industry in Seattle has grown from nearly 120,000 passengers in 2000 to an estimated 1.2 million in 2019. Passenger increases between 2000 and 2019 represent a compound annual growth rate of 13%. (**Exhibit 24**)

**Exhibit 24. Passenger Embarkments, Disembarkments, and In-Transit Stops, Port of Seattle, 2000-2019**




*Source: Port of Seattle, 2019*

A total of seven cruise lines will homeport at the Port of Seattle, including Holland America Line, Norwegian Cruise Line, Princess Cruises, Carnival Cruise Lines, Royal Caribbean, Celebrity Cruises, and Oceania Cruises. Vessels that homeport at the Port of Seattle have passengers embarking and disembarking at the beginning and end of their trips. Homeport vessels take on supplies, handle passenger baggage, provide shore services to passengers, conduct maintenance, and more. For other cruise lines and vessels, the Port of Seattle is a port of call, an intermediary stop on a cruise. Port of call passengers typically spend less than 10 hours in Seattle, and provisioning and maintenance activities rarely occur. In 2019, vessels will make 201 homeport calls and 11 port of call visits in Seattle.

Analytics presented in this section draw on extensive data gathered on 2017 actual cruise activities. This data was then used to develop a cruise industry impact model capturing the various types of impacts of cruise operations to the region, such as cruise ship local procurement, on-shore support services, and cruise passenger on-shore spending before and after a cruise. This model was then applied to the projected 2019 cruise schedule using the expected number of vessels calls and passengers, based on data provided by the Port of Seattle. Cruise industry impacts are disaggregated by: 1) cruise passenger

spending on local goods and services; 2) crew expenditures in the local economy; and 3) cruise operations, including payroll, procurement from local vendors, and on-shore services. The impacts to Washington of crew onboard cruise ships is limited to their expenditures in the local economy and only a small portion of total crew disembark to visit the region during any vessel call.

In 2017, the Port of Seattle commissioned the McDowell Group to conduct a survey of cruise passengers. This survey found that 89% of respondents were non-Washington residents. Of these, 65% spent at least four hours in Seattle before or after their cruise.

The average length of stay among non-resident passengers staying overnight before or after their cruise embarkment was two days. Non-resident passengers spending time in Seattle spent an average of $850 per party pre-cruise and $697 post-cruise, or a total of $1,547. Categories of passenger spending include lodging, food and beverage, entertainment, transportation, and gifts and souvenirs. (**Exhibit 25**)

**Exhibit 25. Average Cruise Visitor Spending in Seattle by Category, 2017**

| Category | Pre Cruise | Post Cruise |
|---|---|---|
| Lodging | $398 | $243 |
| Food and beverage | $185 | $161 |
| Entertainment | $107 | $135 |
| Transportation | $94 | $92 |
| Gifts, souvenirs, clothing | $62 | $64 |
| Other | $4 | $2 |
| **Total Average Spending** | **$850** | **$697** |

*Note: the inclusion of pre- and post-cruise spending reflects the structure of the survey deployed by McDowell Group in 2017.*
*Source: Port of Seattle Cruise Passenger Survey, 2017*

In 2019, Port of Seattle cruise line visitor spending is estimated to directly generate $226.8 million in business output and will support an estimated 2,490 jobs, and $83.2 million in wages including benefits. (**Exhibit 26**)

Cruise staff also generate impacts in the local economy through their local spending. Between vessel debarkations and embarkations at homeport and port of call visits a small proportion of cruise crew spend their earned income on food and beverage, souvenirs, and entertainment. The Cruise Lines International Association's report "The Contribution of the International Cruise Industry to the U.S. Economy in 2016" estimates that average crew spending per visit is $47.06. Crew spending in 2019 is estimated to generate $2.1 million in output in 2019, will support 30 jobs, and $0.9 million in wages and benefits in Washington. (**Exhibit 26**)

In 2019, cruise operation expenditures, including fuel, food and beverage procurement, various onboard accommodation purchases, and maintenance, are estimated to sum to $182.7 million. Various on-shore operations provide services for cruises, such as on-shore cruise line staff handling boarding and baggage, longshoremen, and Port of Seattle personnel. Additionally, tugboat companies provide inner harbor tug assists along with various maritime support services. In total, the on-shore operations supported by the cruise industry in 2019 are estimated to generate business output of more than $56.2 million.

**Exhibit 26. Projected Direct Impacts by Economic Activity of Cruise Operations at the Port of Seattle, Washington, 2019**

| Activity | Jobs | Revenues (mils 2018 $) | Wages (mils 2018 $) |
|---|---|---|---|
| Passenger Spending | 2,490 | $226.8 | $83.2 |
| On Shore Staff | 200 | $28.4 | $14.5 |
| Maritime Services | 130 | $27.8 | $14.2 |
| Maintenance | 90 | $24.2 | $7.4 |
| Provisioning | 30 | $60.2 | $0.7 |
| Fuel | 20 | $98.3 | $1.7 |
| Crew Spending | 30 | $2.1 | $0.9 |
| **Total** | **2,990** | **$467.8** | **$122.7** |

*Sources: Port of Seattle, 2018; Holland America Group, 2018; Norwegian Cruise Lines, 2018; Port of Seattle Passenger Survey, 2017; Cruise Lines International Association, 2018; Washington State Department of Revenue, 2018; Washington State Employment Security Department, 2018; Community Attributes Inc., 2019.*

The cruise industry at the Port of Seattle will directly support an estimated nearly 3,000 jobs, with average annual wages, including benefits of nearly $41,000. The total economic impact of cruise ships to the state economy in 2019, including direct, indirect, and induced impacts, is estimated at 5,500 jobs, $260.1 million in labor income, and $893.6 million in business output (**Exhibit 27**). Based on these estimates, in 2019 each vessel call will support a total of $4.2 million in economic activity to the region. This represents an increase over previous Port of Seattle studies due to: 1) a revised and more thorough 2017 study of passenger spending locally; and 2) an increase in cruise operation expenditures in the region.

**Exhibit 27. Projected Economic Impacts of Cruise Ship Operations at the Port of Seattle, Washington, 2019**

| | Direct | Indirect | Induced | Total |
|---|---|---|---|---|
| Jobs | 3,000 | 1,000 | 1,500 | 5,500 |
| Total Compensation (mils 2018 $) | $122.7 | $56.9 | $80.5 | $260.1 |
| Business Output (mils 2018 $) | $467.8 | $188.3 | $237.6 | $893.6 |

*Sources: Washington State Office of Financial Management, 2018; St. Louis FRED, 2018; Community Attributes Inc., 2019.*

The economic impacts of cruise operations at the Port of Seattle in 2019 will support various state tax bases, which in turn yield tax revenues. The direct and secondary activities of cruise operations in 2019 will generate $10.7 million in state sales and use taxes, an additional $3.8 million in business and occupation taxes, and other statewide taxes. In total the cruise industry, supported by the Port of Seattle, will generate an estimated $14.5 million in statewide taxes directly and through multiplier effects in 2019. (**Exhibit 28**)

**Exhibit 28. Projected Statewide Fiscal Impacts of Cruise Ship Operations at the Port of Seattle, Washington, Mils 2018$, 2019**

| | Direct | Secondary | Total |
|---|---|---|---|
| B&O | $1.0 | $1.8 | $2.8 |
| Sales & Use Taxes | $6.4 | $4.4 | $10.7 |
| Other | $0.4 | $0.6 | $1.0 |
| **Total** | **$7.8** | **$6.7** | **$14.5** |

*Sources: Washington State Department of Revenue, 2018; Washington State Employment Security Department, 2018; Community Attributes Inc., 2019.*

# COMMERCIAL FISHING

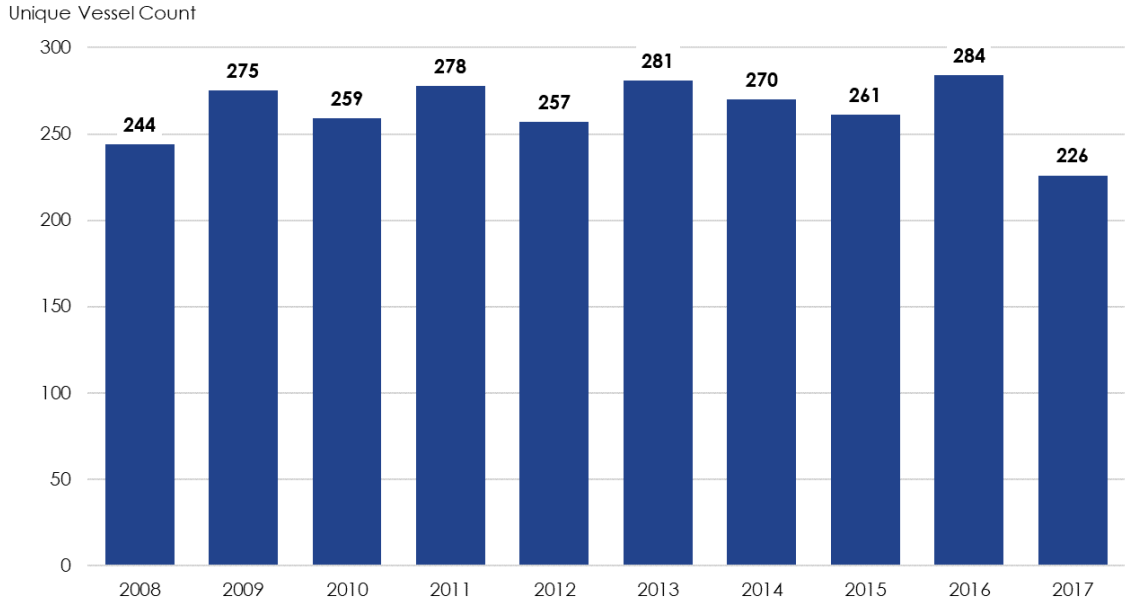
Port of Seattle plays a critical role in supporting the regional fishing industry. This section outlines the impacts of the at least 300 fishing vessels utilizing Port of Seattle facilities and the associated business operations that offer services critical to the industry.

The Port of Seattle owns and operates three facilities that serve as core assets for the regional fishing industry: 1) Fishermen's Terminal; 2) the nearby Maritime Industrial Center, or "MIC"; and 3) Terminal 91, which in addition to serving cruise ships provides loading and offloading for some of the region's largest fishing vessels.

The Port of Seattle is heavily utilized by a large segment of the North Pacific Fisheries Fleet, including vessels engaged in the harvest of pollock, Alaskan king crab, groundfish, and salmon, among many other high value species. A smaller cohort of moored fishing vessels at Fishermen's Terminal operate in non-Alaskan fishing grounds, including in Puget Sound and off the West Coast of the Olympic Peninsula.

In 2017, more than 300 fishing vessels utilized Port of Seattle facilities. Of these, 226 were identified as actively fishing in Alaskan fisheries, based on the Alaska Commercial Fishing Entry Commission licensing data (**Exhibit 29**). In some cases, while a vessel may moor more frequently in other locations (such as in Alaska or in Lake Union in Seattle), these vessels still depend on Port of Seattle infrastructure for loading and offloading, on-dock repairs and periodic maintenance, and provisioning.

**Exhibit 29. Unique Alaskan Fisheries Licensed Vessels Utilizing Port of Seattle Facilities, 2008-2017**




*Note: Some vessels utilize more than one facility throughout the course of a year. Estimates thus report unique vessels and correct for some double-counting.*
*Sources: Port of Seattle, 2018; Alaska Commercial Fishing Entry Commission, 2018; Community Attributes Inc., 2019.*

There are also various supporting and associated businesses and operations located at Port of Seattle facilities in close proximity to the fishing fleet, such as equipment wholesalers, associations, nearby by on-dock mechanics and maintenance workers, maritime law firms and insurance companies, and other services critical to the industry.

In 2017, fishing vessels that moored at Port of Seattle facilities operating in the Alaskan fisheries generated gross earnings of more $455.0 million. An additional $26.6 million in revenues were earned in waters outside of Alaska, such as in Puget Sound and Washington's west coast, based on ex-vessel wholesale value. Additional revenues were generated among various support services and on-shore Port of Seattle tenants, including seafood processing and cold storage facilities, services businesses at Fishermen's Terminal and the economic output equivalent of Port of Seattle staff dedicated to serving the industry. In total, these activities directly supported an additional $189.7 million in business output.

Factoring in all segments of commercial fishing at the Port of Seattle, these activities generated more than $671.2 million in business output in 2017.

In 2017, an estimated 7,200 jobs were directly associated with commercial fishing at the Port of Seattle. These included 5,100 jobs on fishing vessels, the majority of which (4,900) operated in fisheries in Alaska. The number of jobs across fishing vessel customers at the Port of Seattle vary widely by vessel size and type, such as between from large, 150 crew catcher-processors to much smaller seiners and trawlers. In some cases, notably the largest fish processors that use Terminal 91, may primarily moor at locations outside Port of Seattle properties, but due to the size of vessel require use of the Port's facilities for loading and offloading.

These jobs supported labor compensation of $313.4 million in 2017. Of this, $150.3 million were earned from fishing employment, with another $163.1 million from onshore terminal-based jobs, Port of Seattle on-site processing and cold storage, and Port of Seattle staff positions. These estimates represent annual averages, thus accounting for the seasonality of many (but not all) types of fishing employment, such as work that lasts 3-6 months. Overall, direct commercial fishing jobs supported by the Port of Seattle have an annual average wage, including benefits, of more than $43,500 in 2017, in part reflecting the seasonal nature of many commercial fishing jobs.

Factoring in indirect and induced impacts, the total statewide economic impact of commercial fishing operations summed to 11,300 jobs, $543.0 million in labor income, and more than $1.4 billion in business output in 2017 (**Exhibit 30**).

**Exhibit 30. Economic Impacts of Commercial Fishing Operations Based at the Port of Seattle, Washington, 2017**

| | Direct | Indirect | Induced | Total |
|---|---|---|---|---|
| Jobs | 7,200 | 900 | 3,200 | 11,300 |
| Total Compensation (mils 2017 $) | $313.4 | $61.5 | $168.0 | $543.0 |
| Business Output (mils 2017 $) | $671.3 | $270.7 | $495.9 | $1,438.0 |

*Sources: Washington State Office of Financial Management, 2018; Community Attributes Inc., 2019.*

In 2017, the direct and secondary activities supported by commercial fishing operations based at the Port of Seattle generated a total of $8.1 million in state sales and use taxes, $3.8 million business and operations taxes, and $1.3 million in other state taxes. In total, commercial fishing operations at the Port of Seattle supported $13.2 million in statewide fiscal impacts. (**Exhibit 31**)

**Exhibit 31. Total Statewide Fiscal Impacts of Commercial Fishing Operations Based at the Port of Seattle, Washington, Mils 2017$, 2017**

| | Direct | Secondary | Total |
|---|---|---|---|
| B&O | $0.7 | $3.1 | $3.8 |
| Sales & Use Taxes | $0.6 | $7.5 | $8.1 |
| Other | $0.1 | $1.2 | $1.3 |
| **Total** | **$1.4** | **$11.8** | **$13.2** |

*Sources: Washington State Department of Revenue, 2018; Washington State Employment Security Department, 2018; Community Attributes Inc., 2019.*

## North Pacific and U.S. Fisheries

In 2017, 226 fishing vessels operating in the North Pacific Fisheries utilized Port of Seattle facilities throughout the year, such as for periodic maintenance and repair or loading and offloading. In 2017, gross earnings in Alaska's fisheries totaled more than $1.0 billion. The revenues generated in 2017 by Port of Seattle vessels from fishing in Alaska—$455.0 million—represented 44% of all gross earnings from the North Pacific Fisheries. Port of Seattle fishing vessel operator customers harvested catch (Alaska and non-Alaska) are equal to an estimated 13% by value of total U.S. commercial fisheries in 2017 by dollar value.[6]

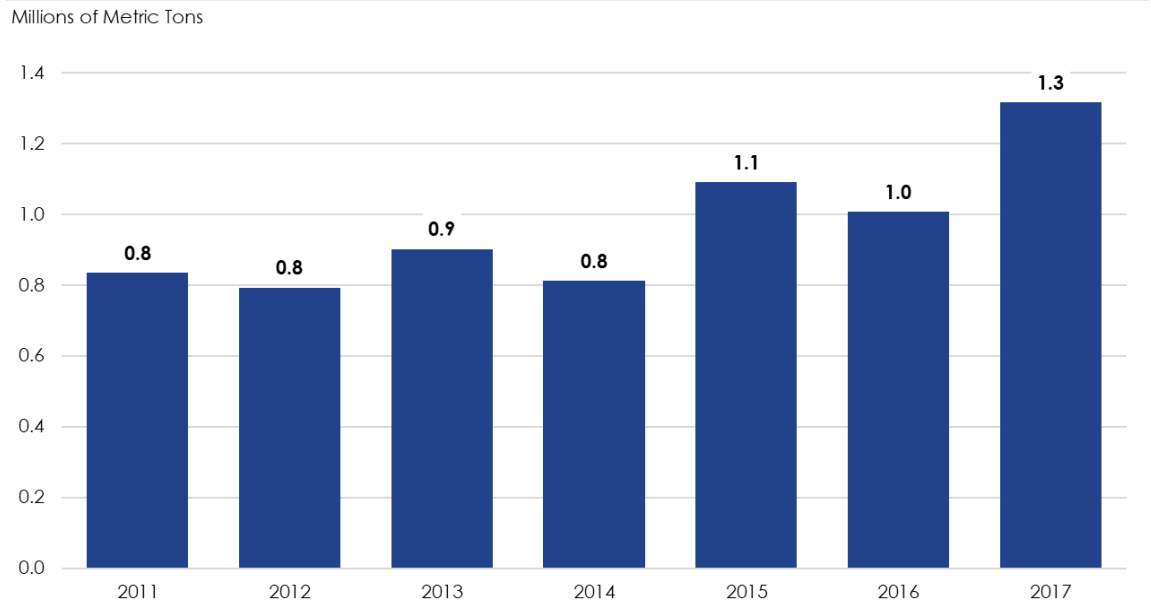
Between 2011 and 2017, Port of Seattle customers harvested between 800,000 and 1.3 million metric tons of seafood from the North Pacific Fisheries (**Exhibit 32**), or equivalent gross earnings of between $259.1 million and $455.0, adjusted for inflation (**Exhibit 33**). Harvested tonnage increased by more than 500% over this period, or approximately 23% per year, based on a compound annual growth rate.

An estimated 72% of all commercially caught seafood biomass from the U.S. North Pacific Fisheries by tonnage and value was exported.[7] A large share of pollock, salmon and other harvested biomass undergoes preliminary processing in Alaska (removal of head and tail). It is then packed in ice and shipped to locations in East Asia, such as several facilities in China, for deboning, filleting, and additional value-added food processing before reshipment back to the U.S. and other markets for final consumption.

[6] Sources: State of Alaska Department of Fish & Game, 2018; National Oceanic and Atmospheric Administration (NOAA), 2018; Community Attributes Inc., 2019.

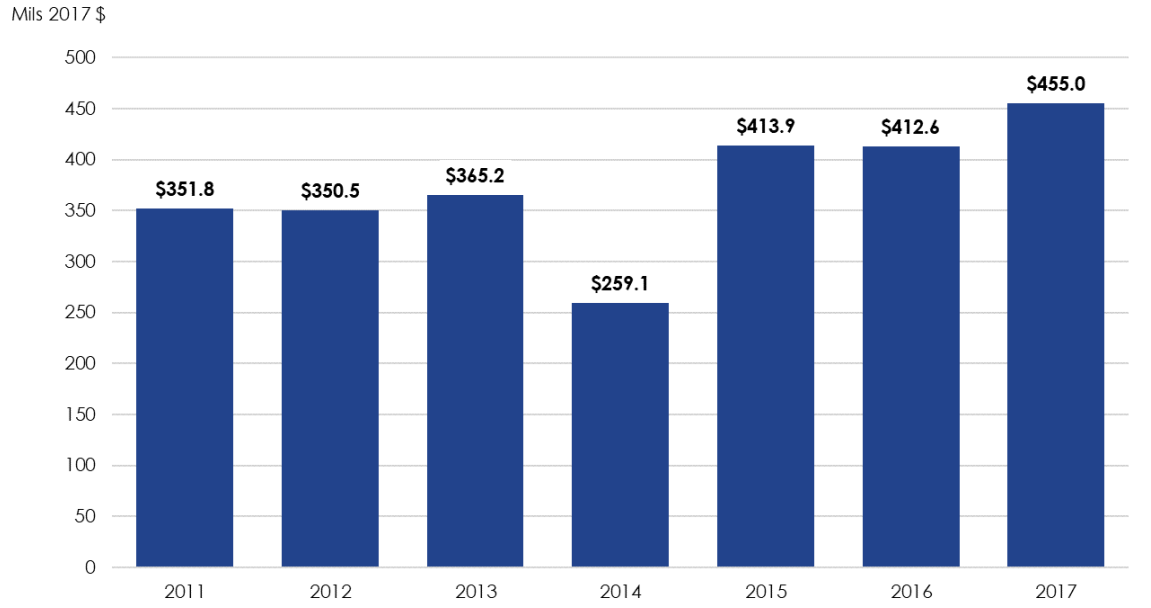
[7] This estimate is based on the weighted multi-year average, inflation-adjusted, of estimated export value to "first wholesale value" for Alaska commercial seafood for the years 2011 to 2015. Data come from the Alaska Seafood Marketing Institute, "Alaska Seafood Export Market Analysis," 2016; with inflation adjustments performed by Community Attributes Inc. using GDP implicit price deflators published by the U.S. Bureau of Economic Analysis, 2019.

## Exhibit 32. Tonnage Harvested by Port of Seattle Customers in North Pacific Fisheries, 2011-2017




*Sources: Alaska Commercial Fishing Entry Commission, 2018; Community Attributes Inc., 2019.*

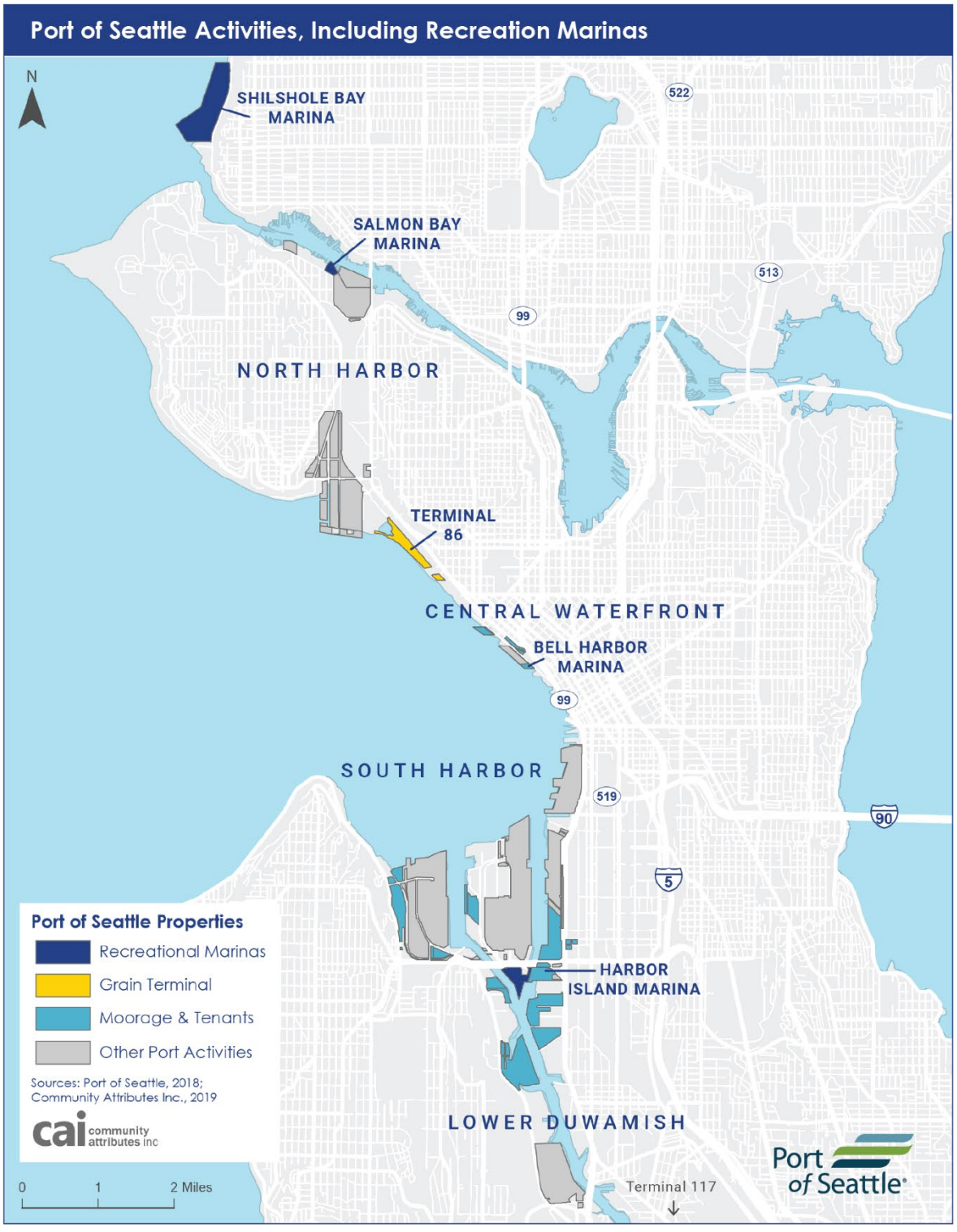
## Exhibit 33. Gross Earnings by Port of Seattle Customers in North Pacific Fisheries, 2011-2017




*Sources: Alaska Commercial Fishing Entry Commission, 2018; Community Attributes Inc., 2019.*

# OTHER PORT OF SEATTLE ACTIVITIES INCLUDING RECREATIONAL MARINAS

Port of Seattle is home to an extensive portfolio of real estate assets and tenants. Supported activities include recreational marinas, industrial and non industrial tenants, the moorage of tugs, barges and more.



In addition to The Northwest Seaport Alliance operations, commercial fishing, and cruise ships, the Port of Seattle is also home to an extensive portfolio of real estate assets and tenants. These activities range from recreational marinas, moorage of tugboat and barges for local common and contract carriers, the grain facility at Terminal 86, non-maritime industrial tenants, to the moorage of research vessels.

The Port of Seattle is home to four recreational marinas: Shilshole Marina, Harbor Island Marina, Salmon Bay Marina, and Bell Harbor Marina. Of these, Shilshole is the largest, with capacity for more than 1,400 vessels. Shilshole is also home to Washington's largest liveaboard community with capacity for 350 live-aboard vessels. Recreational marinas support various economic activities, including marina support staff, onsite restaurants, bars and related food services, fuel, and vessel maintenance and repair services.

Port facilities are also used for a wide variety of other activities. The Port of Seattle offers moorage for tugs and barges, as well as research vessels. Tenants at the Port of Seattle range from construction and architecture companies, to manufacturers and retailers, as well as a wide variety of services outside of those that directly handle marine cargo included under The Northwest Seaport Alliance.

Tug and barge operators provide inter-harbor and long-distance conveying of non-containerized cargo, such as building materials to and from marine construction sites, shipments to Alaska, and towing of industrial equipment. Tug and barge operators that utilize Port of Seattle facilities include Crowley Marine Services, Foss Maritime, General Construction, Manson Construction, and others. In total, tug, barge, and marine construction dockage and moorage leases generated nearly $2.4 million in revenue for the Port of Seattle in 2017.

Research vessels mooring at Port of Seattle facilities in 2017 included three vessels operated by the National Oceanic and Atmospheric Administration, as well as the Sikuliaq, operated by the University of Alaska. These vessels depend upon Port of Seattle facilities for seasonal moorage between research missions as well as essential maintenance and inspection services. These four research vessels conduct a wide variety of research including ocean mapping and activities to support fisheries.

The Port also owns and leases industrial lands to non-maritime tenants. Examples include warehousing of non-containerized cargo, local manufacturers, retail, and services.

**Exhibit 34. Estimated Direct Impacts of Port of Seattle Recreational Marinas and Other Port Business, Washington, 2017**

| Segment | Jobs | Business Output (mils $) | Labor Income (mils $) |
|---|---|---|---|
| Port of Seattle Tenants | 2,400 | $514.9 | $217.6 |
| Vessel Moorage and Barge and Tug Tenants | 820 | $126.0 | $104.5 |
| Recreational Marinas | 200 | $29.6 | $13.9 |
| Port of Seattle Staff | 110 | $34.0 | $13.0 |
| Bulk Cargo Operations | 90 | $24.3 | $8.2 |
| **Total** | **3,620** | **$728.8** | **$357.2** |

*Sources: Puget Sound Regional Council, 2019; Washington State Employment Security Department, 2018; Washington State Department of Revenue, 2018; Port of Seattle, 2018; Community Attributes Inc., 2019.*

There were an estimated 200 jobs directly tied to recreational marinas, with an associated $13.9 million in labor income and $29.6 million in output. In total, recreational marinas and other Port of Seattle business directly supported more than 3,600 jobs, more than $357 million in labor compensation, and nearly $729 million in business output.

An additional 200 jobs were supported through indirect and induced impacts from recreational marina activities. Nearly all direct impacts from recreational marinas were attributed to Shilshole Marina. Factoring in indirect and induced impacts, recreational marinas at the Port of Seattle supported $65.2 million in total business output, of which $23.3 million was through induced impacts. Total labor income impacts summed to $25.5 million (**Exhibit 35**).

**Exhibit 35. Economic Impacts of Recreational Marinas at the Port of Seattle, Washington, 2017**

| | Direct | Indirect | Induced | Total |
|---|---|---|---|---|
| Jobs | 200 | 100 | 100 | 400 |
| Total Compensation (mils 2017 $) | $13.9 | $3.7 | $7.9 | $25.5 |
| Business Output (mils 2017 $) | $29.6 | $12.3 | $23.3 | $65.2 |

*Sources: Washington State Office of Financial Management, 2018; Community Attributes Inc., 2019.*

Other port business includes industrial and non-industrial activities and Port tenants, ranging from bulk cargo handling and support services (such as the grain facility at T-86), research vessels moored at Port of Seattle facilities, construction and engineering firms with activities on Port of Seattle facilities, cargo and barge operations with barges moored on Port property, various non-industrial Port tenants and Port of Seattle staff supporting these activities. In 2017, an estimated 3,400 jobs, $343.3 million in labor income, and $699.2 million in business output were directly tied to these activities. The total economic impact of other port business, including indirect and induced impacts, summed to 8,400 jobs, $616.5 million in labor income, and nearly $1.6 billion in business output (**Exhibit 36**).

**Exhibit 36. Economic Impacts of Other Port of Seattle Business, Washington, 2017**

| | Direct | Indirect | Induced | Total |
|---|---|---|---|---|
| Jobs | 3,400 | 1,400 | 3,600 | 8,400 |
| Total Compensation (mils 2017 $) | $343.3 | $82.4 | $190.8 | $616.5 |
| Business Output (mils 2017 $) | $699.2 | $290.6 | $563.1 | $1,552.8 |

*Sources: Washington State Office of Financial Management, 2018; Community Attributes Inc., 2019.*

Overall, the direct and secondary impacts of recreational marinas, dockage and moorage, industrial and non-industrial Port of Seattle tenants, and all other Port of Seattle business generated $15.2 million in state sales and use taxes in 2017. Additionally, these impacts generated $7.7 million in other taxes and supported through direct and secondary impacts a total of nearly $23 million in state taxes. (**Exhibit 37**)

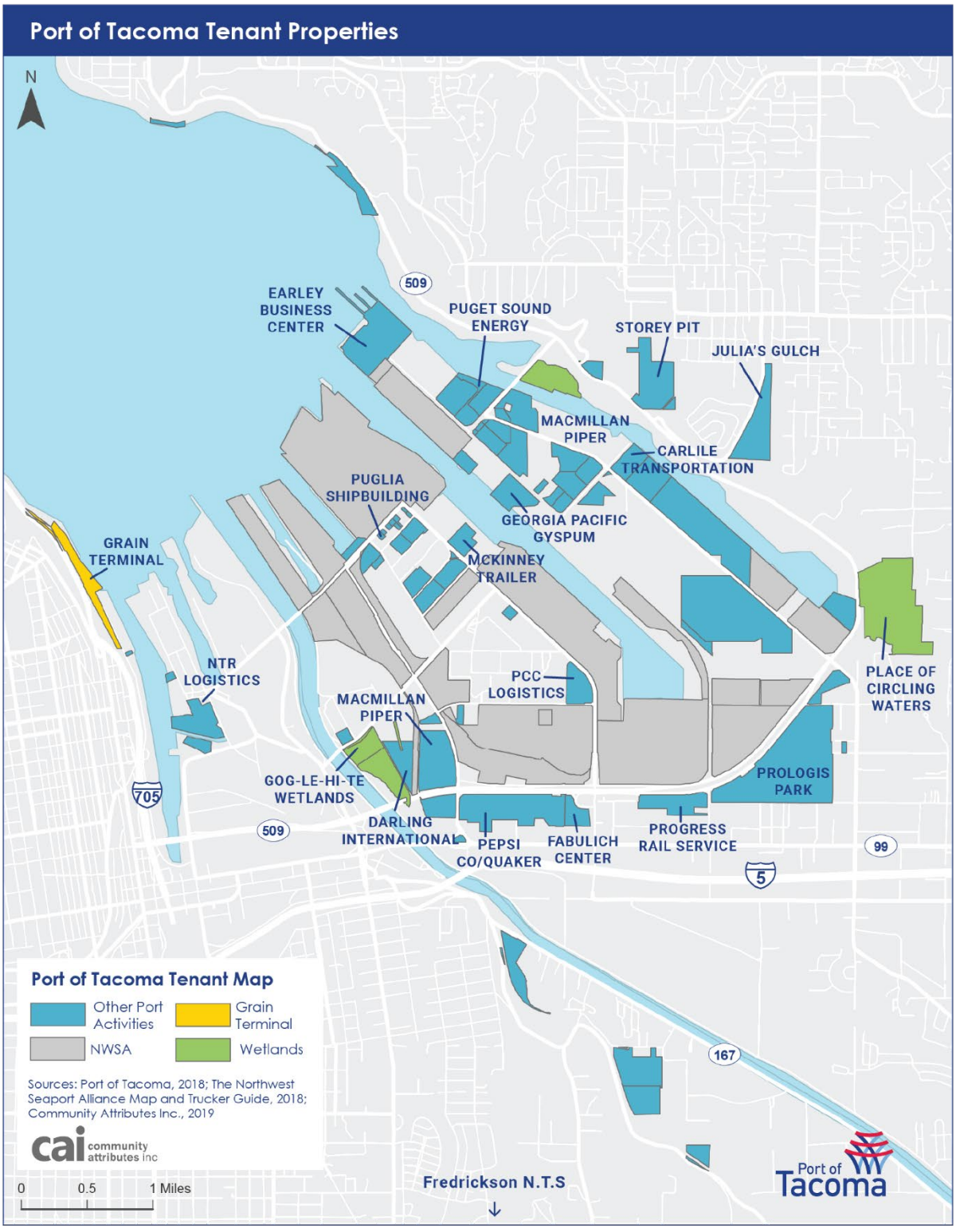
**Exhibit 37. Total Statewide Fiscal Impacts of Recreational Marinas and Other Port of Seattle Business, Washington, Mils 2017$, 2017**

| | Direct | Secondary | Total |
|---|---|---|---|
| B&O | $2.1 | $3.9 | $6.0 |
| Sales & Use Taxes | $6.0 | $9.2 | $15.2 |
| Other | $0.4 | $1.3 | $1.7 |
| **Total** | **$8.5** | **$14.3** | **$22.9** |

*Sources: Washington State Department of Revenue, 2018; Washington State Employment Security Department, 2018; Community Attributes Inc., 2019.*

# TENANTS & OTHER BUSINESS

The Port of Tacoma, beyond supporting marine cargo through The Northwest Seaport Alliance, has a portfolio of real estate properties. The Port of Tacoma provides industrial and non industrial space for a wide variety of activities.



The Port of Tacoma has more than 2,700 acres of real estate property. Many tenants on those properties directly support the marine cargo operations of The Northwest Seaport Alliance. However, the Port of Tacoma is home to a wide range of industrial and non-industrial tenants and activities. The Earley Business Center is home to SAFE Boats for the manufacture of their largest boats. The Fabulich Center provides commercial office space for tenants, including non-NWSA government employees. Other tenants utilizing Port of Tacoma properties include Trident Seafoods, Darling International, North West Company, Pepsi Co/Quaker, Americold, Puget Sound Energy, and many others.

Outside of the NWSA marine cargo operations, the Port of Tacoma also provides bulk cargo operations at the TEMCO Grain Terminal, as well as bulk gypsum operations for the wallboard manufacturing activities of Georgia Pacific Gypsum.

In 2017, Port of Tacoma tenant and bulk activities summed to 1,500 direct jobs, $849.4 million in business output, and $109.8 million in labor income (**Exhibit 38**).

**Exhibit 38. Estimated Direct Impacts of Port of Tacoma Tenants and Other Business, Washington, 2017**

| Activity | Jobs | Business Output (mils 2017 $) | Labor Income (mils 2017 $) |
|---|---|---|---|
| Manufacturing | 310 | $135.7 | $23.3 |
| Services and Non-Industrial Tenants | 620 | $136.0 | $44.1 |
| Construction and Resource Operations | 250 | $76.6 | $18.8 |
| Port of Tacoma Government (non-NWSA) | 80 | $11.1 | $3.6 |
| Bulk Operations | 260 | $490.0 | $20.0 |
| **Total** | **1,520** | **$849.4** | **$109.8** |

*Note: values may not sum due to rounding. The jobs, income and output of Port of Tacoma tenants does not include those activities among tenants that directly support the marine cargo activities of the NWSA.*
*Sources: Puget Sound Regional Council, 2019; Washington State Employment Security Department, 2018; Washington State Department of Revenue, 2018; Community Attributes Inc., 2019.*

The economic impacts of these varied non-NWSA activities on Port of Tacoma property summed to 5,200 jobs, $326.9 million in labor compensation, and $1.6 billion in business output. Every direct job among the Port's tenants and other non-NWSA activities supported a total of 3.5 jobs across the Washington state economy (**Exhibit 39**).

## Exhibit 39. Economic Impacts of Port of Tacoma Tenants and Other Businesses, Washington, 2017

| | Direct | Indirect | Induced | Total |
|---|---|---|---|---|
| Jobs | 1,500 | 1,800 | 1,900 | 5,200 |
| Total Compensation (mils 2017 $) | $114.3 | $111.4 | $101.2 | $326.9 |
| Business Output (mils 2017 $) | $852.2 | $401.0 | $298.6 | $1,551.7 |

*Sources: Washington State Office of Financial Management, 2018; Community Attributes Inc., 2019.*

The direct and secondary activities of Port of Tacoma tenants and other business supported a total of $9.3 million in state sales and use taxes, as well as $4.3 million in state business and occupation taxes, and an additional $1.5 million in other state taxes. In total, these activities supported a total of $15.4 million in state taxes through direct and secondary activities. (**Exhibit 40**)

## Exhibit 40. Total Statewide Fiscal Impacts of Port of Tacoma Tenants and Other Business, Washington, Mils 2017$, 2017

| | Direct | Secondary | Total |
|---|---|---|---|
| B&O | $1.4 | $2.9 | $4.3 |
| Sales & Use Taxes | $3.3 | $6.2 | $9.5 |
| Other | $0.5 | $1.0 | $1.5 |
| **Total** | **$5.3** | **$10.1** | **$15.4** |

*Sources: Washington State Department of Revenue, 2018; Washington State Employment Security Department, 2018; Community Attributes Inc., 2019.*

## SUMMARY OF COMBINED TOTAL IMPACTS AND CONCLUSION

Activities at the Port of Seattle, Port of Tacoma, and The Northwest Seaport Alliance have a significant impact on the statewide economy. The Northwest Seaport Alliance directly supported 20,100 jobs in 2017 and $5.9 billion in business output, of which the largest segment was containerized cargo (14,900 jobs and $4.5 billion in business output). Commercial fishing, including vessel operations tied to the North Pacific fisheries in Alaska, directly supported 7,200 jobs and $671.3 million in business output. Other activities at the Port of Seattle (such as recreational marinas) and Port of Tacoma directly supported 3,600 and 1,500 jobs, respectively. The cruise industry, treated separately in this study, is projected to directly support 3,000 jobs, more than $1.0 billion in business output, and $122.7 million in labor income in 2019. (**Exhibit 41**)

**Exhibit 41. Estimated Direct Impacts of Port of Seattle, Port of Tacoma, and The Northwest Seaport Alliance, Washington, 2017 and 2019**

| | Jobs | Business Output (mils) | Labor Income (mils) |
|---|---|---|---|
| The Northwest Seaport Alliance (2017) | 20,100 | $5,858.7 | $1,902.7 |
| Containerized Cargo | 14,900 | $4,537.6 | $1,502.5 |
| Automobiles | 1,300 | $308.8 | $108.4 |
| Breakbulk, Logs and Other Cargo | 3,900 | $1,012.2 | $291.9 |
| Port of Seattle Cruise Industry (2019, 2018$) | 3,000 | $467.8 | $122.7 |
| Port of Seattle Commercial Fishing (2017) | 7,200 | $671.3 | $313.4 |
| Port of Seattle Recreational Marinas and Other Business (2017) | 3,600 | $728.8 | $357.2 |
| Port of Tacoma Tenants and Other Business (2017) | 1,500 | $852.2 | $114.3 |

*Sources: Puget Sound Regional Council, 2019; Washington State Employment Security Department, 2018; Washington State Department of Revenue, 2018; The Northwest Seaport Alliance, 2018; Port of Seattle, 2018; Port of Tacoma, 2018; Community Attributes Inc., 2019.*

Total economic impacts represent additional jobs, labor income, and business output supported through upstream business-to-business transactions (indirect) and household consumption expenditures (induced). The combined impacts of The Northwest Seaport Alliance and other activities at each Port, less cruise ship operations, supported 83,700 jobs, $5.5 billion in labor income, and $17.0 billion in business output in 2017 (**Exhibits 42**). Cruise operations has a 2019 projected total economic impact of 5,500 jobs, $260.1 million in labor income, and $893.6 million in business output.

**Exhibit 42. Total Economic Impacts of Port of Seattle, Port of Tacoma, and The Northwest Seaport Alliance, Washington, 2017 and 2019**

| | Jobs | Business Output (mils) | Labor Income (mils) |
|---|---|---|---|
| The Northwest Seaport Alliance (2017) | 58,400 | $12,385.4 | $4,018.5 |
| Containerized Cargo | 45,500 | $9,722.6 | $3,194.1 |
| Automobiles | 3,300 | $643.4 | $216.6 |
| Breakbulk, Logs and Other Cargo | 9,600 | $2,019.4 | $607.8 |
| Port of Seattle Cruise Industry (2019, 2018$) | 5,500 | $893.6 | $260.1 |
| Port of Seattle Commercial Fishing (2017) | 11,300 | $1,438.0 | $543.0 |
| Port of Seattle Recreational Marinas and Other Business (2017) | 8,800 | $1,618.0 | $642.0 |
| Port of Tacoma Tenants and Other Business (2017) | 8,400 | $1,552.8 | $616.5 |

*Sources: Washington State Office of Financial Management, 2018; Community Attributes Inc., 2019.*

The economic impacts of the Port of Seattle, Port of Tacoma, and The Northwest Seaport Alliance marine cargo activities and the wide variety of other activities across the Ports of Seattle and Tacoma support various state tax bases, which in turn yield tax revenue. Much of the private sector marine cargo and tenant activity generates taxes directly. The indirect and induced activities generated by both public and private sector expenditures generate additional state sales and use taxes, business and occupation taxes, and other taxes (public utility taxes, quantity taxes, and others). These fiscal impacts are summarized in **Exhibit 43** below.

**Exhibit 43. Direct and Total Fiscal Impacts of the Port of Seattle, Port of Tacoma, and The Northwest Seaport Alliance, Washington, 2017 and 2019**

| | Direct (mils) | Total (mils) |
|---|---|---|
| The Northwest Seaport Alliance (2017) | $33.3 | $135.9 |
| Containerized Cargo | $25.1 | $106.8 |
| Automobiles | $2.7 | $8.0 |
| Breakbulk, Logs and Other Cargo | $5.5 | $21.1 |
| Port of Seattle Cruise Industry (2019, 2018$) | $7.8 | $22.9 |
| Port of Seattle Commercial Fishing (2017) | $1.4 | $13.2 |
| Port of Seattle Recreational Marinas and Other Business (2017) | $8.5 | $22.9 |
| Port of Tacoma Tenants and Other Business (2017) | $5.3 | $15.4 |

*Sources: Washington State Office of Financial Management, 2018; Community Attributes Inc., 2019.*

# Appendix A. Local Economic and Fiscal Impacts for Select Cities

This section provides a summary of estimated city-level direct impacts, total economic impacts, and fiscal impacts for the cities in King and Pierce counties from activities under the Port of Seattle Maritime Division, Port of Tacoma, and The Northwest Seaport Alliance. Analytics are based on the findings presenting in this report on economic and fiscal impacts statewide from these three combined entities and by line of business.

Findings are presented for the largest jurisdictions across both counties based on direct activities tied to Port operations. All findings are reported for year 2017.

## Methods

Estimates were based on total economic impacts for each line of business, combined, for the Port of Seattle Maritime Division, Port of Tacoma, and The Northwest Seaport Alliance. All figures are presented for year 2017. Analysis reviewed available records, additional data published by the Puget Sound Regional Council, business directories, and other relevant sources to allocate direct activities by city. Economic and fiscal impacts were computed using a customized version of the Washington State Input-Output Model and data gathered from the Washington State Department of Revenue.

This analysis assumes that while the majority of direct activities reside in or are in close proximity to the Ports, there are direct activities—such as some rail services—that occur in regions as distant as Spokane and the Tri-Cities.

For this analysis, to allow for comparisons of total economic impact by city, we use 2017 estimates for cruise operations, previously developed as part of the supporting analysis of the total economic impacts of the Port of Seattle, Port of Tacoma and The Northwest Seaport Alliance (but not included in previous sections of this report).

# Economic Impacts

Economic impacts include both direct activities tied to port operations across all three entities and additional jobs, income, and revenues supported through upstream business-to-business transactions (indirect impacts) and household consumption (induced impacts).

In 2017, port-related activities directly supported 34,390 jobs in King and Pierce Counties. These impacts were disbursed across cities based on the location of direct activities. There are 19 cities across King and Pierce Counties with direct activities tied to port operations. The largest direct beneficiaries of port-related activities were Seattle and Tacoma, with 18,410 jobs and 10,040 jobs, respectively (**Exhibit A1**). These were followed by Sumner (1,820 jobs) and Fife (1,150), owing to the high concentration of warehousing and transloading operations in each city serving The Northwest Seaport Alliance.

**Exhibit A1. Direct Jobs, Revenue, and Income by Jurisdiction, King and Pierce Counties, 2017**

| City | Jobs | Output (mils $) | Labor Income (mils $) |
|---|---|---|---|
| Seattle | 18,410 | $3,297.1 | $1,246.2 |
| Tacoma | 10,040 | $3,298.2 | $940.3 |
| Sumner | 1,820 | $500.2 | $174.0 |
| Fife | 1,150 | $315.8 | $110.3 |
| Kent | 660 | $184.9 | $63.2 |
| Puyallup | 510 | $140.0 | $48.9 |
| Uninc. Pierce | 480 | $132.4 | $46.3 |
| Auburn | 360 | $98.3 | $34.3 |
| Renton | 250 | $68.3 | $23.9 |
| Tukwila | 220 | $62.8 | $21.3 |
| Lakewood | 190 | $52.4 | $18.3 |
| Uninc. King | 100 | $28.2 | $9.8 |
| Bellevue | 60 | $17.5 | $5.4 |
| Issaquah | 50 | $14.5 | $5.1 |
| Burien | 30 | $9.0 | $3.2 |
| Kirkland | 30 | $7.4 | $2.6 |
| Des Moines | 10 | $4.0 | $1.4 |
| Kenmore | 10 | $3.8 | $1.3 |
| Edgewood | 10 | $3.3 | $1.2 |
| **Total** | **34,390** | **$8,238.1** | **$2,756.9** |

*Sources: The Northwest Seaport Alliance, 2019; Community Attributes Inc, 2019.*

In 2017, the collective impact of port-related activities, including direct, indirect, and induced, summed to 70,410 jobs within King and Pierce counties (**Exhibit A2**). Approximately 89% of these jobs were within cities with direct activities. Of the remainder, the largest location for indirect and induced jobs was Redmond, with 1,460 jobs. The City of Seattle was the largest location for total direct, indirect, and induced jobs, with 30,340, owing to its large population base, followed by Tacoma (12,600) and Sumner (2,170).

**Exhibit A2. Total Economic Impacts by 19 Jurisdictions with Direct Activities, 2017**

| City | Jobs | Output (mils $) | Labor Income (mils $) |
|---|---|---|---|
| Seattle | 30,340 | $5,241.1 | $3,956.4 |
| Tacoma | 12,600 | $3,717.8 | $3,439.7 |
| Bellevue | 2,910 | $481.3 | $173.9 |
| Kent | 2,670 | $601.4 | $312.0 |
| Sumner | 2,170 | $584.4 | $524.9 |
| Renton | 1,520 | $274.7 | $141.2 |
| Fife | 1,480 | $386.5 | $338.4 |
| Auburn | 1,440 | $316.9 | $163.7 |
| Kirkland | 1,230 | $207.4 | $74.6 |
| Puyallup | 1,120 | $240.8 | $174.6 |
| Uninc. Pierce | 1,120 | $269.4 | $172.5 |
| Tukwila | 920 | $216.6 | $105.6 |
| Lakewood | 770 | $150.2 | $85.2 |
| Issaquah | 590 | $97.7 | $44.0 |
| Uninc. King | 550 | $126.4 | $57.6 |
| Burien | 530 | $86.8 | $36.0 |
| Des Moines | 300 | $49.5 | $19.7 |
| Kenmore | 210 | $36.5 | $14.9 |
| Edgewood | 100 | $19.1 | $8.4 |
| *Remaining Cities* | *7,840* | *$1,321.0* | *$445.0* |
| **Total** | **70,410** | **$14,425.5** | **$10,288.3** |

*Sources: The Northwest Seaport Alliance, 2019; Community Attributes Inc, 2019.*

THE NORTHWEST SEAPORT ALLIANCE

## Fiscal Impacts

There were nineteen jurisdictions in King and Pierce counties with direct port-related activities in 2017. This section provides a deeper analysis of tax revenues supported by these activities through direct and secondary (indirect and induced) impacts. The total fiscal impacts presented earlier in this report reflect the state tax payments generated directly or through multiplier effects from Port of Seattle, Port of Tacoma, and NWSA operations.

In addition to state taxes, city-level taxes presented in this section include local business & occupation taxes (B&O) and local sales & uses taxes.

In 2017, the port-supported activities were associated with state and local taxes collected in the City of Seattle totaling $102.8 million. This was followed by Tacoma with $23.1 million, and Kent with $11.7 million (**Exhibit A3**).

**Exhibit A3. Fiscal Impacts by City, King and Pierce Counties, 2017, by 19 Jurisdictions by Direct Impacts**

| City | State Taxes | Local Taxes | Total |
|---|---|---|---|
| Seattle | $65.2 | $37.6 | $102.8 |
| Tacoma | $11.8 | $11.3 | $23.1 |
| Sumner | $1.7 | $0.5 | $2.2 |
| Fife | $1.7 | $0.6 | $2.3 |
| Kent | $8.2 | $3.5 | $11.7 |
| Puyallup | $3.0 | $1.0 | $4.0 |
| Uninc. Pierce | $7.6 | $2.1 | $9.8 |
| Auburn | $5.1 | $1.7 | $6.8 |
| Renton | $7.2 | $2.7 | $9.9 |
| Tukwila | $5.1 | $1.8 | $6.9 |
| Lakewood | $2.9 | $1.0 | $3.9 |
| Uninc. King | $4.4 | $1.5 | $6.0 |
| Bellevue | $15.3 | $6.0 | $21.3 |
| Issaquah | $2.9 | $1.1 | $4.0 |
| Burien | $1.3 | $0.6 | $1.9 |
| Kirkland | $5.3 | $1.8 | $7.1 |
| Des Moines | $0.7 | $0.3 | $1.1 |
| Kenmore | $0.4 | $0.2 | $0.7 |
| Edgewood | $0.2 | $0.1 | $0.2 |
| **Total** | **$150.1** | **$75.4** | **$225.5** |

*Sources: The Northwest Seaport Alliance, 2019; Washington State Department of Revenue, 2019; Community Attributes Inc, 2019.*

# APPENDIX B. THE NORTHWEST SEAPORT ALLIANCE OCEAN CONTAINER NATIONAL IMPACTS ANALYSIS

## Introduction

The Northwest Seaport Alliance (NWSA) is an important driver of economic activity, not only in the Puget Sound region but as a core economic development asset to trade-oriented communities across the U.S. The NWSA is the fourth-largest container gateway in North America,[8] and key gateway to the Asia Pacific. Via the NWSA these communities have access to source critical components and inputs from elsewhere in the world and to sell their goods to foreign markets.

This analysis assesses contributions, including the value and job-supporting importance of containerized cargo either entering or exiting the U.S. through the NWSA.

Key findings include the following:

- In 2018, $68.8 billion in containerized imports and exports were handled at the NWSA, equal to 6% of all international containerized cargo handled at U.S. ports by value.
- These containerized imports and exports were associated with 355,700 jobs across the U.S. Of this total, an estimated 85,360 jobs are determined to be dependent on access to the NWSA for importing and exporting of containerized cargo.
- The majority of these jobs were in Washington state (59,860), with another 15,130 jobs in Oregon and 7,380 in Minnesota.

### Data and Methods

This analysis examines freight flows to and from the NWSA using two unique datasets: 1) the Freight Analysis Framework (FAF4) data series published by the U.S. Department of Transportation; and 2) export and import containerized goods by value by U.S. origin and destination handled at the NWSA from World Institute for Strategic Economic Research data series (WISER). The FAF4 database has freight volumes and values flowing between 132 domestic regions economic areas (metropolitan and rural areas) by all modes of freight transportation.

The FAF4 data, for year 2015, is used to examine freight flows and to inform subsequent assessment of economic value and importance of the NWSA to

[8] The Northwest Seaport Alliance, "A marine cargo operating partnership," accessed at https://www.nwseaportalliance.com/about.

other states. Analysis by JLL on shipping costs by port to Chicago augmented this analysis.

The second dataset, WISER, is used to estimate the actual dependencies of other states on NWSA container cargo-handling. Jobs associated with these imports and exports to and from other states is then estimated by way of output-to-job ratios by industry derived from data published in the U.S. Economic Census and U.S. Bureau of Economic Analysis.

## Organization of Report

The remainder of this report is organized as follows:

- **Intermodal freight flows and cost analysis**. Discussion of transportation modes used for conveying cargo to and from the NWSA, based on the FAF4 data series, domestic origins and destinations of cargo handled at The NWSA, based on the FAF4 data series, and comparison of shipping costs to/from the NWSA versus select alternative West Coast ports.
- **NWSA containerized cargo activities**. Leading trends and data on cargo operations.
- **Economic benefits of the NWSA to other regions**. The economic impact of the NWSA to cities and regions elsewhere in the U.S. that depend on cargo shipped to or from the NWSA, based on WISER data provided by the NWSA.
- **Data and Methods**. Review of data sources and methods used in this study.

# Intermodal Freight Flows and Cost Analysis

Containerized cargo handled at The Northwest Seaport Alliance facilities can arrive via multiple modes, including rail, truck, and water. Over 63% of containerized cargo by weight is moved domestically to or from the Seattle FAF zone by truck. Multiple modes and mail, which may also include trucking, accounts for approximately 23%, followed by rail (10%), water (4%), and pipeline (0.3%). **Exhibit A4** details these mode distributions by value and weight.

**Exhibit A4. Mode Distributions for Imports and Exports Entering or Leaving The Northwest Seaport Alliance, 2015**

| | By Value (2015 $) | By Weight (KTons) |
|---|---|---|
| Truck | 60.7% | 63.3% |
| Multiple modes & mail | 34.4% | 22.9% |
| Rail | 2.8% | 9.6% |
| Water | 1.8% | 3.9% |
| Pipeline | 0.3% | 0.3% |
| All Modes | 100.0% | 100.0% |

*Sources: U.S. Bureau of Transportation Statistics, 2019; Community Attributes Inc., 2019.*

By absolute value and weight, most cargo containers moving through the Seattle region[9] originate or are destined for the Northwest. The top five origin/destinations are in Washington and Oregon and collectively account for about 45% of all trade through the Seattle FAF4 zone (**Exhibits A5 and A6**). After the Northwest, the Mountain and Midwestern regions—such as Montana, Iowa, and Minnesota—have the next largest amount of trade. Although California and the Southwest are closer to Seattle than the Midwest, containerized trade from these states is likely captured by the Port of Los Angeles and the Port of Long Beach. Seattle also pulls a significant amount of trade from the east coast.

[9] The Seattle FAF Zone, which includes Island, King, Kitsap, Lewis, Mason, Pierce, Skagit, Snohomish, and Thurston counties.

## Exhibit A5. Two-Way Trade (Imports and Exports Combined) by Largest Origin-Destinations by Kilotons, Containerized, 2015, Seattle, WA FAF Zone

| Rank | Origin/Destination Region | Kilotons |
|---|---|---|
| 1 | Seattle WA | 8,598.1 |
| 2 | Portland OR-WA (OR Part) | 1,284.4 |
| 3 | Rest of WA | 1,283.7 |
| 4 | Portland OR-WA (WA Part) | 835.2 |
| 5 | Rest of OR | 461.7 |
| 6 | Idaho | 367.5 |
| 7 | Iowa | 364.9 |
| 8 | Minneapolis-St. Paul MN-WI (MN Pc | 339.6 |
| 9 | Montana | 173.2 |
| 10 | Rest of MN | 128.0 |
| 11 | North Dakota | 79.1 |
| 12 | Rest of NE | 64.7 |
| 13 | San Francisco CA | 63.0 |
| 14 | Los Angeles CA | 52.9 |
| 15 | South Dakota | 45.3 |
| 16 | Omaha NE-IA (NE Part) | 36.6 |
| 17 | West Virginia | 28.9 |
| 18 | Rest of CO | 26.9 |
| 19 | Rest of GA | 21.7 |
| 20 | New York NY-NJ-CT-PA (NJ Part) | 20.2 |
| 21 | Rest of TX | 16.5 |
| 22 | St. Louis MO-IL (IL Part) | 12.1 |
| 23 | Sacramento CA | 12.0 |
| 24 | Rest of CA | 10.0 |
| 25 | Chicago IL-IN-WI (IL Part) | 9.4 |

*Sources: U.S. Department of Transportation, FAF4 Dataset, 2019; U.S. Census Bureau, 2019; Community Attributes Inc., 2019.*

**Exhibit A6. Two-Way Trade by Largest Origin-Destinations by Dollar Value, Containerized, 2015 (2018 $)**

| Rank | Origin/Destination Region | Value |
|---|---|---|
| 1 | Seattle WA | $13,329.6 |
| 2 | Rest of WA | $3,303.8 |
| 3 | Portland OR-WA (OR Part) | $1,749.1 |
| 4 | Portland OR-WA (WA Part) | $1,242.8 |
| 5 | Rest of OR | $647.3 |
| 6 | Iowa | $476.8 |
| 7 | Minneapolis-St. Paul MN-WI (MN Pc | $439.1 |
| 8 | Idaho | $325.6 |
| 9 | Montana | $294.9 |
| 10 | Rest of MN | $168.5 |
| 11 | San Francisco CA | $124.7 |
| 12 | Rest of NE | $84.1 |
| 13 | Los Angeles CA | $80.6 |
| 14 | North Dakota | $78.9 |
| 15 | South Dakota | $54.0 |
| 16 | Omaha NE-IA (NE Part) | $47.3 |
| 17 | St. Louis MO-IL (IL Part) | $32.3 |
| 18 | Sacramento CA | $28.0 |
| 19 | Rest of CO | $20.1 |
| 20 | New York NY-NJ-CT-PA (NJ Part) | $19.6 |
| 21 | Rest of CA | $16.5 |
| 22 | Salt Lake City UT | $16.1 |
| 23 | Rest of TX | $15.3 |
| 24 | Fresno CA | $13.6 |
| 25 | San Diego CA | $12.9 |

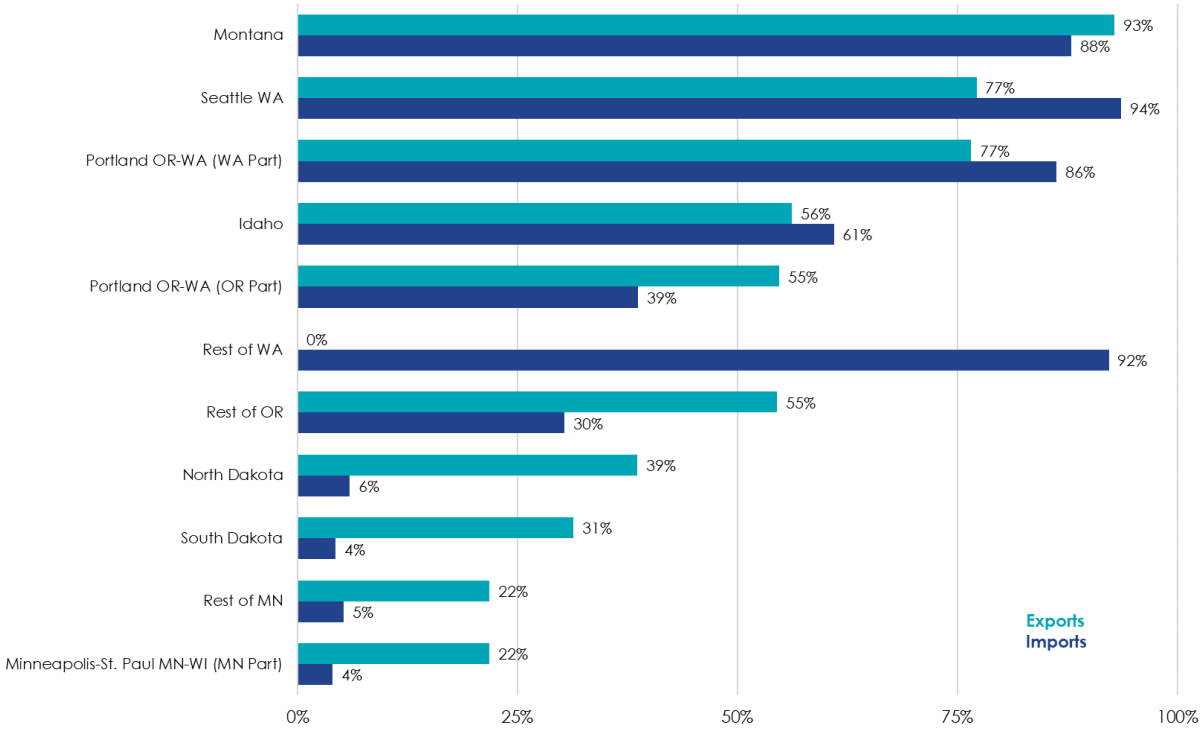
*Sources: U.S. Department of Transportation, FAF4 Dataset, 2019; U.S. Census Bureau, 2019; Community Attributes Inc., 2019.*

The share of a zone's total trade that is imported or exported from Seattle is a measure of the NWSA's importance to that port. **Exhibits A7** and **A8** show all zones where the NWSA has at least 20% of trade by either value or tonnage. As with total trade volume, the NWSA has the strongest relationship with Northwestern and Midwestern states. This is to be expected based on the freight transportation cost analysis discussed further below.

For example, based on this analysis, 93% of all containerized exports by value from Montana exit through The Northwest Seaport Alliance, and 88% of all imports destined for Montana enter via the NWSA. Perhaps unsurprisingly, 94% of imports by value destined for Seattle enter via the NWSA. However, only 4% of imports by value destined for Minneapolis-St.

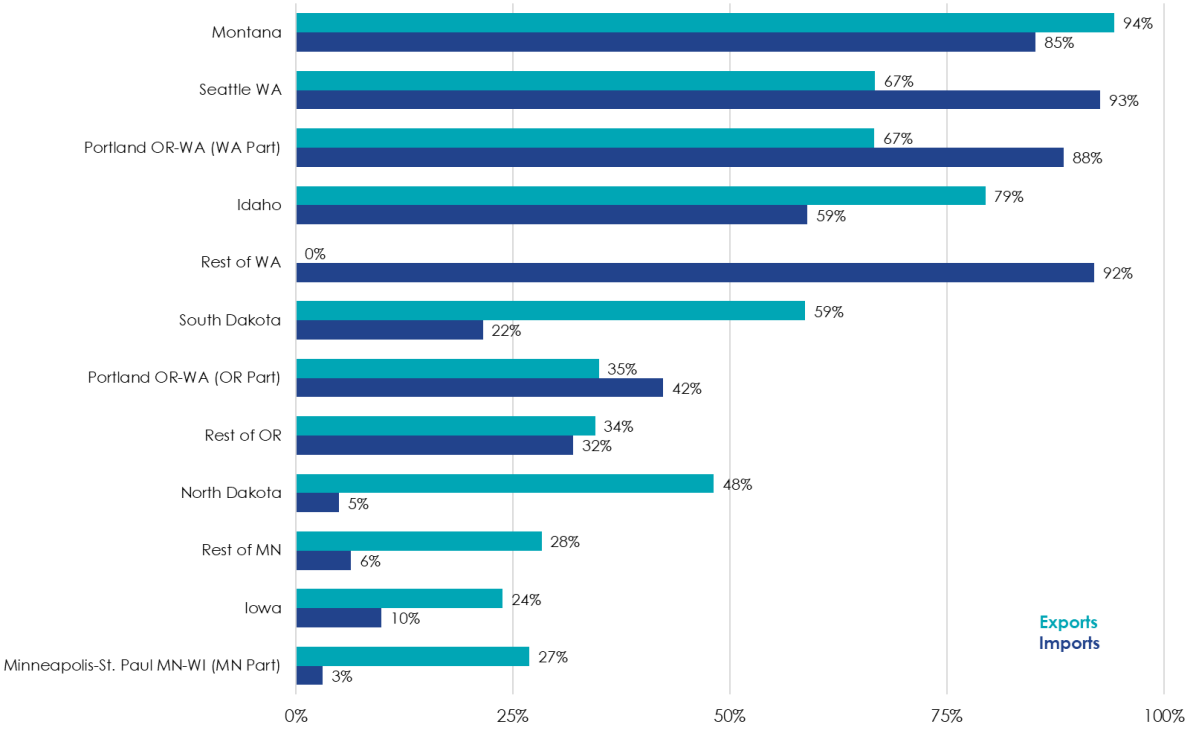
Paul enter the U.S. via the NWSA, though 27% of containerized exports from the Minneapolis-St. Paul region by weight exit through the NWSA.

**Exhibit A7. Leading Regions by NWSA Market-share by Value, Imports and Exports, 2015**




*Sources: U.S. Department of Transportation, FAF4 Dataset, 2019; U.S. Census Bureau, 2019; Community Attributes Inc., 2019.*

## Exhibit A8. Leading Regions by NWSA Market-share by Weight, Imports and Exports, 2015




*Sources: U.S. Department of Transportation, FAF4 Dataset, 2019; U.S. Census Bureau, 2019; Community Attributes Inc., 2019.*

## Comparing Cost of Origin and Destination Shifts from the NWSA to Alternative Ports

It is assumed that firms have the capacity and ability to switch their sourcing from the NWSA to another port system given a disruption in NWSA cargo handling capacity. However, the costs to do so will vary based on a variety of factors, such as rail distance and terminal costs. To help illustrate these differences, the following cost indices were calculated to a set of shipping destinations across the U.S. The Ports of LA-Long Beach and Vancouver, BC. These ports were chosen because of their location on the West Coast and positions as important competitors for the NWSA for Northeast Asian containerized cargo handling (**Exhibit A9**). A further discussion of methods used to compare these indices is explaining in the **data and methods section**.

Cost indices are best on estimates for the NWSA, LA-Long Beach, and Vancouver, BC for shipments to/from Chicago, including rail costs, and extrapolated for other regions of the U.S. Costs to each location are indexed to NWSA costs (100). For example, Shipping to Minneapolis, Minnesota is 10% more expensive from LA-Long Beach than from the NWSA, but 11.2% cheaper from Vancouver, BC. Likewise, LA-Long Beach and the NWSA about equal in cost for shipments to or from Chicago, but more expensive than Vancouver (index value of 87.2).

**Exhibit A9. Shipping Costs Indices to/from Cities in U.S. (NWSA = 100)**

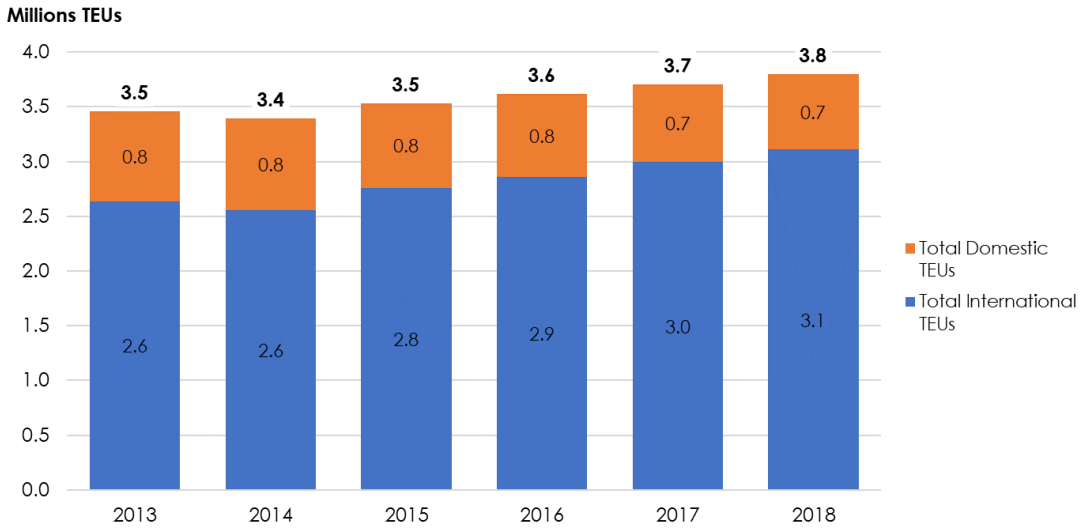
| Destination/Origin | State | LA-Long Beach | Vancouver |
|---|---|---|---|
| Portland | Oregon | 147.3 | 100.4 |
| Seattle | Washington | 172.0 | 103.1 |
| Boise | Idaho | 122.6 | 96.6 |
| Minneapolis | Minnesota | 110.0 | 88.8 |
| Billings | Montana | 120.2 | 93.6 |
| Fargo | North Dakota | 115.3 | 90.0 |
| Sioux Falls | South Dakota | 107.4 | 89.6 |
| Cheyenne | Wyoming | 102.2 | 91.1 |
| Chicago | Illinois | 100.4 | 87.2 |
| Milwaukee | Wisconsin | 103.4 | 87.4 |
| Lexington | Kentucky | 95.5 | 86.1 |
| Indianapolis | Indiana | 97.9 | 87.4 |
| Detroit | Michigan | 100.1 | 86.7 |

*Sources: JLL, 2019; Community Attributes Inc., 2019.*

# The Northwest Seaport Alliance Containerized Cargo Activities

In 2018, the NWSA handled more than 3.7 million TEUs of containerized cargo, of which 3.1 were international (**Exhibit A10**). The vast majority by weight and dollar value are tied to the Puget Sound region, with the remainder discretionary cargo linked to various cities and regions across the U.S. TEUs handled at The Northwest Seaport Alliance increased 3% per year between 2014 and 2018, although some of the largest increases were in international empty containers (13% increase per year). Domestic container shipments between The Northwest Seaport Alliance and Hawaii and Alaska declined 5% per year between 2014 and 2018.

**Exhibit A10. Twenty-Foot Equivalent Unit Containerized Shipments through The Northwest Seaport Alliance, 2013-2018**




*Source: The Northwest Seaport Alliance, 2019.*

The value of two-way containerized trade through the Ports of Seattle and Tacoma was $68.7 billion in 2018, the highest in the last five years (**Exhibit A11**). For containers, imports have consistently made up 80% or more of total two-way trade value. Another important measure is the total number of containers, measured in twenty-foot equivalent units (TEUs), that pass through the NWSA. This rose from 3.1 million TEUs in 2009 to 3.7 million in 2017, including empty containers.[10]

[10] Port of Seattle, Port of Tacoma, and The Northwest Seaport Alliance. March 2019.

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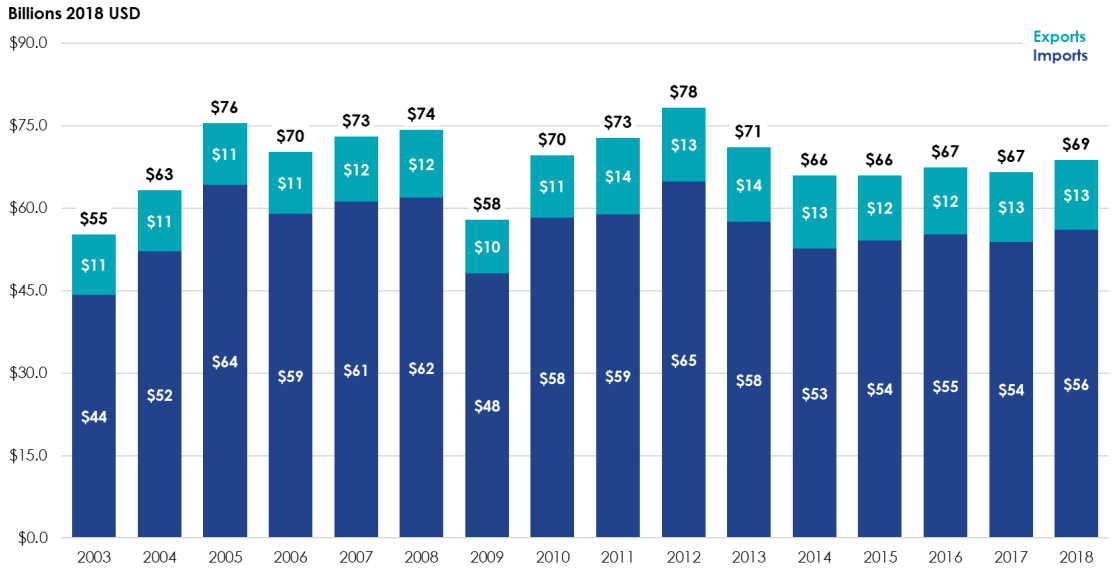
## Exhibit A11. Value of Imports and Exports, Two-Way Trade, Containerized, Northwest Seaport Alliance, 2003-2018 (2018 $)




*Sources: U.S. Census Bureau, 2019; Community Attributes Inc., 2019.*

In 2018, the value of two-way trade in containerized merchandise and commodities handled at The Northwest Seaport Alliance summed to $69 billion, of which the majority ($56 billion) were imports (**Exhibit A12**). For all states, containerized cargo—imports and exports combined—through The Northwest Seaport Alliance represented 6% by value of all containerized imports and exports to or from all states. Put differently, 6% by value of all U.S. containerized imports and exports were handled at the Northwest Seaport Alliance in 2018.

The degree to which importers and exporters use The Northwest Seaport Alliance as their gateway for the shipping will vary by state. For example, merchandise and commodity importers and exporters in Washington used the NWSA, as expected, a disproportionately high share of total shipments by value, at 82%. Illinois importers and exporters used the NWSA for 12% of total containerized shipments, while 77% of Oregon's containerized imports and exports by value combined were handled at the NWSA. Approximately $1.8 billion worth of goods from California were handled at the NWSA, but this represented only 1% of all California imports and exports by value.

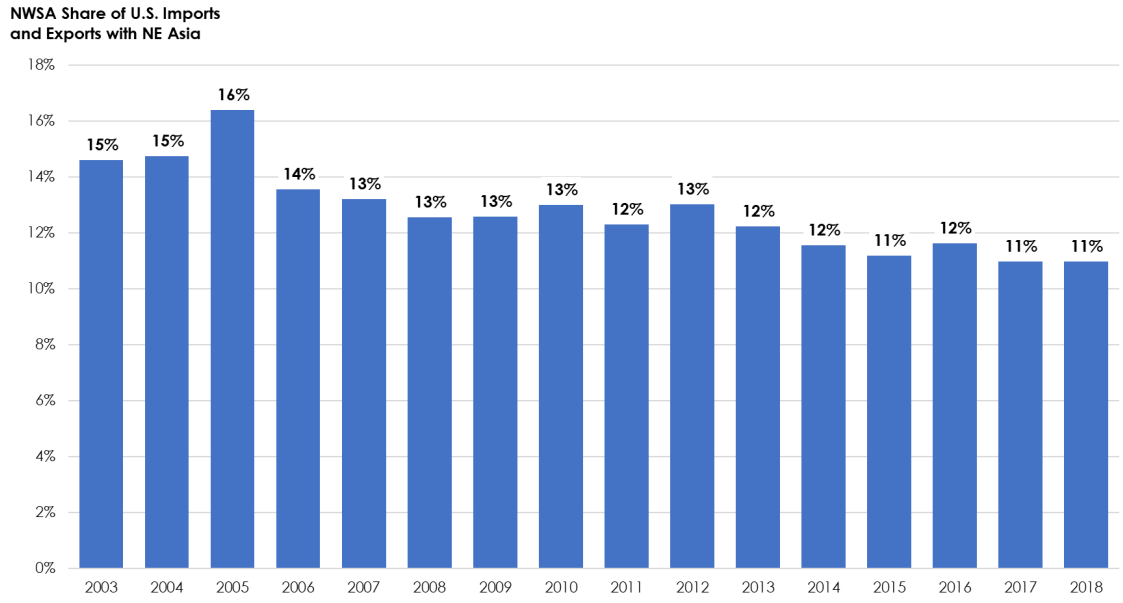
## Exhibit A12. Imports and Exports through The Northwest Seaport Alliance by State, 2018

| State | Containerized Imports through Puget Sound (mils $) | Containerized Exports through Puget Sound (mils $) | Total (mils $) | Share of All Imports and Exports, All Ports |
|---|---|---|---|---|
| Washington | $18,812.9 | $6,812.6 | $25,625.5 | 82% |
| Illinois | $5,440.7 | $820.9 | $6,261.6 | 12% |
| Oregon | $3,867.3 | $1,547.6 | $5,414.9 | 77% |
| Minnesota | $4,352.2 | $749.8 | $5,102.0 | 30% |
| Indiana | $3,797.2 | $92.1 | $3,889.3 | 17% |
| Ohio | $3,574.7 | $97.2 | $3,671.9 | 10% |
| Michigan | $2,125.4 | $169.6 | $2,295.0 | 9% |
| Kentucky | $2,072.1 | $41.4 | $2,113.5 | 12% |
| Arkansas | $2,095.4 | $8.9 | $2,104.3 | 25% |
| California | $1,761.1 | $125.3 | $1,886.4 | 1% |
| Wisconsin | $1,329.3 | $253.8 | $1,583.2 | 10% |
| Iowa | $578.8 | $366.3 | $945.1 | 14% |
| Tennessee | $748.8 | $21.0 | $769.7 | 2% |
| Missouri | $610.8 | $46.4 | $657.3 | 5% |
| Nebraska | $420.0 | $230.4 | $650.4 | 13% |
| Idaho | $268.8 | $241.3 | $510.1 | 49% |
| Georgia | $426.1 | $22.0 | $448.1 | 1% |
| New York | $374.3 | $35.9 | $410.2 | 1% |
| Alaska | $56.3 | $346.4 | $402.7 | 24% |
| Montana | $105.9 | $296.6 | $402.5 | 59% |
| *Other States`* | *$3,254.0* | *$388.4* | *$3,642.4* | *1%* |
| **Total** | **$56,072.1** | **$12,713.8** | **$68,785.9** | **6%** |

*Sources: WISER, 2019; U.S. Census Bureau, 2012; U.S. Bureau of Economic Analysis, 2018; Community Attributes Inc., 2019.*

The Northwest Seaport Alliance serves as among the nation's most important gateways for trade with Northeast Asia. This two-way containerized trade represented 45% of all U.S. containerized imports and 37% of containerized exports in 2018. The Northwest Seaport Alliance handled 11% of all containerized cargo to or from Northeast Asia in 2018, though this is down from a peak of 16% in 2004 (**Exhibit A13**).

## Exhibit A13. NWSA Share of U.S. Two-Way Containerized Trade with Northeast Asia by Weight, 2003-2018



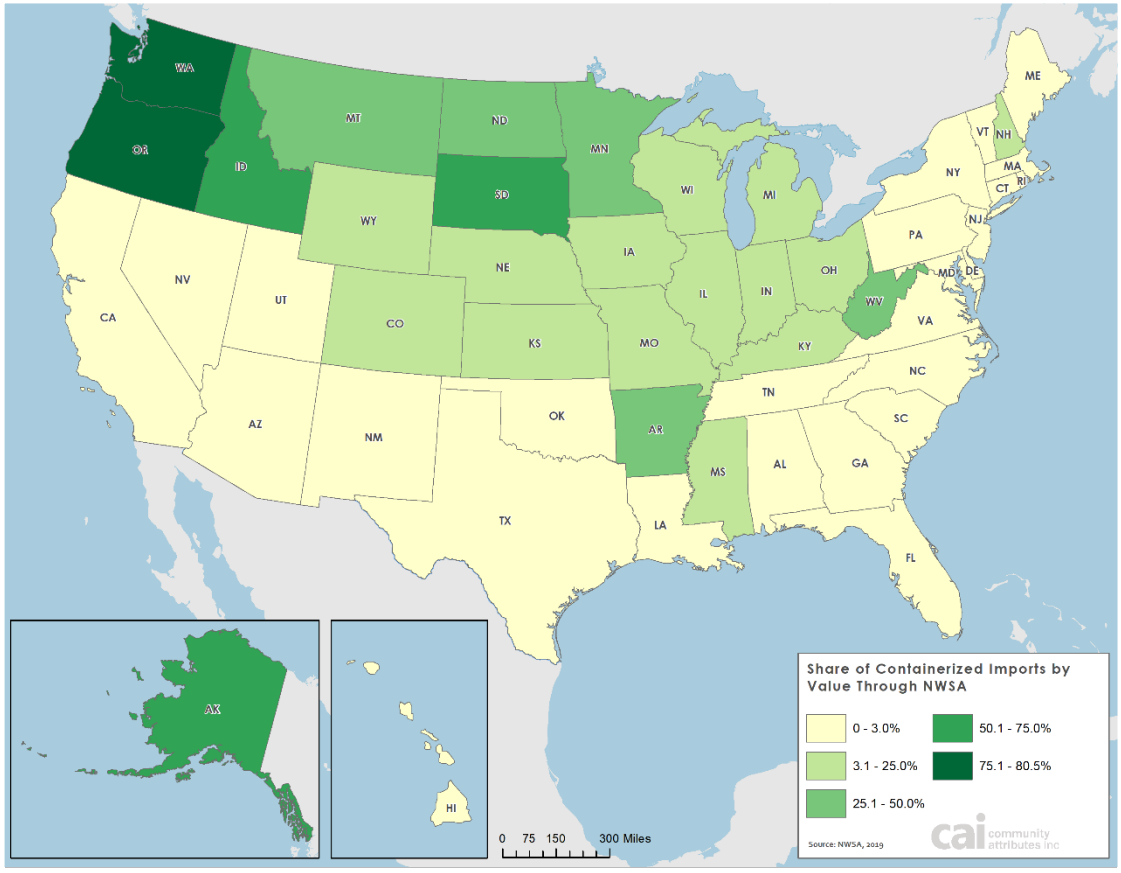

*Sources: U.S. Census Bureau, 2019; Community Attributes Inc., 2019.*
**Note: Northeast Asia comprised of China, Taiwan, Hong Kong, South Korea, and Japan.*

The relative concentration of imports and exports handled at the NWSA for each state is mapped in **Exhibit A14**. More than 80% of Oregon's containerized imports by value passed through the NWSA in 2018, followed by Washington at approximately 80%. This was followed by South Dakota (55%), Idaho (54%), Alaska (52%), and North Dakota (40%). Approximately 15% of imports by value destined for Illinois were handled at the NWSA.

On the export side, nearly 90% of Washington's containerized exports by value were shipped through the NWSA (**Exhibit A15**), similar to imports and generally expected given the local proximity of the port system for Washington exporters and the high share of exports destined for Asian markets. Nearly 86% of Montana's containerized exports were handled at the NWSA, followed by Oregon (69%), Idaho (45%), South Dakota (32%), and North Dakota (24%).

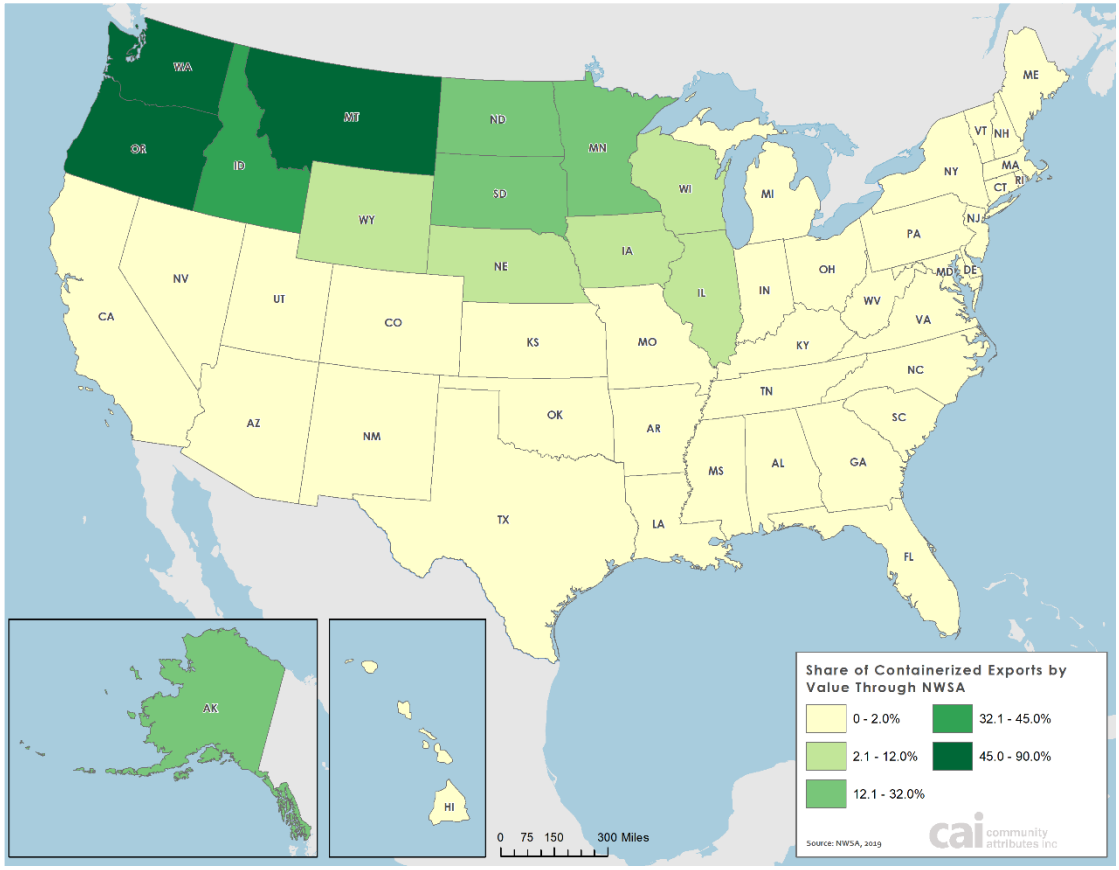
Based on these trends and intermodal analysis of FAF4 data presented above, each state was classified as either tier I, tier II, or tier III based on the relative usage and dependence on access to the NWSA as a port of exit or entry for containerized shipments (**Exhibit A16**).

## Exhibit A14. Share of Containerized Imports by Value Handled at The Northwest Seaport Alliance, 2018




*Sources: WISER, 2019; Community Attributes Inc., 2019, JLL, 2019.*

## Exhibit A15. Share of Containerized Exports by Value Handled at The Northwest Seaport Alliance, 2018




*Sources: WISER, 2019; Community Attributes Inc., 2019, JLL, 2019.*

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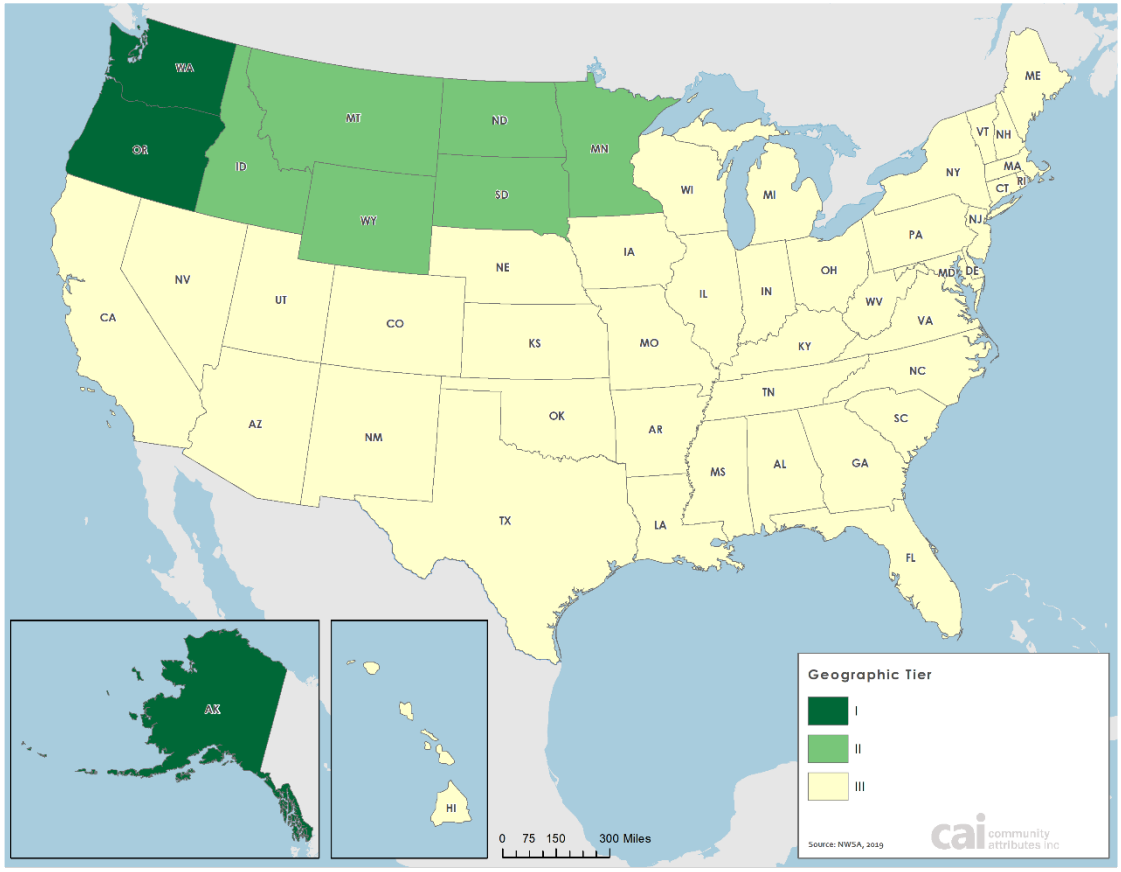
## Exhibit A16. Trade Dependence on The Northwest Seaport Alliance by State, By Tier (I, II, and III)




*Sources: Community Attributes Inc., 2019; JLL, 2019.*

# Estimates of NWSA-Supported Jobs across the U.S.

The import and export of containerized goods is often a critical component of a business's operation, as the world economy globalizes. Having access to port facilities and supporting logistics systems to ensure the timely delivery of these goods to or from a shop floor, retail outlet, or other operation is critical for many firms across the U.S. The Northwest Seaport Alliance, as a key gateway for the import and export of containerized goods serving these businesses, is thus a critical element of economic development for many communities across the Pacific Northwest and Midwest.

This analysis determines the number of jobs either supported through 1) export of products through the NWSA; and 2) handling and use of intermediate goods and products handled or sold that entered the U.S. through the NWSA. WISER data provided by the NWSA was used to arrive at these estimates.

## Estimating Dependence on The Northwest Seaport Alliance

In this analysis, we first screen for shipments of goods by state that are less than 20% by value handled at the NWSA, based on the assumption that locations where NWSA has a small share have access to one or more alternative port gateways. For example, in 2018 on 17% of exports of "fish, crustaceans & aquatic invertebrates" (HS code 03) from Alaska were shipped overseas through the NWSA. We thus remove this state-product export value from our analysis. After screening for these goods, total containerized exports handled at the NWSA is reduced from $12.7 billion to $10.0 billion using WISER data, while imports are reduced from $68.8 billion to $37.0 billion.

Next, we disaggregate states by geographic proximity and dependence on the NWSA, based on industry knowledge and past research. States are treated as either tier I, tier II, or tier III in relation to the Puget Sound ports cost competitiveness in serving those geographies. Tier I states are those that are treated as highly dependent on access to the NWSA, due to geographic proximity, rail routes, and lack of other viable alternatives. For these states, it is assumed that on average 50% of remaining imports and exports are dependent on access to the NWSA. This may be conservative, as some states, such as Washington, likely depends to much a greater extent on NWSA facilities. For Tier II states, 25% of containerized exports and imports by value are treated as "dependent" on access to the NWSA.

For remaining states, each merchandise and commodity export or import is conservatively treated individually based on the share of exports and imports by value shipped through the NWSA. For goods from a given state whose shipments through the NWSA represent 80% or higher of all shipments, 10%

of these goods are treated as dependent on the NWSA. If the share shipped through the NWSA is between 30% and 80%, 5% is treated as dependent. For all remaining goods, 1% is treated as dependent on the NWSA. These methods are discussed in more detail below under **Data Sources** and **Methodology**.

This screening resulted in an estimated $4.5 billion in containerized exports and $12.9 billion in containerized imports dependent on access to The Northwest Seaport Alliance.

## Direct Jobs Supported by Marine Cargo in Other States

Imports and exports in turn support employment across the U.S. It is assumed that shippers choose the NWSA as their shipping route for those goods that enter or exit the U.S. through the NWSA because of cost, convenience, and other mitigating factors. However, the extent to which these businesses and employees depend on access to the NWSA will vary based on geography and availability of alternative, cost-competitive shipping routes.

In 2018, an estimated 12,910 jobs across the nation were directly associated with exports of containerized cargo handled at the NWSA, while 72,450 were associated with imports. A total of 85,360 jobs across the U.S. were dependent on access to the NWSA (**Exhibit A17**). The majority of these jobs were in Washington state (59,860), with another 15,130 jobs in Oregon and 7,380 in Minnesota.

**Exhibit A17. Jobs Dependent on Imports and Exports Through The NWSA, 2018**

| State | Supported by Imports | Supported by Exports | Total |
|---|---|---|---|
| Washington | 50,550 | 9,310 | 59,860 |
| Oregon | 12,380 | 2,750 | 15,130 |
| Minnesota | 7,010 | 370 | 7,380 |
| Idaho | 360 | 170 | 530 |
| Indiana | 460 | - | 460 |
| Arkansas | 390 | - | 390 |
| Illinois | 280 | - | 280 |
| Montana | 150 | 130 | 280 |
| South Dakota | 180 | 50 | 230 |
| Alaska | 120 | 80 | 200 |
| *Other States* | *570* | *50* | *620* |
| **Total** | **72,450** | **12,910** | **85,360** |

*Sources: WISER, 2019; U.S. Census Bureau, 2012; U.S. Bureau of Economic Analysis, 2012; Community Attributes Inc., 2019.*

# Data Sources

## Federal Highway Administration

The FAF database tracks freight movement between states and major metropolitan areas (FAF Zones) by all transportation modes.[11] The 4th edition of this data (FAF4) is based on 2012 data, with scaled estimates available for later dates. This report uses 2015 estimates, the latest year with reliable data. The Seattle FAF Zone includes Island, King, Kitsap, Lewis, Mason, Pierce, Skagit, Snohomish, and Thurston counties, according to the U.S. Census Bureau's Commodity Flow Survey area definitions.[12]

## U.S. Census Bureau

The USA Trade Online database provides port-level imports and exports by commodity and industry, including amounts of freight transported in cargo containers. These were used to estimate containerized cargo volumes through the Ports of Seattle and Tacoma (NWSA), as well as all ports nationwide, in 2018.

The 2012 Economic Census was used to estimate worker output by industry and state.

## U.S. Bureau of Transportation Statistics

A code concordance from the Bureau of Transportation Statistics was used to compare commodities in the Harmonized System (HS) and Standard Classification of Transported Goods (SCTG) lists.

## U.S. Bureau of Economic Analysis

Estimates of supported jobs were computed using the 2012 U.S. Input-Output Table.

## WISER

2018 data on the value of Puget Sound's containerized trade by state and commodity was used to estimate the Northwest Seaport Alliance's share of trade relative to all other U.S. ports.

[11] For more information on the FAF database, see the Federal Highway Administration website: https://ops.fhwa.dot.gov/freight/freight_analysis/faf/

[12] U.S. Census Bureau, Commodity Flow Survey (CFS): https://www.census.gov/programs-surveys/cfs/about.html

# Methodology

The following discussion details the methods used in this study.

## Estimating Price Indices for Comparing Shipping Costs by Port

In this study, we developed a set of price indices to allow for comparisons between The NWSA and L.A.-Long Beach and Vancouver B.C. Indices are based on shipping costs to/from Chicago from/to each port, including terminal loading and unloading costs and rail rates. These cost estimates, produced by JLL, were then extrapolated for many other regions of the U.S. based on distances required between each port and the source or destination region. The cost per mile for rail computed based on the baseline estimate for shipments to/from Chicago was used and then applied to each approximate distance, plus terminal costs, to then extrapolate overall shipping costs. All estimates were then indexed to estimated costs to/from The NWSA. And index value of 100 implies that the cost to ship by rail between a port and The NWSA to/from a given region is the same, whereas a value less than 100 implies the shipping costs are cheaper relative to The NWSA.

## Mapping Destinations and Origins of Containerized Trade

The first step in estimating NWSA's impact across the country is calculating the share of containerized trade in each state that was imported or exported through the NWSA. These ratios, broken down by commodity and mode, are a measure of the NWSA's importance to local economies whose industries use the port to import supplies or export products.

## Jobs Supported by Imports

In order to estimate jobs supported by imported commodities, it is necessary to determine the end-use industries for each imported commodity. This is done using the U.S. Input-Output Table published by the Bureau of Economic Analysis. Using data from the 2012 U.S. Economic Census, output-worker ratios are calculated for each industry and state, then multiplied by the value of imports used by that industry to produce an estimate of import-supported jobs.

## Jobs Supported by Exports

The method for exports is similar to that of imports. The primary difference is that the U.S. Input-Output Table is not employed for this analysis. Instead, after exports by commodity are attributed to each region, the same output-to-worker ratios by industry are applied, yielding direct jobs by region.

## Estimating NWSA-Dependent Jobs

States were designated as either a tier I, tier II, or tier III with respect to their relationship with the NWSA, based largely on geography but also informed by rail freight routes and industry research. For tier I states, it was assumed that 50% of remaining containerized exports and imports, after the above 20% screening, were dependent on the NWSA. For tier II states, 25% was applied to remaining imports and exports. These tier categorizations are presented in **Exhibit A18** below.

**Exhibit A18. Tier Designations by State**

| Tier I States | Tier II States | Tier III States | | | |
|---|---|---|---|---|---|
| Alaska | Idaho | Alabama | District of Columbia | Maine | Oklahoma |
| Oregon | Minnesota | Arkansas | Delaware | Michigan | Pennsylvania |
| Washington | Montana | Arizona | Florida | Missouri | Puerto Rico |
| | North Dakota | California | Georgia | Mississippi | Rhode Island |
| | South Dakota | Colorado | Hawaii | North Carolina | South Carolina |
| | Wyoming | Connecticut | Iowa | Nebraska | Tennessee |
| | | | Illinois | New Hampshire | Texas |
| | | | Indiana | New Jersey | Utah |
| | | | Kansas | New Mexico | Virginia |
| | | | Kentucky | Nevada | Vermont |
| | | | Louisiana | New York | Wisconsin |
| | | | Massachusetts | Ohio | West Virginia |
| | | | Maryland | | |

Remaining tier III states were treated separately. For these states, if state-product value exhibits a high degree of dependence on the NWSA for imports or exports of a given commodity (upwards of 80 percent of all imports or exports currently move through the NWSA), we assume that 10 percent of that industry's jobs are dependent on the NWSA. If the industry exhibits a moderate degree of dependence on the NWSA for imports or exports of a given commodity (30-80 percent of all imports or exports), we assume that 5 percent of that industry's jobs are dependent on the NWSA.

Finally, if a region currently uses the NWSA for a sizable share of imports (at least one ton) but has a lower level of dependence on that route for a given commodity (between 5 and 30 percent of imports or exports), we assume that 1 percent of that industry's jobs are dependent on the NWSA. In several cases where we determined that shipping costs related to imports and exports had a relatively low influence on an industry's overall cost structure, we reduced the estimated employment impacts from 10 percent to 5 percent or 1 percent and in some cases from 5 percent to 1 percent.

# APPENDIX C. FUTURE FISCAL IMPACTS OF THE NORTHWEST SEAPORT ALLIANCE CONTAINERIZED CARGO AND TERMINAL 5 UPGRADES

This section provides estimated long-term state fiscal impacts of the Northwest Seaport Alliance, including analysis of these impacts with and without discretionary cargo handled at Terminal 5. Analytics are based on the economic and fiscal impact model Community Attributes Inc. (CAI) developed for the Northwest Seaport Alliance and Port of Seattle Maritime Division and data and projections produced by the NWSA.

The following scenarios for fiscal impacts, cumulative between 2018 and 2050 and for year 2050, are evaluated:

- Current estimated impacts of discretionary containerized cargo (latest estimates for 2017), based on shares of discretionary cargo provided by the NWSA.
- Total impacts of containerized cargo handled at the NWSA between 2018 and 2050, assuming T-5 upgrade investments are made.
- The impacts of discretionary cargo only, assuming 28% of all containerized cargo handled at the NWSA and T-5 with upgrade investments is discretionary.
- The impacts of additional future cargo handled at the NWSA assuming T-5 investments are made.
- The impacts of additional future discretionary cargo handled at the NWSA assuming T-5 investments are made.
- The impacts of cargo losses to British Columbia in 2017.

## Containerized Cargo Forecast

The Northwest Seaport Alliance estimates that by 2050 containerized cargo handled through the NWSA will reach nearly 7.0 million TEUs, assuming that investments and upgrades to T-5 are completed. Without the T-5 investments, containerized cargo is expected to be just 5.3 million TEUs in 2050, a difference of 1.6 million TEUs. Cumulatively, between 2018 and 2050 containerized cargo handled by the NWSA is expected to total 173.3 million TEUs, assuming T-5 investments are completed. For comparison, total TEUs between 2018 and 2050 without T-5 are expected to total 160 million TEUs, or a loss of more than 13.3 million TEUs. (**Exhibit A19**)

According to the NWSA, discretionary cargo represents 28% of all TEUs handled at the NWSA. Assuming that the proportion of discretionary cargo to total cargo remains constant, discretionary cargo is projected to reach more than 1.9 million TEUs by 2050 assuming that T-5 upgrades are completed.

Without the T-5 upgrades, discretionary cargo is estimated to be nearly 1.5 million TEUs in 2050, or a loss of nearly 0.5 million TEUs. Cumulatively, with the T-5 investments discretionary cargo between 2018 and 2050 is projected to total more than 48.1 million TEUs. Without the T-5 investments the cumulative total of discretionary cargo handled through the NWSA is projected to total more than 44.4 million TEUs, a loss of 3.7 million TEUs of discretionary cargo.

**Exhibit A19. The Northwest Seaport Alliance Containerized Cargo Forecast, Millions of TEUs, 2018-2050**

| | 2018 | 2050 | Total 2018-2050 |
|---|---|---|---|
| **Total Containerized Cargo** | | | |
| TEUs with T-5 Investments | 3.60 | 6.97 | 173.31 |
| TEUs without T-5 Investments | 3.60 | 5.34 | 160.00 |
| Additional TEUs due to T-5 Investments | 0.00 | 1.63 | 13.31 |
| **Discretionary Cargo** | | | |
| TEUs with T-5 Investments | 1.00 | 1.94 | 48.14 |
| TEUs without T-5 Investments | 1.00 | 1.48 | 44.44 |
| Additional TEUs due to T-5 Investments | 0.00 | 0.45 | 3.70 |

*Sources: The Northwest Seaport Alliance, 2018; Community Attributes Inc., 2018.*

The Northwest Seaport Alliance developed projections for both the with T-5 upgrades and without T-5 upgrades scenarios. The with T-5 scenario assumes that T-5 will come online in 2019. The forecast additionally assumes that T-46 capacity is reduced in 2026 due to multi-use changes. Capacity at all other terminals is based on the NWSA Property Book and maps. Forecasts for the 2019-2023 period are based on recent short-term forecasts, while international cargo growth from 2024 to 2050 is assumed at a 2% annual average growth rate and domestic volumes are assumed at a 1% average annual growth rate.

Assumptions that drive the without T-5 scenario forecast are slightly different. This scenario assumes that T-5 does not come online within the forecast timeframe. All other terminal capacity assumptions remain the same as with the T-5 scenario. The 2019-2023 forecast is also based on recent short-term forecasts developed by the NWSA. International cargo volumes are assumed to grow at an annual average of 2% for the 2024-2034 time period, and at a 0% average annual growth rate from 2035 to 2050. Domestic cargo volume is assumed to grow at 1% annually.

THE NORTHWEST SEAPORT ALLIANCE

# Findings

**Exhibits A20** and **A21** summarize key findings on the economic and fiscal impacts of containerized cargo between 2018 and 2050. The following estimates were produced based on the NWSA long-term forecast, CAI's economic and fiscal impact for containerized cargo, and key assumptions provided by the NWSA. CAI used the NWSA's container cargo forecast and assumptions to evaluate differences in total cargo and discretionary cargo with and without T-5 improvements. Analytics also used the NWSA's estimate that, on average, 28% of cargo passing through port is discretionary, irrespective of whether the future includes an upgraded T-5. These estimates represent outcomes based on the NWSA's internal analysis. All values are presented in 2018 dollars.

**Exhibit A20. Annual Economic and Fiscal Impacts of Forecasted Containerized Cargo Handled Through The NWSA, 2017 and 2050**

| | Year | Direct Jobs | Direct Business Output (mils 2018$) | Direct State Fiscal Impact (mils 2018$) | Total State Fiscal Impact (mils 2018$) |
|---|---|---|---|---|---|
| Containerized Cargo | 2017 | 14,900 | $4,628.8 | $25.6 | $108.9 |
| Forecasted Containerized Cargo | 2050 | 28,000 | $8,710.6 | $48.1 | $205.0 |
| Forecasted Discretionary Cargo | 2050 | 7,800 | $2,419.6 | $13.4 | $56.9 |
| Forecasted Containerized Cargo Due to T-5 Upgrades | 2050 | 6,600 | $2,037.9 | $11.3 | $48.0 |
| Forecasted Discretionary Cargo Due to T-5 Upgrades | 2050 | 1,800 | $566.1 | $3.1 | $13.3 |

*Sources: Washington State Office of Financial Management, 2017; Community Attributes Inc., 2019.*

**Exhibit A21. Cumulative Fiscal Impacts of Forecasted Containerized Cargo Handled Through The NWSA, 2018-2050**

| | Direct State Fiscal Impact (mils 2018$) | Total State Fiscal Impact (mils 2018$) |
|---|---|---|
| Forecasted Containerized Cargo | $1,196.3 | $5,098.9 |
| Forecasted Discretionary Cargo | $332.3 | $1,416.4 |
| Forecasted Cargo Due to T-5 Upgrades | $91.9 | $391.5 |
| Forecasted Discretionary Cargo Due to T-5 Upgrades | $25.5 | $108.8 |

*Sources: Washington State Office of Financial Management, 2017; Community Attributes Inc., 2019.*

## Impacts from Containerized Cargo through the NWSA in 2017

In 2017, we estimate that 14,900 jobs were supported directly by containerized cargo at the ports of Seattle and Tacoma. These include longshoremen and stevedoring businesses, truck drivers, warehouse operations handling marine containerized cargo and other related support services. These activities directly supported more than $4.5 billion in business output in 2017. Additionally, containerized cargo activities through the NWSA directly supported $25.1 million in state fiscal impacts and supported nearly $107 million in total state fiscal impacts, factoring in multiplier effects, in 2018 dollars.

## Containerized Cargo Handled at the NWSA between 2018 and 2050, Assuming T-5 Upgrade Investments are Made

Based on the NWSA forecast, assuming investments in T-5 are completed, and assuming no technical changes affecting labor requirements per container, in 2050 containerized cargo flows would directly support 28,000 jobs, $8.7 billion in business output, and $48.1 million in state tax payments. Factoring in multiplier effects (further tax payments supported via indirect and induced activities), the total state fiscal impact would be $205.0 million. Cumulatively, between 2018 and 2050, total state tax payments would sum to nearly $1.2 billion from direct activities and $5.1 billion factoring in multiplier effects.

## Impacts of Discretionary Cargo Only, Assuming T-5 Upgrades

According to the Northwest Seaport Alliance, discretionary cargo currently represents approximately 28% of all cargo handled through the Ports of Seattle and Tacoma. Assuming discretionary cargo continues to make up 28% of all containerized cargo through 2050, discretionary cargo in 2050 would support 7,800 direct jobs and more than $2.4 billion in business output. State fiscal impacts in year 2050 would sum to $56.9 million, based on an estimated $13.4 million in direct and $43.6 million in indirect and induced (2018 $). The cumulative fiscal impact between 2018 and 2050 would be $332.3 million from direct activities and more than $1.4 billion including multiplier effects.

## Impacts of Additional Future Cargo Handled at NWSA, After T-5 Upgrade Investments

The additional NWSA forecasted containerized cargo due to T-5 investments would support 6,600 direct jobs and more than $2.0 billion in direct output in 2050, with direct and total fiscal impacts of $11.3 million and $48.0 million respectively. The cumulative fiscal impact between 2018 and 2050 of

additional cargo handled at the NWSA if T-5 upgrades are completed would be $391.5 million, including $91.9 million in direct impacts (2018 $).

## Impacts of Additional Future Discretionary Cargo Handled at the NWSA, After T-5 Upgrade Investments

The additional forecasted discretionary cargo handled through the NWSA due to T-5 investments would support 1,800 direct jobs and more than $560 million in business output in 2050. State fiscal impacts of the additional discretionary cargo handled in 2050 assuming the T-5 upgrades are completed would sum to $13.3 million, based on an estimated $3.1 million direct and $10.2 million in indirect and induced (2018 $). The cumulative fiscal impact between 2018 and 2050 would be $25.5 million from direct activities and nearly $109 million including multiplier effects.

## Impacts from Loss in Cargo to British Columbia in 2017

According to the NWSA, the Ports of Vancouver and Prince Rupert grew by 1.5 million TEUs between 2008 and 2017, the NWSA estimates that 1.0 million of those TEUs represent losses to the NWSA. Based on the estimated economic impact of current containerized cargo through the NWSA in 2017, these lost TEUs would have directly supported 4,000 jobs and nearly $1.3 billion in business output. The state fiscal impacts associated with these TEUs would have been an estimated $29.4 million, composed of $6.9 million in direct state fiscal impacts and $22.5 million supported through multiplier effects (2018 $).

## Economic Value of The Northwest Seaport Alliance Marine Cargo Broken Out by Each Harbor

The economic impacts of the NWSA, Port of Tacoma, and Port of Seattle can be further disaggregated between the two Ports. The Port of Seattle includes commercial fishing, cruise ship operations, recreational marinas and other port business, Sea-Tac International Airport, and the share of the NWSA cargo activities at the North Harbor. The Port of Tacoma includes the NWSA's South Harbor operations and non-NWSA Port of Tacoma tenants and other port business, including the grain terminal and port-based manufacturers.

**Exhibit A22** below summarizes the NWSA activities broken out across each harbor.

**Exhibit A22. Estimated Direct Impacts of Marine Cargo by Harbor, The Northwest Seaport Alliance, 2017**

| | Jobs | Business Output (mils 2017 $) | Labor Income (mils 2017 $) |
|---|---|---|---|
| North Harbor | 7,160 | $2,157.8 | $709.3 |
| Containerized Cargo | 6,690 | $2,036.0 | $674.1 |
| Automobiles | 0 | $0.0 | $0.0 |
| Breakbulk, Logs and Other Marine Cargo | 470 | $121.8 | $35.1 |
| South Harbor | 12,950 | $3,700.9 | $1,193.4 |
| Containerized Cargo | 8,210 | $2,501.6 | $828.3 |
| Automobiles | 1,330 | $308.8 | $108.4 |
| Breakbulk, Logs and Other Marine Cargo | 3,410 | $890.5 | $256.8 |
| **The NWSA Total** | **20,100** | **$5,858.7** | **$1,902.7** |

*Sources: The Northwest Seaport Alliance, 2018; Port of Seattle, 2018; Port of Tacoma, 2018; Community Attributes Inc., 2019.*

# Port of Seattle Economic and Fiscal Impacts by Line of Business, 2017 and 2019

Impacts are further disaggregated by each port. **Exhibits A23, A24**, and **A25** report the estimated direct and total economic and fiscal impacts across each lines of business for the Port of Seattle. The economic impacts of Sea-Tac International Airport are also included, along with the projected impacts of cruise ship operations for year 2019 (reported in 2018 dollars). It should also be noted that an estimated 8.6% of air passenger through Sea-Tac International Airport during the cruise season are cruise passengers. In addition to different years, there is some overlap in impacts across these two segments as result in the table below. To account for the overlap between the two lines of business in visitor spending impacts, the direct output impacts of the airport should be reduced by nearly $11.2 billion in direct business output and a total economic impact of $21.9 billion.

**Exhibit A23. Estimated Direct Impacts by Lines of Business, Port of Seattle, 2017 and 2019**

| | Jobs | Business Output (mils) | Labor Income (mils) |
|---|---|---|---|
| The NWSA North Harbor Marine Cargo (2017) | 7,160 | $2,157.8 | $709.3 |
| Sea-Tac International Airport (2017)* | 87,300 | $11,481.3 | $3,650.8 |
| Cruise Industry (2019, 2018$) | 3,000 | $467.8 | $122.7 |
| Commercial Fishing (2017) | 7,200 | $671.3 | $313.4 |
| Recreational Marinas and Other Business (2017) | 3,600 | $728.8 | $357.2 |

*Note: * Direct impacts of Sea-Tac International Airport are sourced from the Port of Seattle's Sea-Tac International Airport Economic Impacts study, August 2018.*
*Source: Community Attributes Inc., 2019.*

**Exhibit A24. Total Economic Impacts by Line of Business at the Port of Seattle, Washington, 2017 and 2019**

| | Jobs | Business Output (mils) | Labor Income (mils) |
|---|---|---|---|
| The NWSA North Harbor Marine Cargo (2017) | 21,600 | $4,605.4 | $1,506.3 |
| Sea-Tac International Airport (2017)* | 151,400 | $22,477.9 | $7,099.5 |
| Cruise Industry (2019, 2018$) | 5,500 | $893.6 | $260.1 |
| Commercial Fishing (2017) | 11,300 | $1,438.0 | $543.0 |
| Recreational Marinas and Other Business (2017) | 8,800 | $1,618.0 | $642.0 |

*Note: * Total economic impacts of Sea-Tac International Airport are sourced from the Port of Seattle's Sea-Tac International Airport Economic Impacts study, August 2018.*
*Source: Community Attributes Inc., 2019.*

## Exhibit A25. Direct and Total Statewide Fiscal Impacts by Line of Business at the Port of Seattle, Washington, 2017 and 2019

| | Direct (mils) | Total (mils) |
|---|---|---|
| The NWSA North Harbor Marine Cargo (2017) | $33.3 | $135.9 |
| Port of Seattle Sea-Tac International Airport (2017)* | $236.3 | $415.0 |
| Port of Seattle Cruise Industry (2019, 2018$) | $7.8 | $22.9 |
| Port of Seattle Commercial Fishing (2017) | $1.4 | $13.2 |
| Port of Seattle Recreational Marinas and Other Business | $8.5 | $22.9 |

*Note: * Direct and total fiscal impacts of Sea-Tac International Airport are sourced from the Port of Seattle's Sea-Tac International Airport Economic Impacts study, August 2018.*
*Source: Community Attributes Inc., 2019.*

# Port of Tacoma Economic and Fiscal Impacts by Line of Business, 2017

**Exhibits A26**, **A27**, and **A28** report the estimated direct and total economic and fiscal impacts of the Port of Tacoma for each line of business.

### Exhibit A26. Estimated Direct Impacts by Line of Business, Port of Tacoma, 2017

| | Jobs | Business Output (mils) | Labor Income (mils) |
|---|---|---|---|
| The NWSA South Harbor Marine Cargo | 12,950 | $3,700.9 | $1,193.4 |
| Port of Tacoma Tenants and Other Business | 1,500 | $852.2 | $114.3 |
| **Port of Tacoma Total** | **14,450** | **$4,553.1** | **$1,307.8** |

*Source: Community Attributes Inc., 2019.*

### Exhibit A27. Total Economic Impacts by Line of Business, Port of Tacoma, 2017

| | Jobs | Business Output (mils) | Labor Income (mils) |
|---|---|---|---|
| The NWSA South Harbor Marine Cargo | 36,900 | $7,780.0 | $2,512.2 |
| Port of Tacoma Tenants and Other Business | 5,200 | $1,551.7 | $326.9 |
| **Port of Tacoma Total** | **42,100** | **$9,331.8** | **$2,839.1** |

*Source: Community Attributes Inc., 2019.*

### Exhibit A28. Direct and Total Statewide Fiscal Impacts by Line of Business at the Port of Tacoma, Washington, 2017

| | Direct (mils) | Total (mils) |
|---|---|---|
| The NWSA South Harbor Marine Cargo | $21.4 | $85.4 |
| Port of Tacoma Tenants and Other Business | $5.3 | $15.4 |
| **Port of Tacoma Total** | **$26.6** | **$100.8** |

*Source: Community Attributes Inc., 2019.*

## Annual Income Comparisons by Line of Business and Segment

Total annual average direct income for each line of business is presented **Exhibit A29**. Containerized cargo employment, on average, provides the highest annual compensation among all lines of business and segments across both Ports and The Northwest Seaport Alliance. The overall average estimated annual total compensation for the NWSA was $94,700 for 2017. The Port of Seattle cruise average labor income estimates are included in **Exhibit A29**, but represent projected incomes for 2019, reported in 2018 dollars, so are not directly comparable to other segments shown.

**Exhibit A29. Average Annual Labor Income by Line of Business and Segment, Port of Seattle, Port of Tacoma, and The Northwest Seaport Alliance, Washington, 2017 and 2019**

| | Average Income |
|---|---|
| The Northwest Seaport Alliance (2017) | $94,662 |
| Containerized Cargo | $100,837 |
| Automobiles | $83,355 |
| Breakbulk, Logs and Other Cargo | $74,840 |
| Port of Seattle Sea-Tac International Airport (2017)* | $41,819 |
| Port of Seattle Cruise Industry (2019, 2018$) | $40,899 |
| Port of Seattle Commercial Fishing (2017) | $43,524 |
| Port of Seattle Recreational Marinas and Other Business (2017) | $99,217 |
| Port of Tacoma Tenants and Other Business (2017) | $76,225 |

*Note: * Average income of Sea-Tac International Airport are sourced from the Port of Seattle's Sea-Tac International Airport Economic Impacts study, August 2018.*
*Source: Community Attributes Inc., 2019.*

# APPENDIX E. DATA SOURCES

Analysis in this report drew on various local, state, and federal data sources. Descriptions of each source are listed below.

- **Quarterly Census of Employment and Wages (QCEW)**. Payroll employees and wages, excluding benefits, by industry. Sources include the U.S. Bureau of Labor Statistics and Washington State Employment Security Department.
- **Puget Sound Regional Council (PSRC)**. The PSRC maintains a database of QCEW records for employers with establishments in King, Kitsap, Pierce, and Snohomish Counties. The PSRC conducts a further review of geocoded business establishments to improve accuracy of employment location assignments. Data was collected through several custom data requests to the PSRC, using GIS shapefiles and unified business identification codes, or UBIs, for specific queries of this database. For example, the number of jobs by industry code on Ports of Tacoma and Seattle properties. PSRC data also includes estimated self-employment per industry, in addition to QCEW records.
- **Gross Business Income**. Gross receipts by North American Industry Classification System (NAICS) code reported by the Washington State Department of Revenue.
- **Washington State Input-Output Model**. The Washington State Office of Financial Management publishes a state-specific input-output model designed to reflect the unique dynamics and complexities of the Washington state economy. This model also includes estimated average total compensation per employee per industry sector.
- **Customs Data on Trade Flows**. Data on value and weight of shipments in total and by commodity or merchandise good from the U.S. Census Bureau, reported by port district.
- **Tenant Activities**. Gathered from Port of Seattle, Port of Tacoma, and The Northwest Seaport Alliance staff, including locational data for mapping.
- **Port of Seattle Marine Vessel Customers**. Moorage period and duration by vessel, including commercial fishing vessels and research vessels, provided by the Port of Seattle.
- **PIERS Container Shipments Data**. Provided by the NWSA staff, including TEU breakouts by commodity and origin/destination, including domestic cargo and empty containers.
- **Alaska Licensed Fishing Vessel Data**. Alaska Commercial Fishing Entry Commission licensing data, with detailed information by vessel for gears and other key attributes per vessel licensed to conduct commercial fishing operations in Alaskan waterways. The Alaska Department of Fish & Game ran custom queries of this database for

vessels with reported moorage at Port of Seattle facilities in 2017. Custom aggregations included gross earnings by dollar value and weight (pounds) of harvested biomass in Alaskan waters.

- **Ex-vessel value of catch for fishing vessels**. National Oceanic and Atmospheric Administration data on ex-vessel biomass harvest by weight and dollar value by port.
- **Longshoremen hours**. Published by the Pacific Maritime Association.
- **Port of Seattle Cruise Schedule, Passengers, and Passenger Survey**. The Port of Seattle maintains records for the actual cruise schedule, disembarkments, embarkments, and in-transit stops. Additionally, the Port of Seattle has the projected passenger count and schedule for the 2019 cruise season in Seattle. The Port of Seattle also commissioned a survey of passengers by the McDowell Group in 2017.
- **Reports and studies**. Including those published by the Cruise Line Industry Association and Alaska Seafood Marketing Institute.

Data sources were supplemented by interviews with industry stakeholders and experts, as well as Port of Seattle, Port of Tacoma, and The Northwest Seaport Alliance staff as necessary.

# APPENDIX F. ECONOMIC IMPACT MODELING

Economic impacts include the following components and concepts:

- **Business output**. The economic value of business and operations activities. Similar to business revenues, but also includes the revenue-equivalent value of government operations, such as the revenue contributions of Port of Seattle staff supporting various fishing operations. Business output is the common, accepted term in economic impact modeling.
- **Labor income**. Estimated total compensation earned from employment, inclusive of wages plus additional monetary benefits, such as the value of healthcare insurance.
- **Direct impacts**, representing jobs, income (wages and benefits), and revenues, or output, directly associated with Port of Seattle, Port of Tacoma, and The Northwest Seaport Alliance activities. The definition and measurement of direct activities varies across lines of business, discussed further below. Direct impacts are measured in jobs, labor income, and business output.
- **Indirect impacts**, encapsulating the economic benefit and employment supported through upstream business-to-business transactions and supply chain purchases from supporting industries. Indirect impacts are measured in jobs, labor income, and business output.
- **Induced impacts** are the wider economic benefits supported through the spending of labor income received through the direct and indirect employment on household consumption throughout the broader economy. For example, the spending of earned income among longshoremen on groceries, restaurants, and household goods. Induced impacts are measured in jobs, labor income, and business output.
- **Total economic impacts** refer to the combined impacts of direct, indirect, and induced impacts, measured in jobs, labor income, and business output.
- **Total statewide fiscal impacts** refer to the state-level tax revenues generated through payments of business and occupation, sales and use tax, and other taxes and fees from direct business output and additional state taxes supported through indirect and induced business output.

The Washington State Input-Output Model was used to estimate indirect and induced impacts. This model is published by the Washington State Office of Financial Management every five years, with subsequent annual updates to labor income and industry-specific deflators. The model is built in collaboration across multiple state agencies, leveraging confidential data records, surveys, and the U.S. Benchmark Input-Output Table published by

the U.S. Bureau of Economic Analysis. The intensive use of state-specific industry data improves the model's overall representation of the Washington state economy and the complexities and dynamics unique to Washington state.

## Defining Direct Impacts

Each line of business across both Ports entails a specific methodology and definition for direct impacts. These methods and definitions are described below.

**Containerized Cargo through The Northwest Seaport Alliance**
All activities involved in the direct handling of containerized cargo until after the point where such cargo either leaves the state or is reformatted into a non-marine container. This definition thus includes stevedoring operations and longshoremen; shipping companies; intermodal transportation operations (such as rail); short- and long-haul trucking of marine containers (including drayage); tug services for inbound and outbound container vessels; marine support services; and transloading, warehousing, and logistics operations.

**Automobile Shipments through The Northwest Seaport Alliance**
All activities engaged in the movement of imported automobiles at the Port of Tacoma. This definition thus includes stevedoring operations and longshoremen; shipping companies; intermodal transportation operations (such as rail); short- and long-haul trucking of marine containers (including drayage); tug services for inbound and outbound car carrier vessels; marine support services; and transloading, warehousing, and logistics operations.

**Breakbulk, Logs, and Other Non-Containerized Marine Cargo Under The Northwest Seaport Alliance**
Activities involved in the direct handling of breakbulk, logs and lumber, and liquid bulk. This definition thus includes stevedoring operations and longshoremen; shipping companies; intermodal transportation operations (such as rail); short- and long-haul trucking of marine containers (including drayage); tug services for inbound and outbound vessels; marine support services; and transloading, warehousing, and logistics operations. either for import or export, such as longshoremen services, terminal operations, trucking, and warehousing either directly prior to shipment or immediately after arrival.

**Port of Seattle Cruise Operations**
Cruise ship operations direct impacts are defined as including: 1) estimated cruise ship passenger spending in the region before and after a cruise, such as on local hotels, souvenirs, restaurants, and other goods and services; 2) on-shore support services, such longshoremen loading and unloading cruise cargo; 3) crew member on-shore spending; and 4) cruise vessel local procurement of provisions, such as food, alcohol, and other purchases.

**Port of Seattle Commercial Fishing**
Commercial fishing activities include: 1) fishing vessels identified as Port of Seattle customers for moorage and facility services at Fishermen's Terminal, T-91, and the Marine Industrial Center; and 2) on-shore businesses located at Fishermen's Terminal. Any fishing vessel that utilizes Port of Seattle facilities throughout the year is counted as part of direct activities. In some cases, vessels may only utilize these facilities for a short period or only periodically over several years, of which some time in 2017 happened to be one such instance. These vessels, and the economic activities associated with their operations, are still treated as "direct," because access to the Port of Seattle's facilities is viewed as essential to their operations. Similarly, there are some larger fish processor vessels that periodically use T-91 for loading and offloading, but moor off-season primarily at other locations, such as private facilities in Lake Union in Seattle. These vessels are also counted among direct operations because of the essential importance of Port of Seattle facilities to their business as a customer.

**Other Port of Seattle Business Including Recreational Marinas**
All other Port-based businesses and operations, including tenants, research vessels, barge operations, and activities at the Port of Seattle's recreational marinas. This definition excludes all tenant, tug, and barge activities that are included within the direct activities associated with The Northwest Seaport Alliance marine cargo.

**Port of Tacoma Tenants and Other Business**
All other Port of Tacoma tenants excluding activities that are directly associated with the marine cargo under The Northwest Seaport Alliance. This category includes Port-based manufacturers, the grain terminal, and other businesses.