

Appendix D: Washington's Freight Transportation System

(2022 Washington State Freight System Plan Update)

Appendix D: Washington's Freight Transportation System documents the inventory of multimodal freight infrastructure and facilities (both public and privately owned) in Washington, including major freight activity centers. The inventory captures Washington's road freight network, rail freight network, maritime network, air cargo network, and pipeline network.

**WASHINGTON STATE DEPARTMENT OF
TRANSPORTATION**

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Acronyms & Abbreviations

Abbreviation	Description
AADT	Annual Average Daily Traffic
ALW	Walla Walla Regional Airport
BFI	King County International Airport
BLI	Bellingham International Airport
BLMR	Blue Mountain Railroad
BNSF	Burlington Northern Santa Fe Railway
BTS	Bureau of Transportation Statistics
CBRW	Columbia Basin Rail
CERB	Community Economic Revitalization Board
CLM	Fairchild International Airport
COFC	Container-on-Flatcar
CO2	Carbon dioxide
CRFC	Critical Rural Freight Corridor
CUFC	Critical Urban Freight Corridor
COVID-19	Corona Virus Disease 2019
CSCD	Cascade and Columbia River railroad
DOD	Department of Defense
DOT	Department of Transportation
EGT	Export Grain Terminal
ESD	Orcas Island Airport
EWG	Eastern Washington Gateway Railroad
FAF	Freight Analysis Framework
FEC	Freight Economic Corridors
FGTS	Freight and Goods Transportation System
FHWA	Federal Highway Administration
FMSIB	Freight Mobility Strategic Investment Board
FRD	Friday Harbor Airport
FTZ	Foreign Trade zone
GEG	Spokane International Airport
LNG	Liquefied Natural Gas
MPO	Metropolitan Planning Organizations
MWH	Grant County International Airport
NHS	National Highway System
NHFN	National Highway Freight Network
NOx	Nitrogen Oxides
NWSA	Northwest Seaport Alliance
PAE	Paine Field Airport
PCC	Palouse River and Coulee City
PCCA	Palouse River and Coulee City Rail Authority

Abbreviation	Description
PHFS	Primary Highway Freight System
PNWRC	Pacific Northwest Rail Corridor
POE	Port of Entry
PSAP	Puget Sound and Pacific Railroad
PSC	Tri-Cities Airport
PSRC	Puget Sound Regional Council
RORO	Roll-on/Roll-off
RTPO	Regional Transportation Planning Organization
SEA	Seattle-Tacoma International Airport
SOx	Sulfur Oxides
SR	State Route
STB	Surface Transportation Board
STRACNET	Strategic Rail Corridor Network
STRAHNET	Strategic Highway Network
TEU	Twenty-Foot Equivalent Unit
TMBL	Tacoma Municipal Belt
TOFC	Trailer-on-Flatcar
UP	Union Pacific
U.S.	United States
USACE	U.S. Army Corps of Engineers
WCUS	Waterborne Commerce of the United States
WSDOT	Washington State DOT
YKM	Yakima Air Terminal

Executive summary

This document updates the inventory of multimodal freight infrastructure and facilities (both public and privately owned) in Washington, including major freight activity centers. The freight system inventory presented in this memo was created through analysis of the existing assets identified by Washington State DOT's (WSDOT's) prior freight plan, as well as other state and national resources, and identification of additional freight-relevant assets based on the location of freight-related business establishments or the observation of freight-related vehicle traffic.

Figure 1: Washington's multimodal freight system

7,000	3,200	22	22	46,000
Highway Miles	Active Rail Miles	Deep Draft and Shallow Ports	Air Cargo Airports	Pipeline System Miles

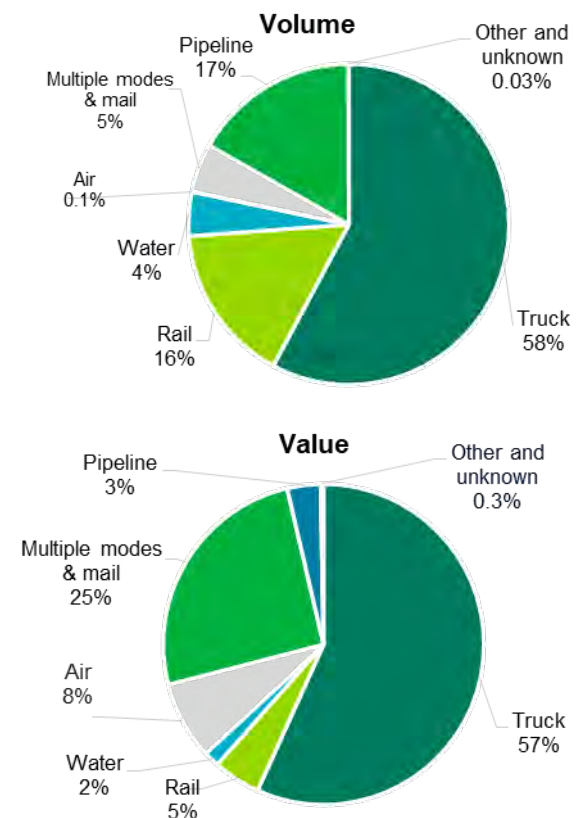
Source: CPCS analysis of data provided by WSDOT, 2021.

The state's multimodal freight system transported nearly 600 million tons of goods with a value of over \$677 billion in 2017.

Trucks carried nearly 60 percent of the commodities moving to and from Washington, while pipeline and rail also moved a large tonnage of goods. Higher value goods transported to and from the state were primarily carried by multiple modes and mail and air cargo (Figure 2).¹ Trucks are responsible for 65 percent of domestic goods movements in Washington by tonnage and 62 percent by value. Meanwhile, international goods movement is often supported by other modes, with rail carrying 33 percent, pipeline carrying 21 percent, and multiple modes and mail carrying 8 percent of import and export tonnage. The export of goods grown and manufactured in the state is an important piece of Washington's economy. This is where air cargo plays a key role. As a percentage of total export value, air cargo carries 30.5 percent of the value of the state's exports.²

Shippers and freight-reliant businesses in Washington have a range of modal options to optimize their transportation time and reliability while minimizing logistics costs. However, shippers' freight transportation decisions are often impacted by the availability of access to various modes and the characteristics of the cargo being moved, especially its unit value. This Appendix takes a mode-by-mode approach to establish the existing regional freight system characteristics and inform upcoming project tasks such as freight corridor designation and freight system performance analysis.

Figure 2: Total freight tonnage and value carried by mode, 2017



Source: CPCS analysis of FAF5 data, 2021.

¹ Includes parcel, postal services, or courier; truck and rail intermodal; truck and water intermodal; rail and water intermodal; and other multiple modes. For more information see FAF User Guide: <https://faf.ornl.gov/faf5/data/FAF5%20User%20Guide.pdf>

² CPCS analysis of Freight Analysis Framework (FAF) data, 2021.

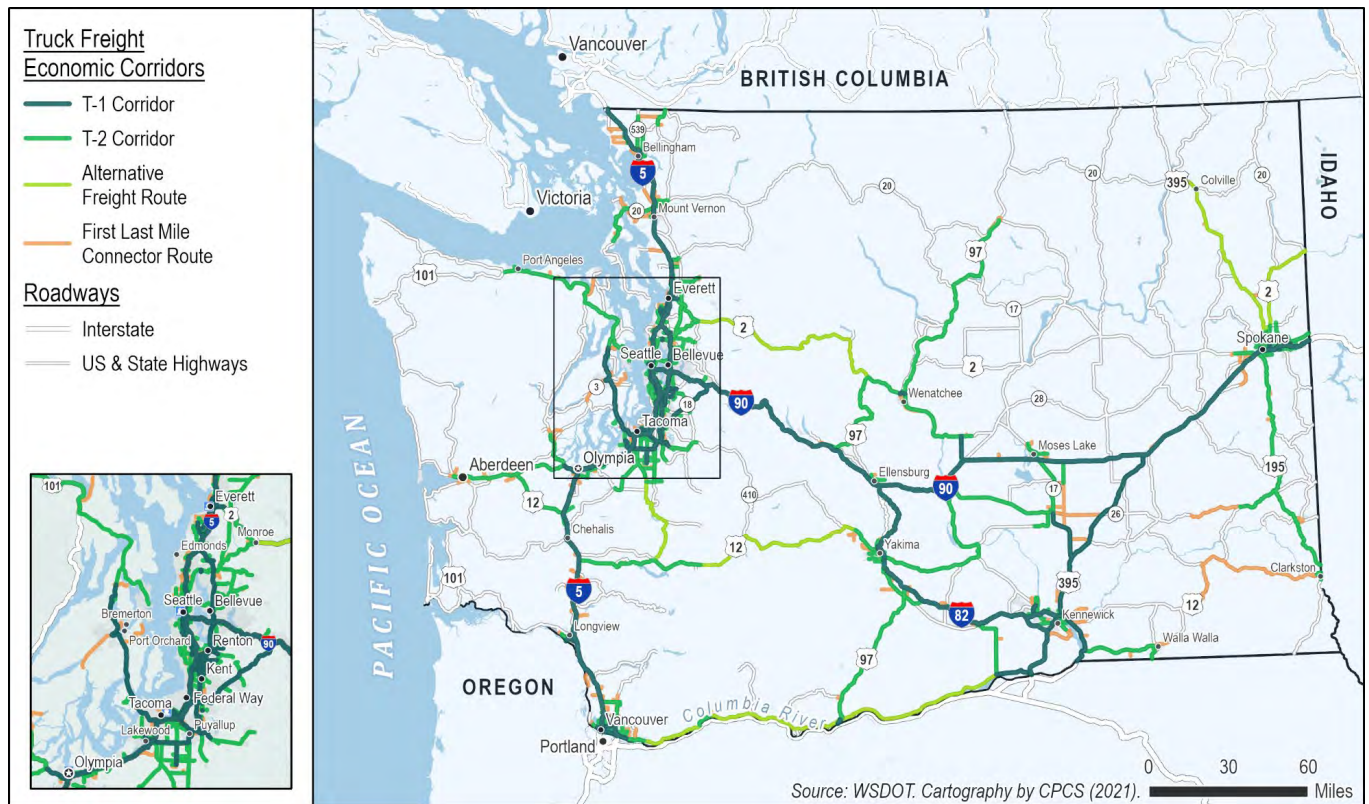
Washington's road network

Washington's road network provides direct links between nearly all freight origins, nodes, and destinations while also enabling connections to other modes within the freight network.

Over 760 interstate miles, 1,600 U.S. Highway miles, and 3,175 state route miles carry freight in Washington.

Figure 3 illustrates Washington's road network. As shown, key interstate corridors include Interstate 5 (I-5), I-90, and I-82. These corridors support domestic and international trade movements, as they connect Washington's northern and western borders to dozens of other states, cities, and intermodal, coastal, and land border ports nationally.

Figure 3: Washington's road network



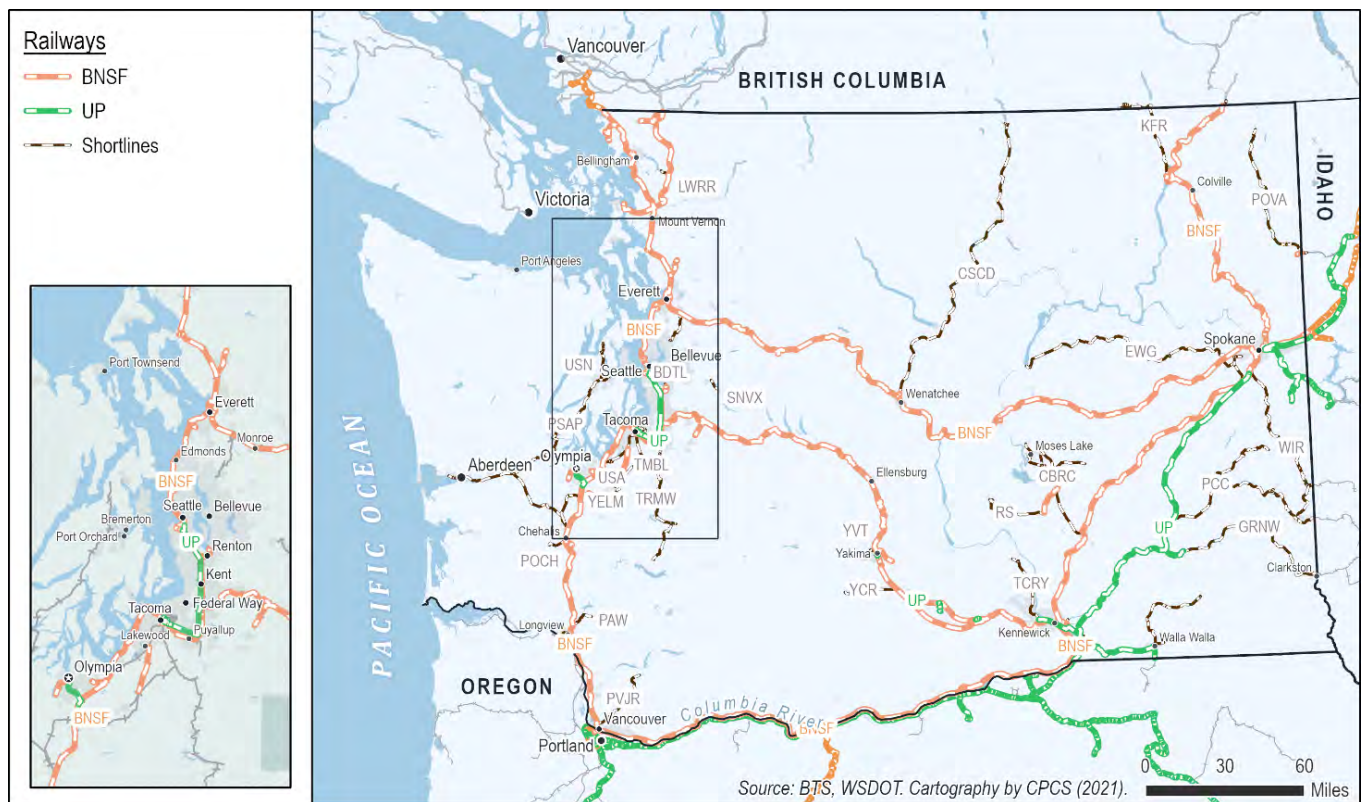
Washington's rail network

Washington's rail network offers an environmentally and economically efficient goods movement option to support the statewide economy. As Figure 4 shows, Burlington Northern Santa Fe Railway (BNSF) and Union Pacific (UP) are the Class I rail operators in the state, serving over 1,400 miles and 500 miles of track, respectively. Short line railroads in the state operate about 1,300 miles of track. Washington's freight rail activities are connected with other modes by 255 rail-served facilities. Freight rail traffic in Washington serves both heavy bulk and break-bulk goods (i.e., agricultural cargo) and lighter, higher-value cargo (i.e., intermodal containers).

The state's freight rail system consists of two Class I railroads and 27 Class III railroads or short lines, operating on over 3,200 miles of track across the state.

Transportation of grain has such significance for the state's economy that WSDOT established the Grain Train program in 1994 to carry thousands of tons of grain to the state's deep-water ports for transportation by ships to international markets. The Grain Train program also supports Washington's short line operations. Approximately 106 grain elevators and 60 grain warehouses across the state enable the transfer of grain between rail and other modes.

Figure 4: Washington's rail freight network



Washington's maritime network

Washington's maritime system consists of three subsystems: the Salish Sea, the Pacific Coast, and the Snake-Columbia River system, each playing a critical role in serving the state's international and domestic freight operations, connecting to overseas markets, and supporting the state's role as a key international trade gateway for the U.S. (Figure 5).

The state's maritime system includes 828 miles of Waterway Freight Corridor miles, 13 deep-draft ports, and nine shallow-draft ports.

Over 26 million tons of Washington's freight is carried by the state's maritime system annually, which is about 4 percent of the state's total freight by tonnage and only 2 percent by value. A vast majority of Washington's waterborne freight activities by tonnage (86 percent) and value (79 percent) are domestic. Between 2022 and 2050 the tonnage of maritime shipments is expected to grow 13 percent. Over half of the state's domestic waterborne freight by tonnage and value moves between origins and destinations within the state. Washington ports also play an important role in international trade. In addition to cargo shipped from or to locations in Washington, the state's ports handle a variety of commodities (e.g., grain, consumer goods, petroleum, transportation equipment) that move between the state's ports and locations in other parts of the country. When accounting for these shipments that flow through the state using the maritime transportation network, nearly 110 million tons of freight moved through marine terminals in Washington in 2020. The Northwest Seaport Alliance is the nation's 4th largest container gateway and the 2nd largest gateway for refrigerated exports. As a state, Washington ranks 5th in the U.S. in terms of overall maritime volumes behind only Texas, Louisiana, California, and New Jersey. In terms of exports, Washington handles the 3rd highest volume (by weight) of any state.³

³ Waterborne tonnage for principal U.S. ports and all 50 states and U.S. territories; Waterborne tonnages for domestic, foreign, imports, exports and intra-state waterborne traffic, U.S. Army Corps of Engineers Waterborne Commerce Statistics Center, 2020. <https://usace.contentdm.oclc.org/digital/collection/p16021coll2/id/7447>

Figure 5: Maritime corridors in Washington



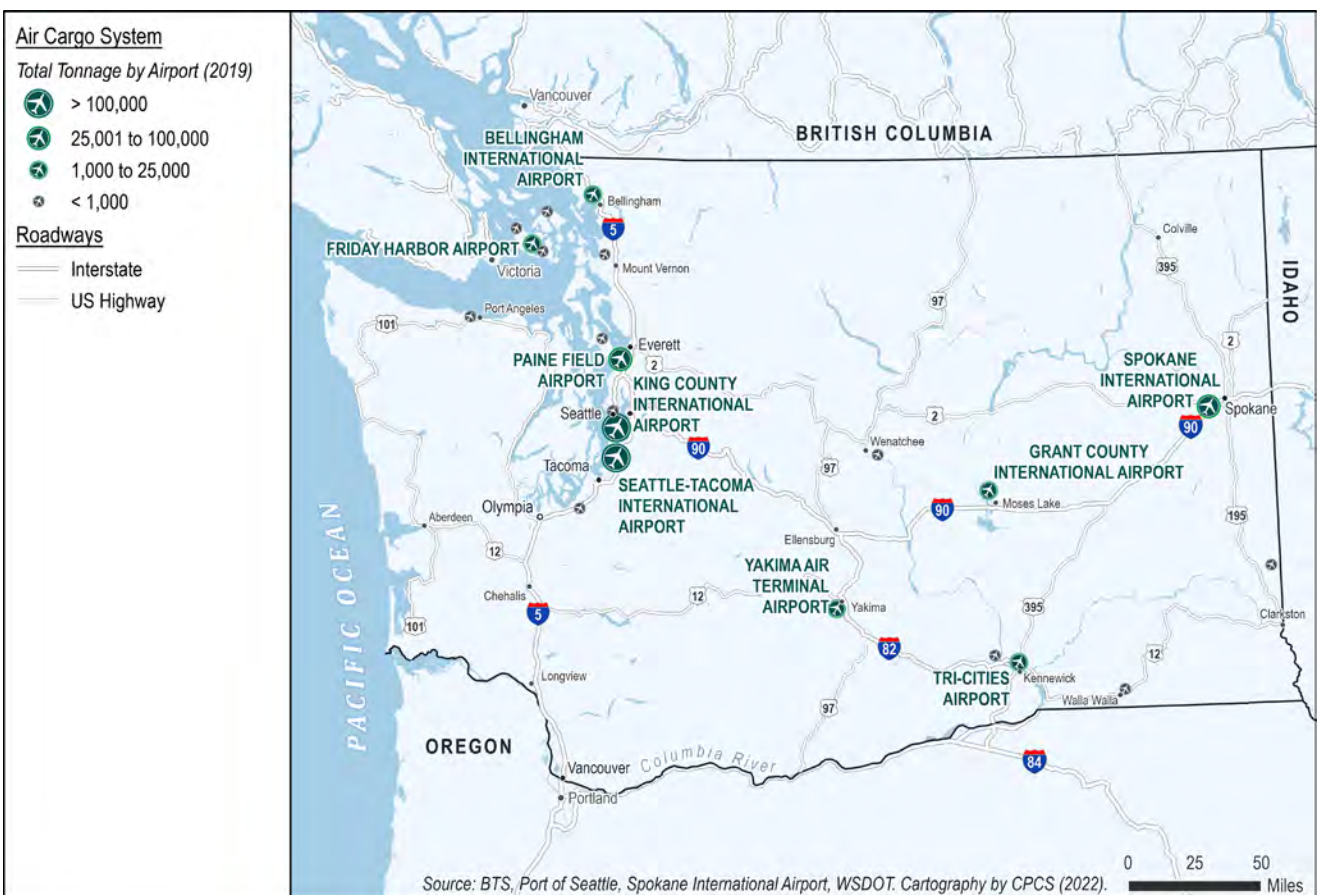
Washington's air cargo network

The state's four major cargo airports are Seattle-Tacoma International Airport, King County International Airport, Spokane International Airport, and Paine Field Airport (Figure 6).

Twenty-two airports provide air cargo services in Washington.

Shippers in Washington move over 310 thousand tons of cargo by air annually, worth about \$54 billion. Air cargo tonnages are expected to reach 636.7 thousand tons in 2050, with a value of about \$110.5 billion.⁴ By tonnage, Washington air cargo shippers move slightly more international imports (35 percent) than exports (30 percent) to international destinations. The remaining 35 percent of tonnage handled is associated with domestic movements. About 83 percent of Washington's domestic air cargo tonnage is outbound from the state.

Figure 6: Washington's air cargo system



⁴ FHWA Freight Analysis Framework V5, 2021.

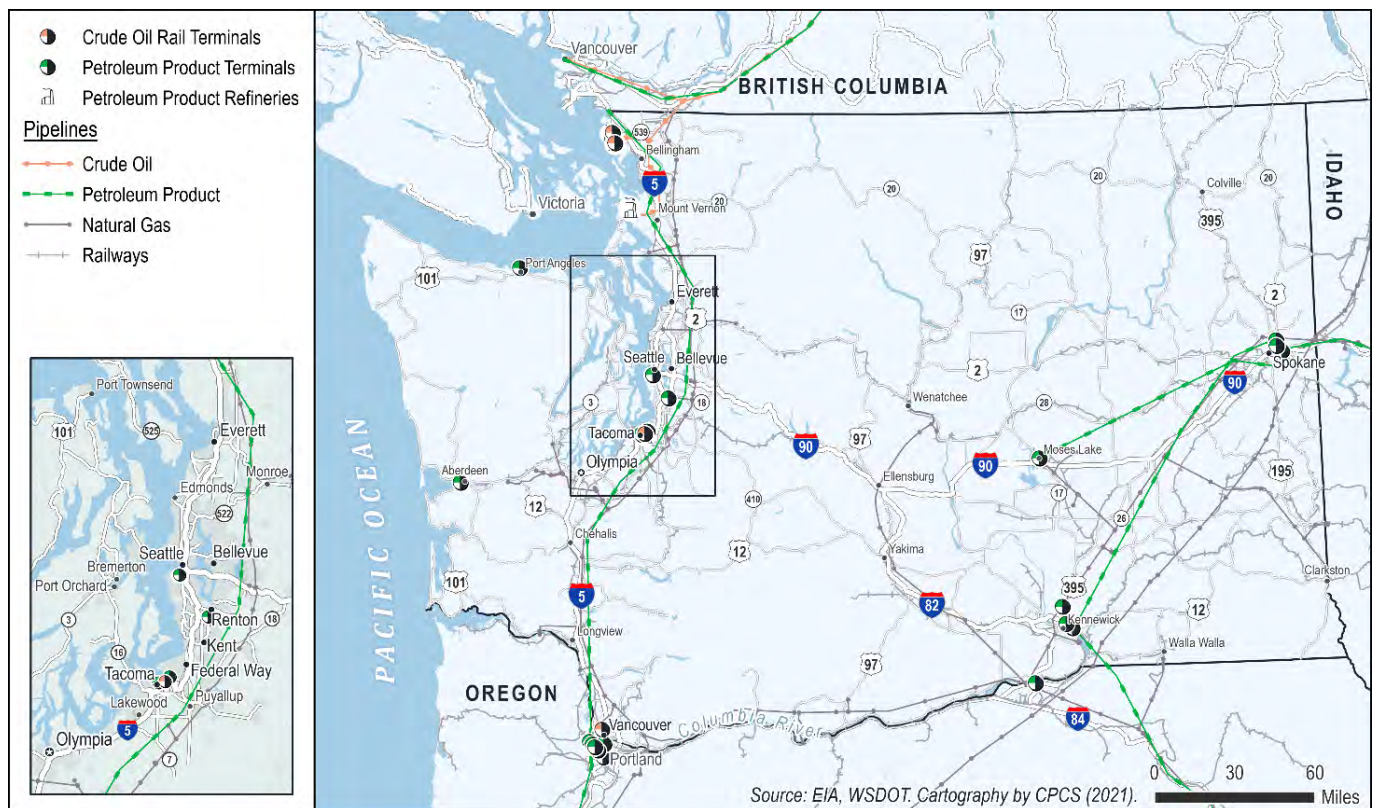
Washington's pipeline network

Washington's pipeline system is over 46,000 miles long and carries natural gas, crude oil, and petroleum products across 30 of 39 counties in the state (Figure 7).

Nearly 100 million tons of fuel is carried by pipelines in Washington annually, worth over \$22.8 billion. The state's five refineries are significant producers of gasoline, diesel, and jet fuel.

The majority (72 percent by tonnage and 78 percent by value) of commodities traveling by pipeline in Washington move domestically, meaning they are carried entirely within the state, into the state from a domestic source, or out of the state to a domestic destination.

Figure 7: Pipeline system in Washington



1. Washington's multimodal freight system

Key chapter takeaway

Over 760 of miles of interstate highways, 3,200 mile of rail freight lines, 22 maritime ports, 22 air cargo airports, and over 46,000 miles of pipelines support Washington's goods movement activities and serve freight-reliant industries such as agriculture and manufacturing. Additionally, about 22,207 centerline miles of roadways, 2,963 miles of rail system, and approximately 812 miles of waterways in the state are designated as Freight and Goods Transportation System corridors due to their significance to the state's freight activity and economic competitiveness.

Freight system overview

Washington's vast freight system consists of hundreds of miles of road and rail systems, ports and maritime corridors, air cargo airports, and a highly integrated network of pipelines (Figure 8). These assets enable seamless movement of goods across the state and support international and domestic supply chains, including agriculture and seafood, food manufacturing, forestry products, energy, construction, retail and restaurant, and aerospace manufacturing sectors.

Figure 8: Washington's multimodal freight system

7,000	3,200	18	22	46,000
Highway Miles*	Active Rail Miles	Deep Draft and Shallow Ports	Air Cargo Airports	Pipeline System Miles

Source: CPCS analysis of data provided by WSDOT, 2021.

*Combination of interstate and U.S. Highways and state route miles in Washington. All numbers are rounded to the nearest hundred.

This Appendix inventories Washington's public and private multimodal freight infrastructure and facilities. This inventory was created through a review of existing state and national documents and resources and the identification and analysis of freight-relevant assets based on the location of freight-reliant business establishments or the observation of freight traffic flows. This appendix takes a modal approach (road, railroad, etc.) to establish the existing regional freight system characteristics and inform upcoming project tasks such as freight corridor designation and freight system performance analysis.

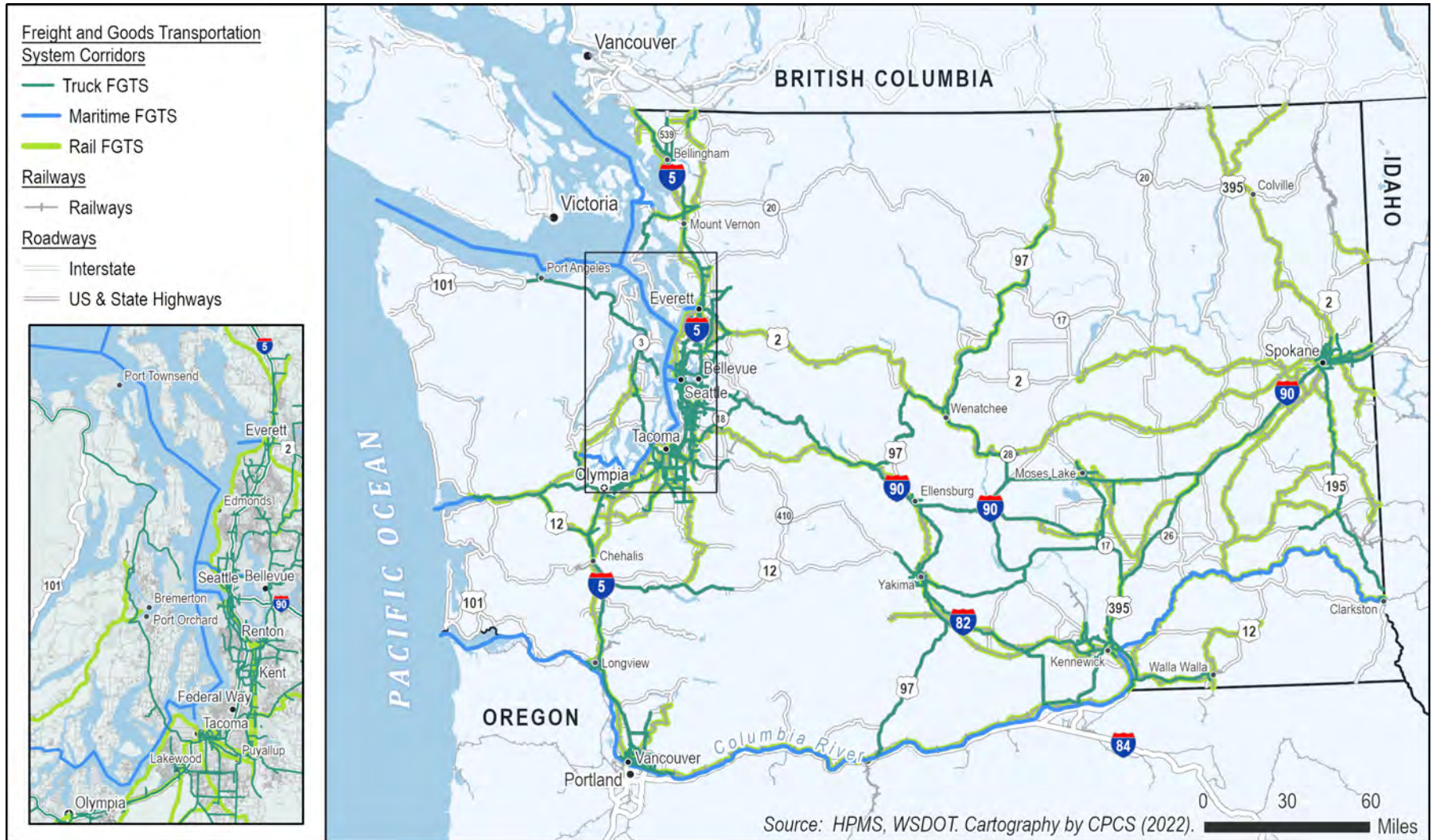
Washington's Freight and Goods Transportation System

The Freight and Goods Transportation System (FGTS) is a freight system designation specific to Washington and classifies the state's multimodal transportation system according to tonnage of annual goods movement. WSDOT updates the FGTS every other year to meet legislative requirements, establish eligibility for funds allocated by the Freight Mobility Strategic Investment Board (FMSIB), and inform freight planning and investment decisions. The FGTS was updated in 2021 (Figure 9) and will be assessed as part of the 2022 Washington State Freight System Plan activities.

The **Washington State Freight Mobility Strategic Investment Board** is responsible for proposing "policies, projects, corridors and funding to the Legislature to promote strategic investments in a statewide freight mobility transportation system." FMSIB's 12 members are appointed by the Governor and are charged with identifying and mitigating the impacts of freight activities on local communities.

Source: FMSIB Website. <https://fmsib.wa.gov/>

Figure 9: Washington's Freight and Goods Transportation System



The FGTS includes about 22,207 centerline miles of roadways, 2,963 miles of rail system, and approximately 812 miles of waterways. Each of these corridors is classified into five tiers, as shown in Figure 10. FMSIB designates the T-1 and T-2 truck freight corridors, R-1 rail freight corridors, and W-1 through W-4 waterway freight corridors as Washington's Strategic Freight Corridors to emphasize their significance for the state's goods movement. As of 2021, a total of 2,923 miles of the FGTS road corridors, 1,801 miles of the FGTS rail corridors, and 751 miles of FGTS waterways were categorized under the Strategic Freight Corridors subsets.⁵

Figure 10: FGTS corridor tiers

Truck Corridors		Rail Freight Corridors		Waterway Freight Corridors	
T-1	More than 10 million tons per year	R-1	More than 5 million tons per year	W-1	More than 25 million tons per year
T-2	4 million to 10 million tons per year	R-2	1 million to 5 million tons per year	W-2	10 million to 25 million tons per year
T-3	300,000 to 4 million tons per year	R-3	500,000 to 1 million tons per year	W-3	5 million to 10 million tons per year
T-4	100,000 to 300,000 tons per year	R-4	100,000 to 500,000 tons per year	W-4	2.5 million to 5 million tons per year
T-5	At least 20,000 tons in 60 days and less than 100,000 tons per year	R-5	Less than 100,000 tons per year	W-5	0.9 million to 2.5 million tons per year

Source: State Freight and Goods Transportation System, WSDOT, 2019.

Washington's strategic defense system

The Strategic Highway Network (STRAHNET) is a system of public highways designated by the Department of Defense (DOD) and Federal Highway Administration (FHWA) in collaboration with state DOTs to accommodate the emergency transportation of military personnel and equipment in times of peace and war. This system provides connections to military installations and ports.

Washington's STRAHNET includes the entire length of I-5, I-90, and I-82 in the state and sections of US 101, SR 8, and US 12 west of Olympia and between Aberdeen and Knapton (a total of 835 miles with about 103 miles connector routes).⁶ Both I-82 and I-5 connect with I-84 along the Columbia River in Oregon. I-84 is also part of the STRAHNET system providing access to military installations and the defense system in Washington and California through the I-5 corridor. WSDOT continues coordination with FHWA, DOD, and other various entities in keeping the STRAHNET up-to-date and meeting the nation's defense needs.

President Eisenhower enacted the **Defense Highways** legislation in 1956. Since then, DOD and FHWA, in collaboration with state DOTs, have continued to identify and update the defense-significant highway designation.

In early 2022, WSDOT coordinated with the Surface Deployment and Distribution Command, Port of Everett, City of Everett, and FHWA to modify the STRAHNET designation within the City of Everett. The purpose of this modification was to improve military access and mobility by adding new STRAHNET connector segments for accessing the **Naval Station Everett** and the **Port of Everett** – a newly designated Department of Defense Strategic Seaport.

Source: WSDOT, 2022; FHWA, National Highway System Questions & Answers, 2013.

⁵ State Freight and Goods Transportation System, WSDOT, 2021. <https://wsdot.wa.gov/sites/default/files/2021-12/2021-FGTS-update.pdf>

⁶ Computed using milepost length based on attributes from FHWA and WSDOT in the 2019 HPMS submission, 2021.

The Strategic Rail Corridor Network (STRACNET) provides rail access to military installations across the U.S. Washington's STRACNET encompasses BNSF's Columbia River and scenic subdivisions running from Spokane to Everett and Seattle and the railroad's Seattle subdivision between Seattle and Vancouver (a total of 586 miles with over 266 miles of connector lines).⁷ UP's line running along the Columbia River in Oregon is also part of the STRACNET system, connecting with Washington's STRACNET lines at Hinkle and Portland, Oregon.

The STRAHNET and STRACNET systems serve several military facilities across the state. As shown in Figure 11, there are nine major military facilities in Washington with connections to the highway and rail strategic defense system.

Figure 11: Major military facilities in Washington

Facility Name	Facility Type	Location	Highway/Rail Connection
Fairchild Air Force Base	Air Force	Spokane	I-90 Though US 2; BNSF Railroad
Joint Base Lewis-McChord	Air Force, Army, and Army Medical Center	McChord	I-5; BNSF Railroad
Thirteenth Coast Guard District	Coast Guard	Seattle	I-5 through SR 99; BNSF Railroad
Washington National Guard	National Guard, Air Force, and Army	Bremerton	SR 3; Puget Sound & Pacific Railroad
Whidbey Naval Air Station	Navy	Whidbey Island	I-5 through SR 20
Everett Naval Base	Navy	Everett	I-5 through SR 529
Kitsap Naval Base	Navy	Kitsap Peninsula	SR 3; Puget Sound & Pacific Railroad
Naval Undersea Warfare Center	Navy	Keyport	SR 3 through SR 308
Puget Sound Naval Shipyard and Intermediate Maintenance Facility	Navy	Bremerton	SR 3 through Charleston Blvd; Puget Sound & Pacific Railroad

Source: AccessWashington.gov.

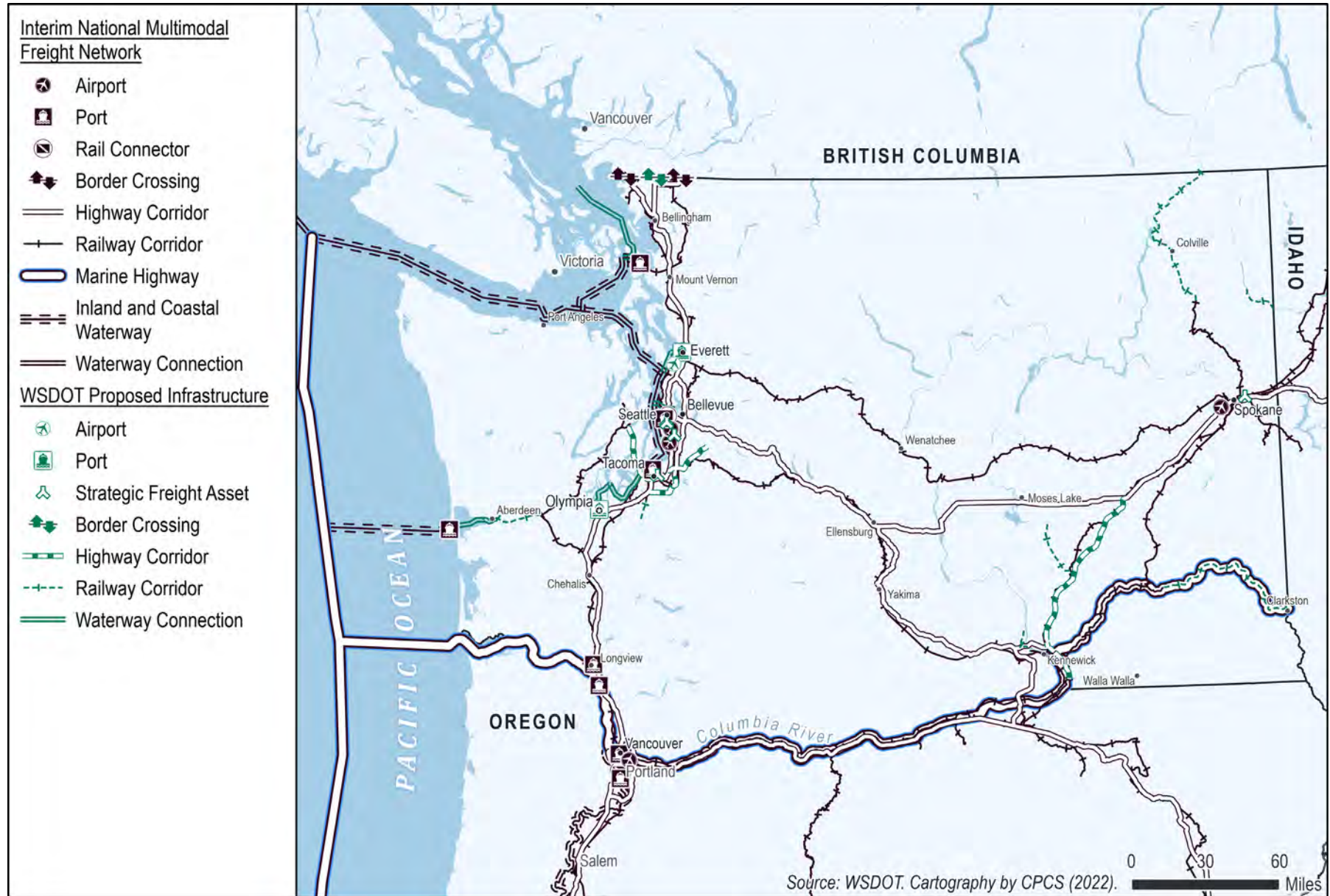
Figure 12 illustrates the STRAHNET and STRACNET systems in Washington. Both networks and their connector roads and rail lines must meet defense-readiness requirements in terms of maintenance condition, clearance, and gross weight capacity. While the STRAHNET system primarily serves the flow of heavy armor, fuel, ammunition, repair parts, food, and other commodities needed to support U.S. military operations, the STRACNET system mainly accommodates transportation of heavy military equipment.

⁷ Computed based on shapefile attributes from Bureau of Transportation Statistics of the USDOT, 2021.

Figure 12: Washington's strategic corridor networks



Figure 13: Interim National Multimodal Freight Network and proposed additions



Interim National Multimodal Freight Network

The Fixing America's Surface Transportation (FAST) Act's (49 U.S. Code § 70103) requires the USDOT to establish a National Multimodal Freight Network (NMFN) to inform coordinated infrastructure planning and investments. USDOT published an interim NMFN and solicited public and stakeholder comments between October 2017 and February 2018. WSDOT identified and submitted proposed freight corridor and facility designations to USDOT for addition to interim NMFN during that comment period.⁸ Those proposed designations were developed based on factors and criteria under 49 U.S.C. § 70103(c)(2) and have incorporated inputs from freight industry and planning partners in Washington state.

Figure 12 shows the interim NMFN in Washington and WSDOT's proposed additional designation of multimodal freight facilities and corridors. As shown, Washington's interim NMFN encompasses the entire interstate highway system (I-5, I-82, I-90, and I-405); other primary arterials that connect the interstate system with multimodal points and border crossing facilities; marine highways 5, 84, and the Salish Sea/Puget Sound navigation system; BNSF Railway's east-west and north-south corridors; the Puget Sound and Pacific short line; and several ports and airport facilities.

Freight industry transportation requirements

Washington's vast and integrated freight system provides a range of modal options to shippers, who are interested in optimizing travel time and reliability while minimizing logistics costs.⁹ However, shippers' ability to optimize these factors is impacted by the availability of access to various freight modes and the characteristics of the cargo being moved, especially its unit value. For lower-value cargo (based on value per unit of volume – e.g., gravel, logs, grain), the shipping costs can make up a larger share of the overall logistics costs, while a greater logistics cost can be absorbed when shipping higher-value cargo (e.g., electronics, pharmaceuticals, consumer goods).

Figure 14 shows the spectrum and characteristics of services provided by each freight mode. As shown, each mode of freight transportation has unique characteristics and offers specific goods movement services:

- **Pipelines** carry large quantities of select commodities (in liquid or gas states) over long distances. In general, pipelines offer the most economical method of moving bulk liquid and gas cargos.
- **Maritime** freight transportation mode is critical to Washington's international and domestic trade. This mode is best suited for the movement of large volumes of cargo in bulk (i.e., grain, oil, chemicals, and aggregates) as well as intermodal containers and oversized-overweight freight. Higher-value manufactured goods can also be suitable candidates for maritime transportation when fast service is not needed. Waterborne freight also offers significantly lower carbon and pollution emissions per ton-mile of cargo transported compared to heavy-duty trucks.
- **Railroads** typically move high tonnage cargo over short and long distances. Both lower value bulky goods (such as grain, aggregates, forest products, and oil) as well as higher-value goods (often carried in intermodal containers) are carried by rail, depending on the desired shipping time and access to rail facilities.
- **Trucks** offer lower capacity and higher costs for transporting goods compared to maritime and rail modes. However, trucking is important due to flexibility in access and providing the first/last

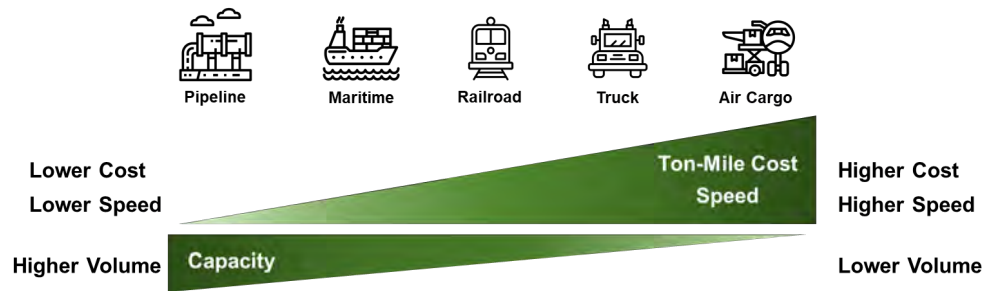
⁸ Federal register: Establishment of Interim National Multimodal Freight Network, [Regulations.gov](https://www.regulations.gov)

⁹ Total logistics cost includes administrative, transportation, handling, and storage costs.

connection between shippers and other modes. Trucks are typically used for carrying moderate- and higher-value goods over relatively long distances in relatively shorter periods.

- **Air cargo** enables the fast movement of high-value and time-sensitive goods over long distances. Using air cargo is the most expensive modal choice when comparing modes based on per ton-mile carrying costs.

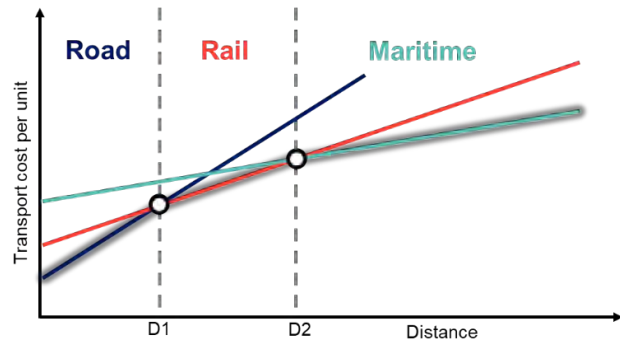
Figure 14: The freight modal spectrum of services



Source: CPCS, 2021.

Distance is another consideration in the freight modal spectrum. The relatively high shipping cost and low capacity of trucks mean that for any given product, trucking is most cost-effective for short-haul moves. By comparison, the higher capacity and efficiency of rail means that rail is well-suited as a “medium-distance” option, while maritime offers lower costs for extremely long-distance moves. Figure 15 simplifies the general concept of shipping distance impacts on costs and the “break points” created by the initial and incremental cost differences between truck, rail, and maritime modes.

Figure 15: Transport cost changes by distance



Source: Rodrigue, Jean-Paul. The Geography of Transport Systems, Fifth Edition. Routledge, 2020.

Freight system use

Washington's freight system transported nearly 600 million tons of goods worth over \$677 billion in 2017. The graphs in Figure 16 show modal share of the total tonnage and value of goods moved in Washington. The 2022 forecast illustrated in Figure 17 does not show major changes in the modal shares by tonnage from 2017. The value carried by multiple modes and mails is expected to increase the most, by 3 percent, while the value of freight moved by water, rail, and truck is forecast to decrease by 1 percent in 2022. The following are key findings from the graphs:

- Trucks carry over half of the commodities moving to and from Washington, making up 58 percent by tonnage and 57 percent by value (compared to national movements, for which trucks carry 64 percent by tonnage and 72 percent by value).
- Pipeline and rail also move high-tonnage goods, whereas multiple modes and mail, along with air, move high-value goods to and from the state.
- The modal share of truck movements increases for domestic goods movement, carrying 65 percent of domestic goods by tonnage and 62 percent by value.

- The share of other modes increases for import and export goods movement, with rail (33 percent), pipeline (21 percent), and multiple modes and mail (8 percent) carrying a larger share of import and export tonnage.
- Air and rail modes handle larger shares of import and export goods by value (16 percent and 11 percent, respectively).

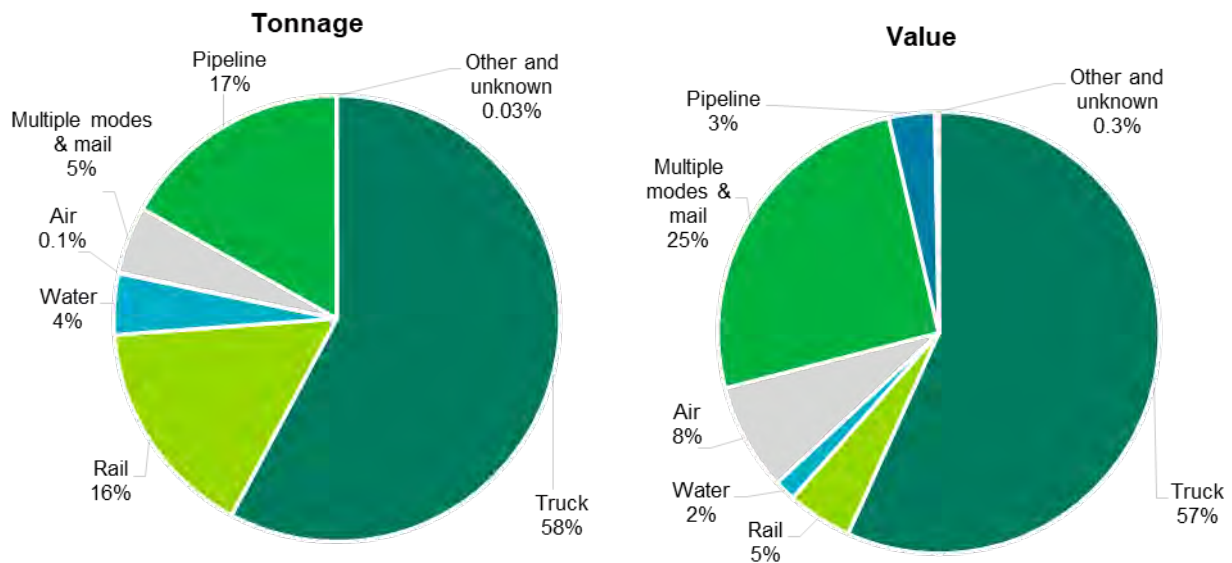
The **FHWA Freight Analysis Framework version 5 (FAF5)** provides data on domestic and international goods movement for the base year 2017, based on data from the 2017 Commodity Flow Survey (CFS), international trade data from the U.S. Census Bureau, and data from other sectors. Information available from FAF includes tonnage and value by regions of origin and destination, commodity type, and mode. FAF5 also offers forecast on tonnage and value from 2020 to 2050 using the 2017 baseline data.

For the purposes of this Appendix, Washington's domestic movements refer to the movement of goods within the U.S. that originate in and/or are destined for Washington. Washington's international movements refer to imports that enter the U.S. through Washington and/or are destined for Washington, and exports that originate in Washington and/or exit the U.S. through Washington. Additionally, modal shares include only the modes used for the domestic movement of goods. Therefore, for international goods movement (i.e., imports and exports), "mode" refers to the domestic movement of import and export goods within in the U.S., except where otherwise noted.

Since the 2022 data presented in the following section is a forecast conducted before the COVID-19 pandemic, it does not reflect the impacts brought by the global event and any other recent changes in freight movements and international trade.

Source: FHWA Freight Analysis Framework, https://ops.fhwa.dot.gov/freight/freight_analysis/faf/

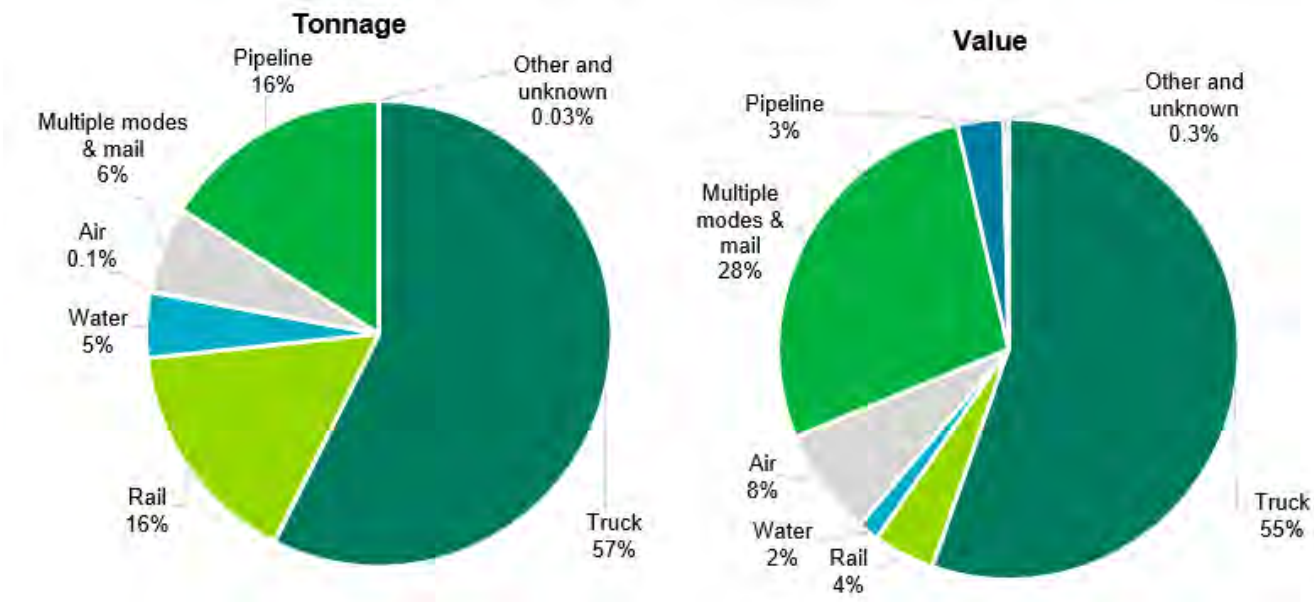
Figure 16: Total freight tonnage and value carried by mode, 2017



Source: CPCS analysis of FAF5 data, 2022.

Note: Does not include 0.3 percent of no domestic mode by tonnage and 0.1 percent by value. Note: Mode refers to the domestic movement of goods within the U.S, for both domestic and international goods.

Figure 17: Total freight tonnage and value carried by mode, 2022



Source: CPCS analysis of FAF5 data, 2022.

Note: Does not include 0.3 percent of no domestic mode by tonnage and 0.1 percent by value. Note: Mode refers to the domestic movement of goods within the U.S, for both domestic and international goods.

Between 2012 and 2017, the share of total freight moved by truck in Washington decreased, with other modes replacing trucks for 7 percent of goods by tons and 2 percent of goods by value. During this time, pipeline and rail experienced the highest increases in modal share by tonnage, while the share of multiple modes and mail increased by value (Figure 18). The significant increase in pipeline and freight rail tonnage can be associated with many factors, including:

- Completion of the South Seattle Delivery lateral pipeline expansion project by Puget Sound Energy in 2013, which increased the capacity for carrying natural gas in the Seattle area by 68,000 dekatherms per day.¹⁰ The increased pipeline capacity is equal to about 180 small tanker truckloads or approximately 50 large tanker trailers per day.¹¹
- Recent investments in freight rail enhancements across the state, including improvements in capacity along BNSF's east-west corridors with track additions, bridge replacement and reinforcement, and operational efficiency improvements.¹²
- The state's investment in short line improvements (in particular, track maintenance and rehabilitation along the state-owned Palouse River and Coulee City short line railroad) through funds appropriated by the Washington state Legislature.¹³

The 2022 forecast data predicts that the freight will grow 0.15 percent by tonnage and 4 percent by value across all modes. The share of total freight carried by multiple modes will increase, whereas all the other modes will experience minor decreases in both tonnage and value.

¹⁰ Williams Pipeline, South Seattle Delivery Lateral Expansion Project, 2013.

<https://www.govlink.org/watersheds/8/committees/1111/WilliamsPipelineSSeattleExpansProject.pdf>

¹¹ Tanker trucks can carry between 3,300 and up to 11,000 gallons of liquid natural gas which is about 375 to 1,373 dekatherms, respectively. Source: How much gas does a tanker truck hold? Transcourt, November 2018. <http://transcourt.com/blog/how-much-gas-does-a-tanker-truck-hold/>

¹² Washington State Rail Plan, WSDOT, 2019.

¹³ Washington Integrated Freight and Passenger Rail Plan 2013-2035, WSDOT, 2014.

https://www.aawa.us/site/assets/files/7322/2014_wsdot_state_rail_plan_2013-2035.pdf

Figure 18: Total freight tonnage and value difference in modal share

Mode	Freight Tonnage				Freight Value			
	2012	2017	2022	Difference in Modal Share between 2017 and 2022	2012	2017	2022	Difference in Modal Share between 2017 and 2022
Truck	65%	58%	57%	-0.17%	59%	57%	55%	-1.30%
Rail	12%	16%	15%	-0.59%	3%	5%	4%	-0.49%
Water	4%	4%	4%	-0.05%	1%	2%	1%	-0.14%
Air	0.3%	0.1%	0.05%	0.00%	10%	8%	8%	-0.24%
Multiple modes & mail	5%	5%	6%	1.14%	22%	25%	28%	2.36%
Pipeline	12%	17%	16%	-0.29%	2%	3%	3%	-0.25%
Other and unknown	0.1%	0.03%	0.03%	0.00%	1.7%	0.3%	0.3%	0.06%

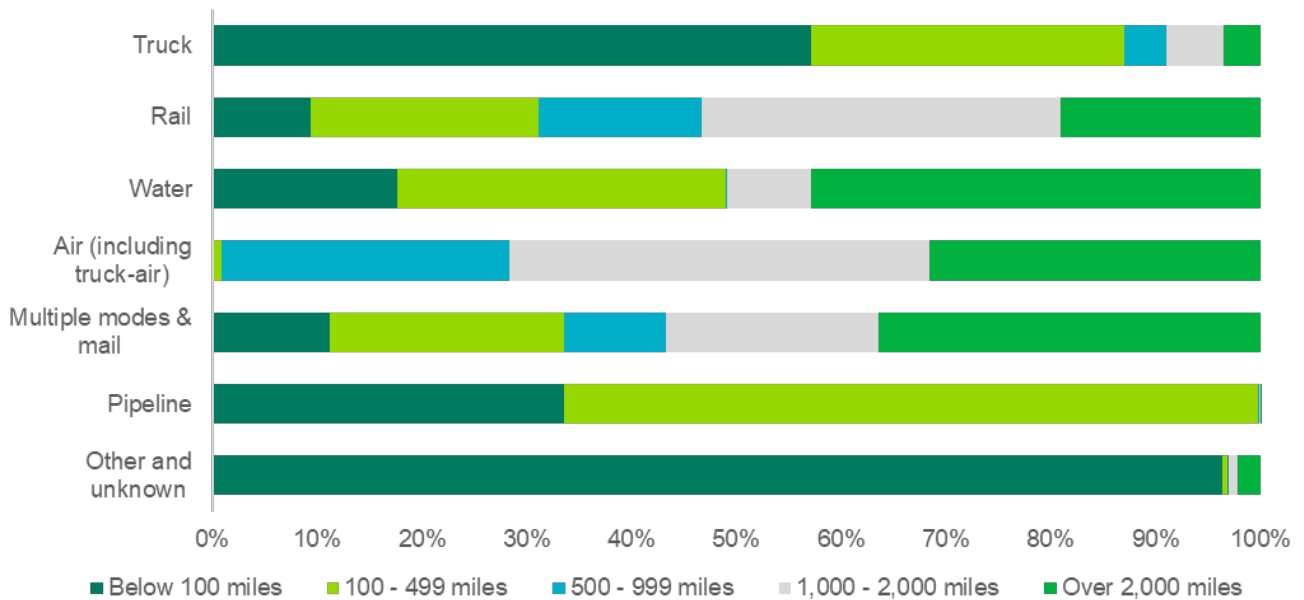
Source: CPCS analysis of FAF5 data, 2022.

Note: Does not include 2.5 percent of no domestic mode by tonnage and 0.6 percent by value (2012), 0.3 percent of no domestic mode by tonnage and 0.1 percent by value (2017), and 0.3 percent of no domestic mode by tonnage and 0.1 percent by value (2022). Note: Mode refers to the domestic movement of goods within the U.S., for both domestic and international goods.

The average length of haul carried differs across mode in Washington, as displayed in Figure 19 and detailed below:

- **Trucks typically move goods across shorter distances**, with 87 percent of truck movements under 500 miles (including 57 percent of total truck movements below 100 miles).
- **Rail movements vary in length of haul**, moving goods on trips that span less than 500 miles (31 percent), between 500 and 2,000 miles (50 percent), and over 2,000 miles (19 percent), reflecting movements by both local short lines and national Class I operators.
- **With direct access to the Salish Sea, U.S. Pacific Coast, and Snake-Columbia River inland waterway**, the state's waterway systems also serve short trips (18 percent of tonnage is moved less than 100 miles), medium-length trips (31 percent between 100 and 499 miles), and longer trips (43 percent over 2,000 miles). This highlights the state's integrated maritime system, providing opportunities for users to cost-effectively ship cargo over varied distances. Across all modes, water has the highest share of tonnage moved on long trips spanning over 2,000 miles.
- **All pipeline tonnage in Washington moves less than 500 miles**, with 34 percent of tonnage transported less than 100 miles and 50 percent carried between 250 and 499 miles.
- **Air freight typically moves goods across longer distances**, with almost all air movements on trips with a distance of 500 miles or more. Among air cargo tonnage moved, 72 percent are carried over 1,000 miles (including 32 percent of total air movements above 2,000 miles).
- **Goods moved by multiple modes and mail (including intermodal container traffic) have diverse lengths of haul**, with 34 percent of tonnage carried less than 500 miles, 30 percent spanning 500 to 2,000 miles, and 36 percent moved over 2,000 miles.

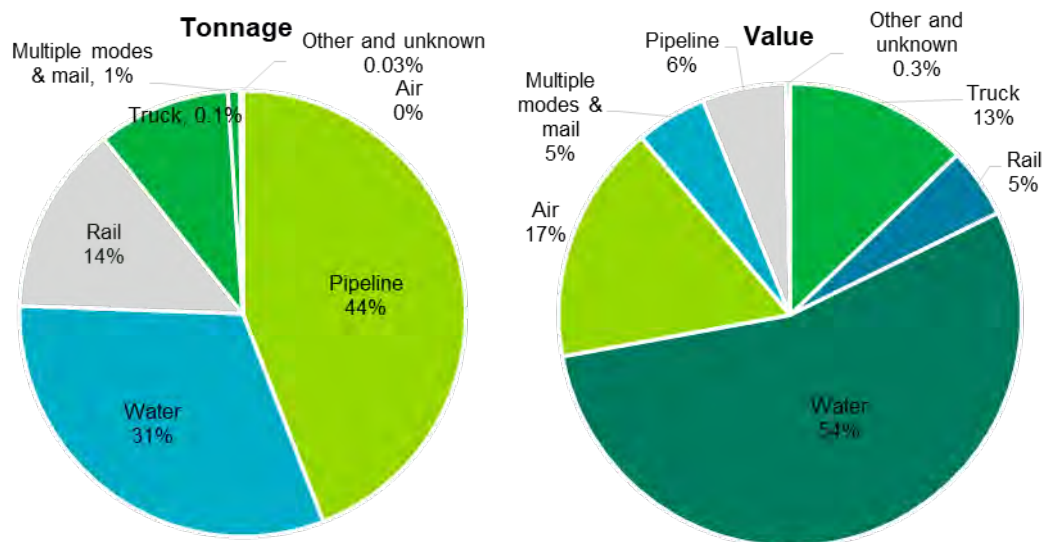
Figure 19: Modal share of total freight tonnage transported over various distances, 2017



Source: CPCS analysis of FAF4.5.1 data, 2022.
 Note: Mode refers to the domestic movement of goods within the U.S., for both domestic and international goods.
 Note: FAF5 doesn't have distance band data for 2022.

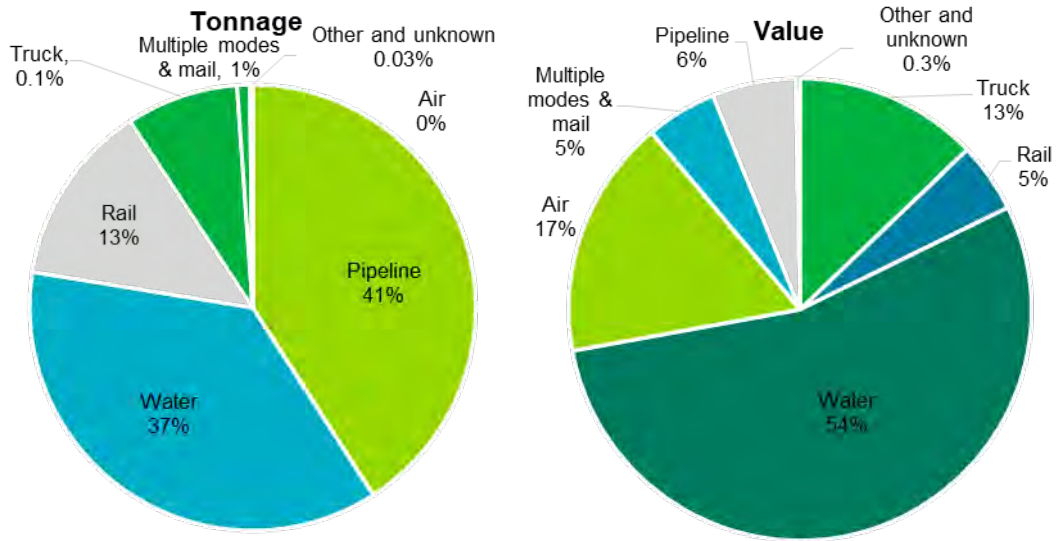
The top entry modes for goods entering the U.S. through and/or destined for Washington are pipeline (44 percent) and water (31 percent) by tonnage, and water (54 percent) and air (17 percent) by value in 2017 (Figure 20). The share of tonnage by water is forecast to increase by 6 percent, whereas other modes are expected to see decreases. The forecast also shows that the entry mode splits by value do not change in 2022. Meanwhile, for export goods exiting the U.S. and/or originating from Washington, water is the primary exit mode (84 percent) by tonnage, while air (30 percent), multiple modes and mail (28 percent), and water (26 percent) are the top modes by value (Figure 22). The tonnage by water is expected to shrink the most (-7 percent), whereas multiple modes and mail shows an increase of 9 percent. Similarly, the export value by water is forecast to decrease, while multiple modes and mail presents the most growth (+7 percent).

Figure 20: Import tonnage and value by entry mode, 2017



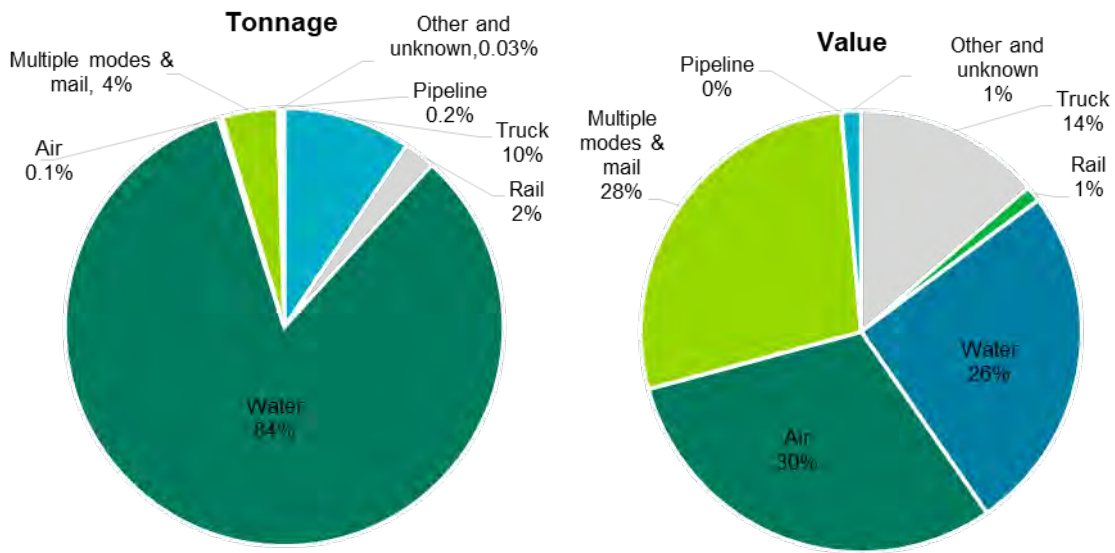
Source: CPCS analysis of FAF5 data, 2012.
 Note: Mode refers to the foreign mode of import into the U.S.

Figure 21: Import tonnage and value by entry mode, 2022



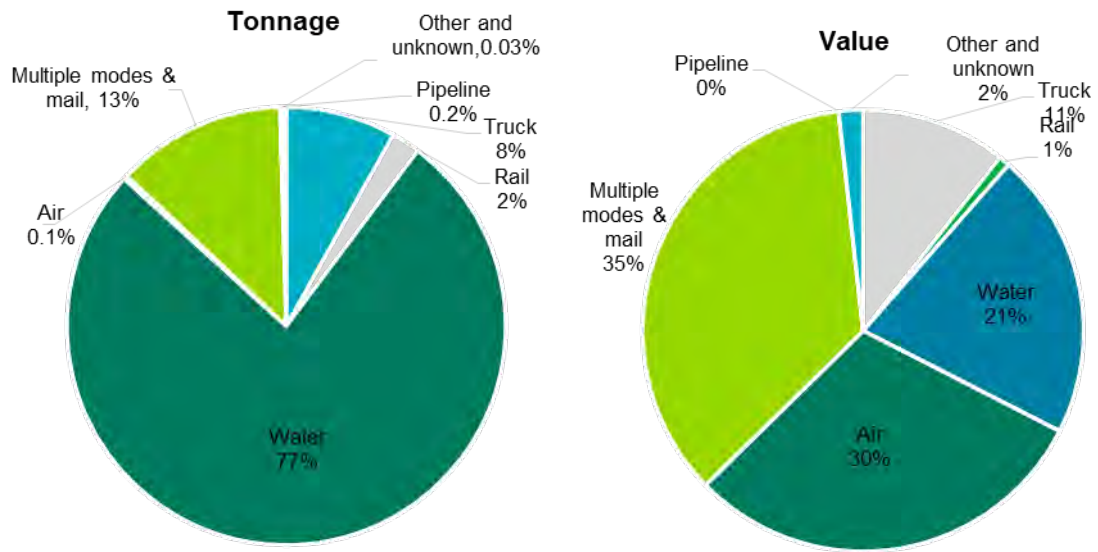
Source: CPCS analysis of FAF5 data, 2022.
 Note: Mode refers to the foreign mode of import into the U.S.

Figure 22: Export tonnage and value by exit mode, 2017



Source: CPCS analysis of FAF5 data, 2022.
 Note: Mode refers to the foreign mode of export out of the U.S.

Figure 23: Export tonnage and value by exit mode, 2022



Source: CPCS analysis of FAF5 data, 2022.
Note: Mode refers to the foreign mode of import into the U.S.

2. Washington's road freight network

Key chapter takeaway

Washington's road network spans over 80,000 centerline miles, with 764 interstate miles and 1,602 miles of U.S. Highways connected by state routes, county roads, city streets, and other roadways. This includes 5,135 miles of high-volume truck corridors, 932 miles of alternative freight routes, and 818 miles of first/last mile connector routes, which make up the state's Truck Freight Economic Corridors designation. The road network handles the largest share of freight compared to other modes, with trucks moving over half of all goods in Washington. The majority of goods moved by truck to or from Washington – 86 percent by volume and 77 percent by value – have domestic origins and destinations. The remaining share are imports and exports, including those carried by truck across the 12 land ports of entry on the Washington-British Columbia border.

Road freight system overview

Washington's road network is the backbone of freight movement throughout the state. The roadway system provides direct links to freight origins, nodes, and destinations, while also enabling connections to other modes within the freight network. Goods moved by truck vary, moving along the road network for both long-hauls and short trips (e.g., first/last mile delivery).

Over 760 interstate miles, 1,600 U.S. Highway miles, and 4,600 state route miles carry freight in Washington (Figure 24).^{14,15} Additionally, 820 miles of Washington's road network are assigned to the Primary Highway Freight System (PHFS), representing the state's network of highways identified as the most critical portions of the national freight transportation system.¹⁶

Figure 24: Washington's road freight system

764	1,602	4,668	820
Interstate Miles	U.S. Highway Miles	State Route Miles	PHFS Miles

Source: CPCS analysis of FHWA HPMS (interstate and U.S. Highway miles) and WSDOT data (state route miles) 2019, 2022.

Note: Mileage for concurrent segments is assigned to the primary route.

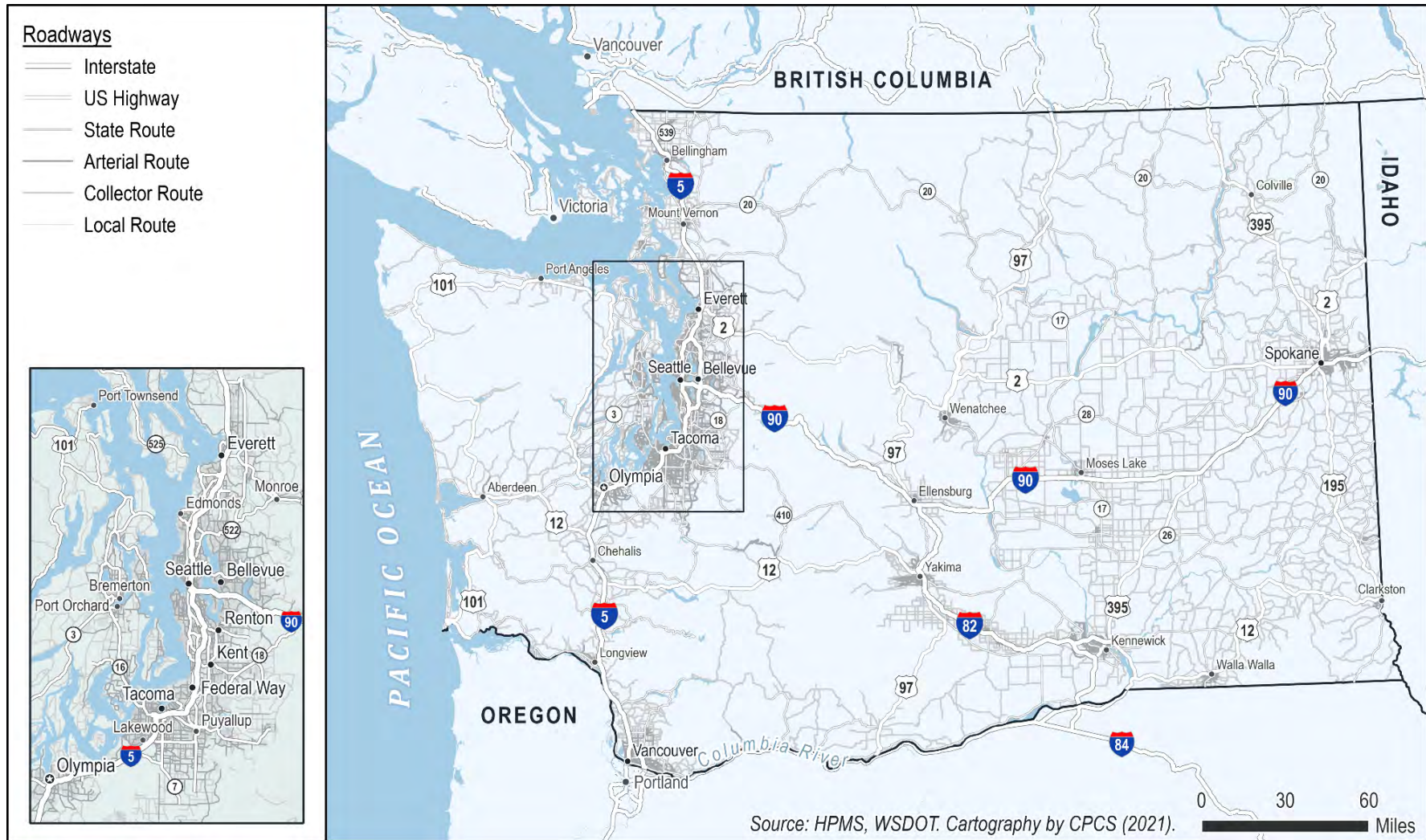
Figure 25 maps Washington's road network. As shown, key corridors in Washington include Interstate 5 (I-5) running north-south from Canada to Mexico, and Interstate 90 (I-90) running east-west from the Pacific to Atlantic Coast. Additionally, Interstate 84 (I-84) runs along Oregon's northern border with Washington, with several bridges across the Columbia River connecting I-84 to SR 14 along Washington's southern border. These interstate corridors support domestic and international trade movements, as they connect Washington's northern and western borders to dozens of other states, cities, and intermodal, coastal, and land border ports nationally.

¹⁴ Interstate and U.S. Highway miles based on FHWA HPMS, 2019. Note: US 2 is classified under "state" route sign in HPMS and has been manually removed from the interstate mileage total and added to the U.S. Highway miles total.

¹⁵ As classified by WSDOT Linear Referencing System, 2019.

¹⁶ National Highway Freight Network, FHWA, <https://ops.fhwa.dot.gov/Freight/infrastructure/nfn/index.htm>

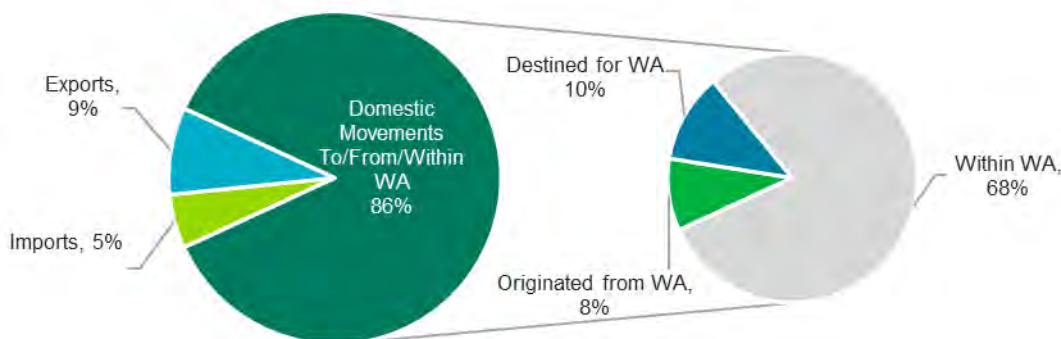
Figure 25: Washington's road network



Trucking moves the largest share of freight in Washington, making up 57.6 percent of Washington's total movements by tonnage and 58 percent by value. However, trucks make up a larger share of goods movement nationally, carrying 64 percent of total movements in the U.S. by tonnage and 72 percent by value). As shown in Figure 26 and Figure 27, truck trips in Washington primarily move goods domestically. The largest share of domestic movements by truck move within Washington – two-thirds by tonnage and just over one-third by value. This is not expected to change too much in 2022. The share of domestic movements will increase by 1 percent between 2017 and 2022. Domestic movements within Washington include top commodities of gravel and logs by tonnage (over 40 million tons each) and mixed freight (\$23.7 billion) and coal (\$10.8 billion) by value, moving within the state.

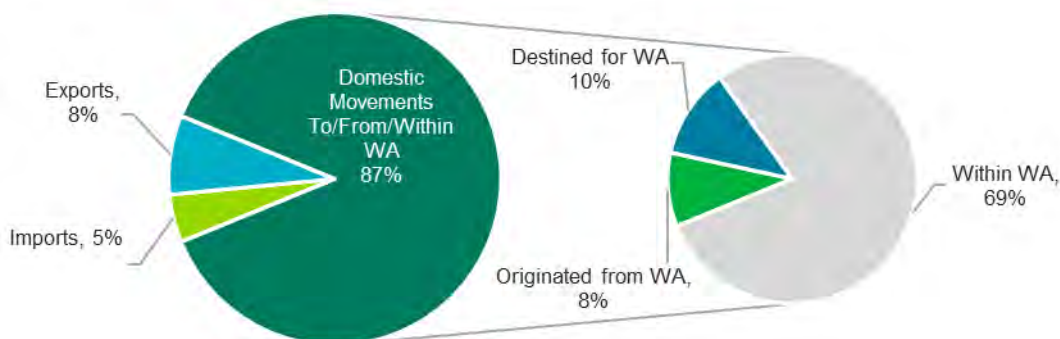
Washington's top domestic trade partners for goods moved by truck are Oregon and California. Top commodities moved by truck to and from Washington include other foodstuffs¹⁷, wood products, and other agricultural products. A smaller share of Washington's truck movements carry import and export goods – 14 percent by tonnage and 23 percent by value in 2017. Top imports to Washington that move by truck in the state include wood products and nonmineral metal products by tonnage and electronics and motorized vehicles by value. Meanwhile, top exports from Washington that move by truck in the state include other agricultural products and foodstuffs by both tonnage and value, in addition to cereal grains and gasoline by tonnage and electronics and machinery by value. East Asia and Canada are Washington's top trading partners for imports and exports moved domestically by truck.

Figure 26: Tonnage of freight carried by road in Washington by trade type, 2017



Source: CPCS analysis of FAF5 data, 2022.

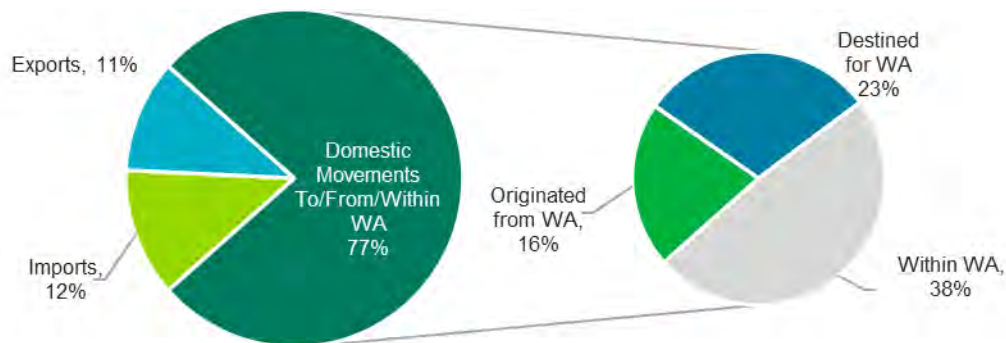
Figure 27: Tonnage of freight carried by road in Washington by trade type, 2022



Source: CPCS analysis of FAF5 data, 2022.

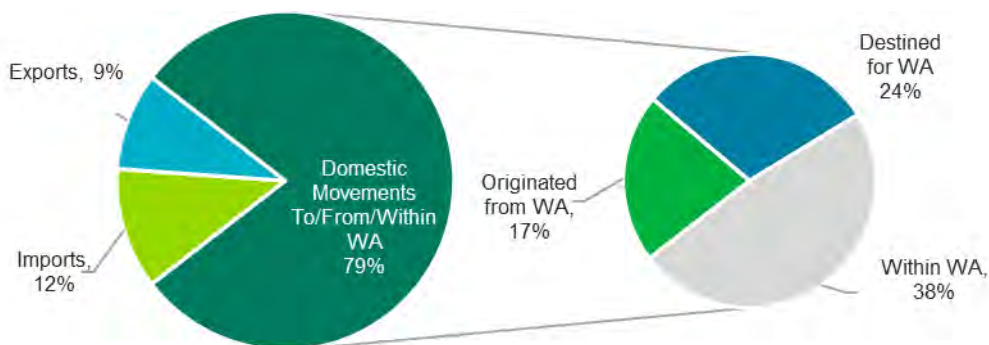
¹⁷ Other foodstuffs refer to commodities classified under SCTG code 07 Other Prepared Foodstuffs, Fats and Oils, which includes dairy products; processed or prepared vegetables, fruit, or nuts; coffee, tea, and spices; animal or vegetable fats and oils; sugars, confectionary, and cocoa; other edible preparations; non-alcoholic beverages and ice.

Figure 28: Value of freight carried by road in Washington by trade type, 2017



Source: CPCS analysis of FAF5 data, 2022.

Figure 29: Value of freight carried by road in Washington by trade type, 2022



Source: CPCS analysis of FAF5 data, 2022.

Key road freight corridors

Key corridors for freight in Washington, as identified by Annual Average Daily Traffic (AADT) for trucks, are typically concentrated along the interstate system and near urban areas.¹⁸ Figure 30 displays truck traffic along Washington corridors. The following segments have the highest truck volumes, as measured by combination truck AADT:

- I-5 statewide, with particularly high concentrations between Seattle and Vancouver, including through Tacoma, Olympia, and Centralia. Segments near Seattle and Vancouver experience the highest truck tonnage in the state.
- I-405 around Seattle, through Bellevue.
- I-90 east of Seattle, between Snoqualmie and Ellensburg.
- I-90 near and through Spokane.
- I-205 through Vancouver.

¹⁸ Single unit and combination trucks, defined as vehicle classes 5 through 13 according to FWHA HPMS Field Manual, 2016.

U.S. Highway and state routes also provide key connections for truck movement through the state. The following non-interstate segments have the highest truck volumes:

- US 395 near Kennewick.
- State routes near Seattle and Tacoma, including SR 18, SR 167, SR 512, and SR 599.

Additionally, select corridors in Washington carry high shares of truck traffic relative to total traffic. This is represented by combination truck AADT as a percentage of total AADT.¹⁹ Figure 31 displays truck traffic as a share of total traffic along Washington corridors. The following segments have the highest truck volumes:

- I-90 between Snoqualmie and Spokane.
- US 97 between Toppenish and Goldendale.
- US 730 from the state's southern border to US 12 at the Wallula Junction.
- SR 14, along the state's southern border, between bridges in Maryhill and Plymouth that each cross the Columbia River to connect to I-84 in Oregon.
- SR 221 extending from the SR 14 interchange in Paterson.
- SR 24 connecting SR 240 to I-82 in Yakima.
- SR 26 east of I-90 in Vantage.
- SR 17 extending north from US 395 to Othello, as well as SR 17 north from US 2 to Bridgeport.
- SR 127 from Peyton, north of the Snake River, to Dusty, and SR 26 from Dusty to US 195 in Colfax.

Reference Chapter A further details Washington's key road corridors for truck movements.

¹⁹ FWHA HPMS Field Manual, 2016.

Figure 30: Washington's truck traffic volume

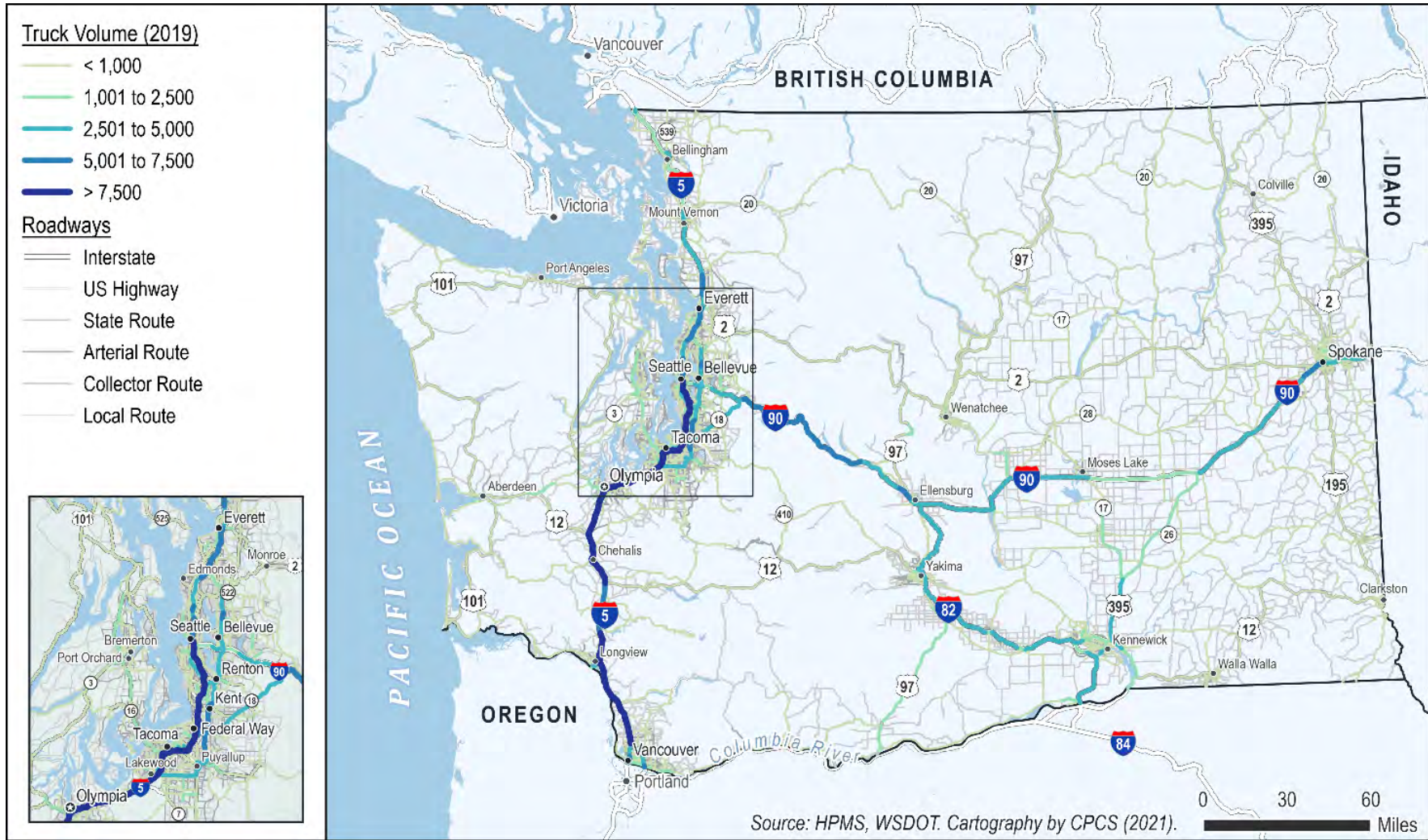
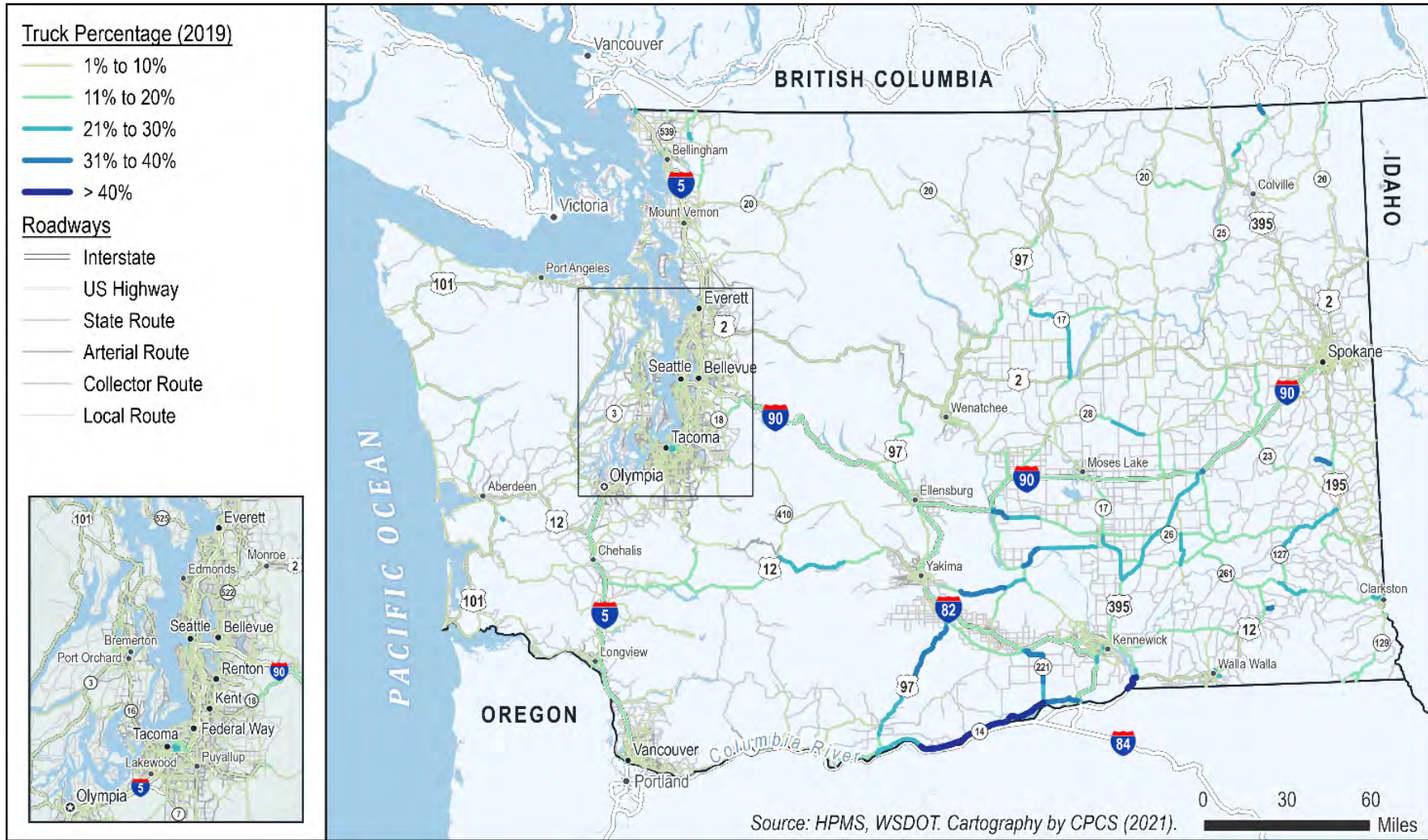


Figure 31: Truck percentage of overall traffic volume in Washington



Truck Freight Economic Corridors

WSDOT established the Truck Freight Economic Corridors in 2014, in partnership with the Freight Mobility Strategic Investment Board (FMSIB), the freight industry, Metropolitan Planning Organizations (MPOs), Regional Transportation Planning Organizations (RTPOs), and other city, county, port, and tribal government stakeholders. The Truck Freight Economic Corridor designation builds on the FGTS tonnage classification while also considering freight resiliency and first/last mile connectivity (Figure 32). The designation includes:

- **High Volume Truck Corridors (T-1 and T-2 Corridors):** Freight corridors defined in the FGTS as carrying at least 4 million tons of gross truck tonnage per year. There are 2,923 miles in Washington classified as High-Volume Truck Corridors.
- **Alternative Freight Routes:** Routes that serve as alternatives to primary cross-state freight routes during severe weather or other disruptions to increase freight system resiliency. A total of 485 miles are classified as Alternative Freight Routes in Washington.
- **First/Last Mile Connector Route:** Truck routes that connect freight-intensive land uses to T-1 and T-2 freight corridors, and alternative freight routes. First/last mile connectors provide important freight linkages to strategic national defense facilities, significant intermodal facilities, warehouse districts, industrial land, and distribution centers, and agricultural processing centers, and the NHFN. There are 885 miles of first/last mile connector routes in Washington.

Washington's National Highway Freight Network

The NHFN includes the following components (Figure 33):²⁰

- **Primary Highway Freight System (PHFS):** This is a network of highways identified as the most critical highway portions of the U.S. freight transportation system determined by measurable and objective national data. The national network consists of 41,518 centerline miles, including 37,436 centerline miles of the Interstate Highway System and an additional 4,082 centerline miles not on the Interstate Highway System. There are 819.96 miles of the PHFS located within Washington.
- **Other portions of the Interstate Highway System not on the PHFS:** These highways consist of the remaining portions of the Interstate Highway System not included in the PHFS. These routes provide important continuity and access to freight transportation facilities. These portions amount to an estimated 9,843 centerline miles of the Interstate Highway System nationwide and will fluctuate with additions and deletions. A total of 17.4 miles of these routes are located within Washington.
- **Critical Urban Freight Corridors (CUFCs) and Critical Rural Freight Corridors (CRFCs):** These are public roads critical for freight movement and can be designated by state DOTs and large MPOs with a population of 500,000 or more. CRFCs are public roads outside of a highway urbanized area and should meet one of seven characteristics to be designated:
 - Is a rural principal arterial roadway and has a minimum of 25 percent of the annual average daily traffic of the road from trucks.
 - Provides access to energy exploration, development, and installation areas.
 - Connects the Primary Highway Freight System, or the Interstate Highway System to facilities that handle more than 50,000 20-foot equivalent units per year, or 500,000 tons per year of bulk commodities.

²⁰ National Highway Freight Network, FHWA, <https://ops.fhwa.dot.gov/freight/infrastructure/nfn/index.htm>

- Provides access to a grain elevator, agricultural facility, mining facility, forestry facility, or intermodal facility.
- Connects to an international port of entry.
- Provides access to significant air, rail, water, or other freight facilities in the state.
- Is determined by the state to be vital to improving the efficient movement of freight important to the economy of the state.

By comparison, CUFCs are public roads inside of a highway urbanized area and should meet one of four characteristics to be designated:

- Connects an intermodal facility to the Primary Highway Freight System, the Interstate Highway System, or an intermodal freight facility.
- Is located within a corridor of a route on the Primary Highway Freight System and provides an alternative highway option important to goods movement.
- Serves a major freight generator, logistics center, or manufacturing and warehousing industrial land.
- Is important to the movement of freight within the region, as determined by the MPO or the state.

Figure 32: Washington's truck freight economic corridors

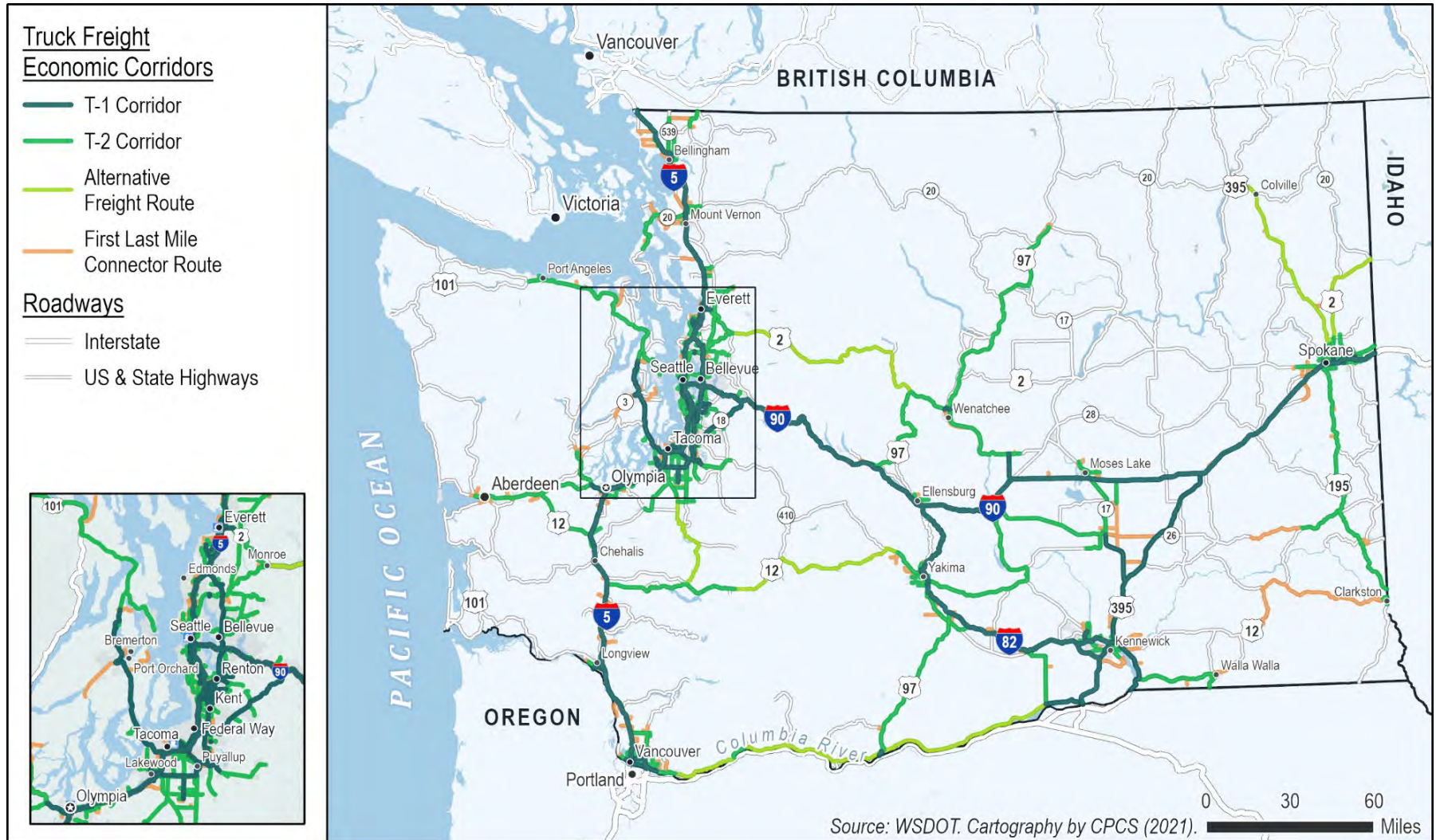
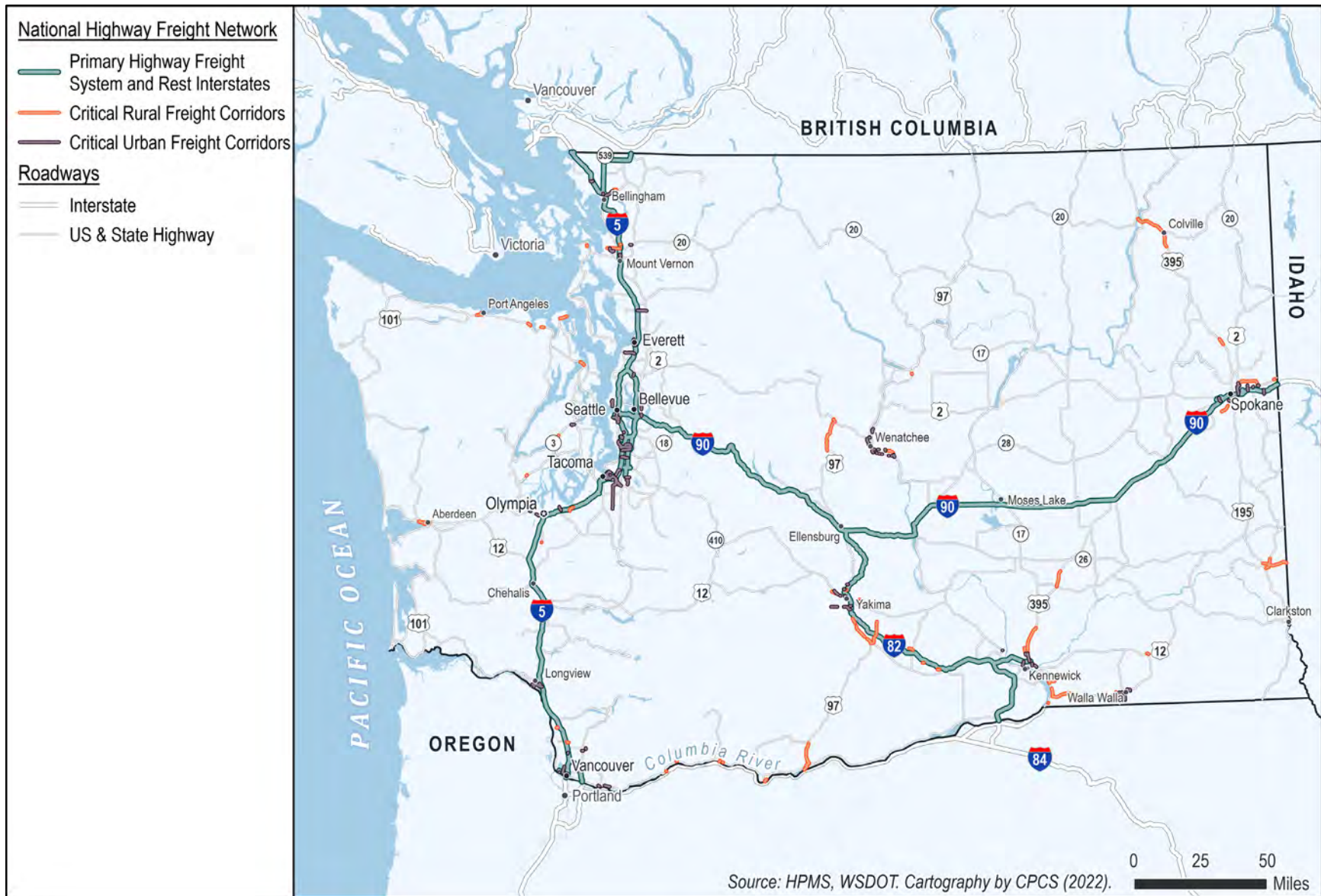


Figure 33: Washington's designated freight network



In addition to the freight network within Washington, shippers and residents of southern Washington rely on I-84 on the Oregon side of the Columbia between I-82 in the east and I-5/I-205 in the west. As shown in Figure 34, SR 14 carries very little truck traffic, particularly between US 97 in Goldendale and I-205/I-5 in Vancouver. I-84, as a parallel route on the Oregon side of the Columbia River, serves as a cross-state freight route for southern Washington. Disruptions along this route would result in added delivery time as well as additional traffic on the Washington freight network.

National Highway System (NHS) Intermodal Connectors are roadways that serve as first/last mile connections between the NHS and major intermodal terminals. Freight intermodal connectors provide important linkages between key freight corridors and intermodal facilities, connecting the road network to rail, maritime, and aviation systems.

Figure 34: List of intermodal freight corridors in Washington

Facility	Type	Connector Description	Connector Length
Bellingham Airport	Airport	From I-5: Westerly on Bennett Drive to Airport Entrance	0.6
BNSF - Yardley (Spokane)	Truck/Rail Facility	No Additional Connector Needed - Direct Access from Fancher Road	0
BNSF-SIG Yard (Seattle Intl Gateway)	Truck/Rail Facility	Served by an existing NHS route	0
BNSF-South Seattle Yard	Truck/Rail Facility	From Boeing Access Rd (just off I-5): North on Airport Way S to Facility Entrance at Hardy Street	3.1
BNSF-UP Port of Tacoma Yards	Truck/Rail Facility	Served by an existing NHS route	0
Burlington Northern Interbay Yd, Seattle	Truck/Rail Facility	Served by an existing NHS route	0
Elliot Bay-Alaskan Way Port (Port of Seattle)	Port Terminal	Served by an existing NHS route	0
Elliot Bay-Florida St. Port (Port of Seattle)	Port Terminal	11th Ave (Spokane St to Port), SW Spokane St (Chelan to E Marginal Way)	1.3
Mukilteo/South Everett Airport (Paine Field Airport)	Airport	Served by an existing NHS route	0
Pasco Airport (Tri-Cities Airport)	Airport	From I-182: North on 20th Ave. to Airport Entrance at Argent Road	0.7
Port of Anacortes	Port Terminal	Served by an existing NHS route	0
Port of Bellingham	Port Terminal	From I-5: Southerly on Meridian St, Squallicum Way, Roeder Ave., Chestnut St., and Cornwall Ave.	4.2
Port of Everett	Port Terminal	W Marine View Dr. (Port to Pacific), Pacific Ave. (Marine View to I-5S) and Maple St ramps to I-5N	2.2
Port of Grays Harbor	Port Terminal	Served by existing NHS (proximity to US 101 and Highway 12).	0
Port of Kalama	Port Terminal	W Kalama River Rd (I-5 to Sportsmens Club Rd)	0.5
Port of Longview	Port Terminal	SR 432 (SR 4 to -5), SR 433 (SR 432 to Port)	11
Port of Olympia	Port Terminal	From I-5: Via Henderson Blvd. and Plum Street to Port Entrance at State Street	1.1
Port of Port Angeles	Port Terminal	Served by an existing NHS route	0
Port of Tacoma	Port Terminal	Port of Tacoma Rd (I-5 to E 11th St, 2.2 mi); Lincoln Avenue (Port of Tacoma Rd to Milwaukee Way, 0.6 mi.)	2.8

Facility	Type	Connector Description	Connector Length
Port of Tacoma	Port Terminal	Taylor Way/54th Ave. (I-5 to E 11th St)	3.3
Port of Vancouver	Port Terminal	SR 501 (I-5 to Port)	3.8
Pullman Airport	Airport	From SR 270: North on Airport Road to Airport	3.2
Seattle-Tacoma International Airport	Airport	No Additional Connector Needed - Direct Access from Airport Access Road off of SR 518	0
South Seattle Airfield (King County International Airport)	Airport	Served by an existing NHS route	0
Spokane International Airport	Airport	Airport Dr (US 2 to Airport)	1.9
Union Pacific Argo Yard, Seattle	Truck/Rail Facility	Served by an existing NHS route	0
Walla Walla Airport	Airport	From US 12: Northwesterly on "A" Street to Airport	0.7
Wenatchee Airport (Pangborn Memorial Airport)	Airport	From SR 28: North on Rock Island Road to Airport Entrance	1.5
Yakima Airport	Airport	From I-82: West on Valley Mall Blvd, North on S 16th Ave, west on Washington Ave. to S 24th Ave. to Airport Entrance	3.53
Total Freight Connector Length			45.43

Source: CPCS analysis of NHS Intermodal Connectors, Washington.
https://www.fhwa.dot.gov/planning/national_highway_system/intermodal_connectors/washington.cfm
 Note: includes truck/rail facilities port terminals, and cargo airports.

Land border crossing facilities

Washington and British Columbia share 13 land ports of entry (POE), as mapped in Figure 37. The Cascade Gateway handles most of the traffic between the two regions.²¹

Figure 35 provides a listing of Washington's land POEs, inbound trucks and railcars, and top commodities as of 2019. Of the top three POEs, Peace Arch (passenger-only), Pacific Highway, and Sumas are open 24 hours a day, 7 days a week, while Lynden is open 8 am to 12 am daily.

Figure 35: Washington-British Columbia land POEs, 2019

No.	Port of Entry	Inbound Trucks	Inbound Railcars	Top Commodities by Value
1	Pacific Highway (Blaine)	369,777	212,102	Computers, Vehicle Parts, Wood Products, Electrical Machinery, Mineral Fuels
2	Sumas-Abbotsford	154,508	4,430	Wood Products, Vehicle Parts, Computers, Fruits and Nuts, Vegetables and Roots
3	Kenneth G Ward Poe (Lynden)	44,442	N/A	Wood Products, Fruits and Nuts, Computers, Stone/Cement, Plastics/Articles
4	Oroville	28,500	N/A	Wood Products, Vehicle Parts, Computers, Plastics/Articles, Fruits and Nuts
5	Frontier	23,757	N/A	Chemicals, Fertilizers, Lead/Articles, Ores, Zinc
6	Point Roberts	11,851	N/A	Ships and Boats, Beverages, Electrical Machinery, Computers, Plastics/Articles

²¹ Cascade Gateway includes Peace Arch-Douglas, Sumas-Abbotsford, Lynden-Aldergrove, and Pacific Highway (Blaine). Of these, Peace Arch-Douglas is a passenger traffic-only border crossing.

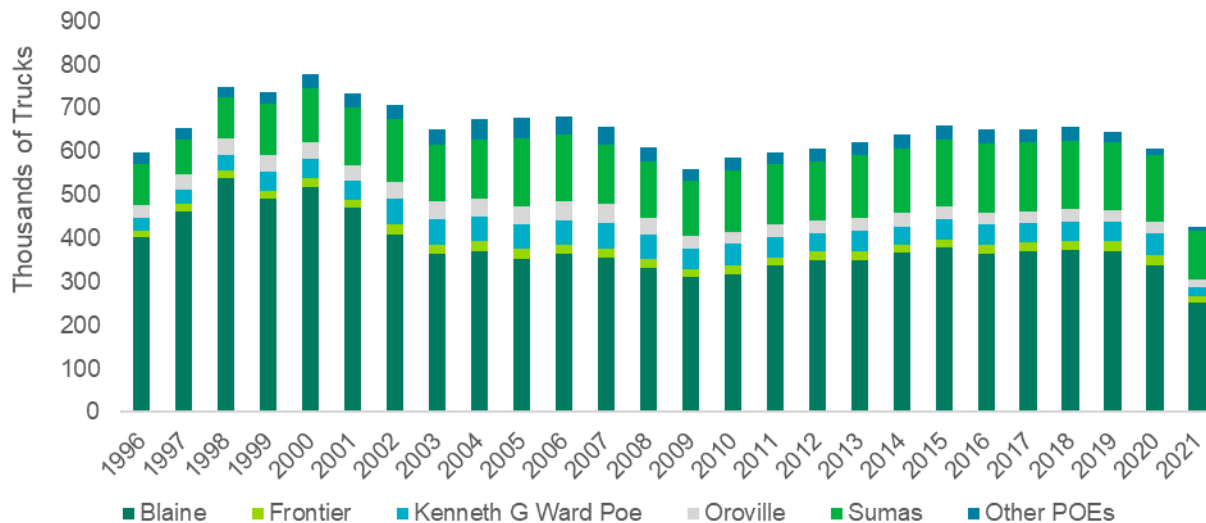
No.	Port of Entry	Inbound Trucks	Inbound Railcars	Top Commodities by Value
7	Laurier	6,703	2,714	Wood Products, Stone/Cement, Computers, Plastics/Articles, Ores
8	Metaline Falls	4,733	N/A	Ores, Wood Products, Computers, Chemical Products, Chemicals
9	Danville	666	1	Electrical Machinery, Wood Products, Plastics/Articles, Printed Books, Furniture
10	Port Angeles	436	N/A	Wood Products, Vegetables, Ships and Boats, Computers, Salt
11	Boundary	297	13,229	Zinc, Lead, Wood Products, Wood Pulp, Fertilizers
12	Ferry	62	N/A	Computers, Toys, Measuring/Testing Instruments, Aluminum, Vehicle Parts
13	Peace Arch-Douglas	Passenger-Only		
Total (Cargo-Handling)		645,732	232,476	N/A

Source: BTS Border Crossing/Entry Data 2019 for Inbound Trucks and Railcars, and BTS Transborder Freight 2019 for Inbound and Outbound Top Commodities by Value.

Note: In 2019, Friday Harbor, Anacortes, and Nighthawk did not handle any trucks.

Between 1996 and 2019, inbound trucks crossing the Washington-British Columbia land border remained relatively consistent, growing by nearly 49,000 trucks, or 8 percent, from 597,000 to 646,000 (Figure 36).

Figure 36: Inbound trucks crossing the Washington-British Columbia border by land POE

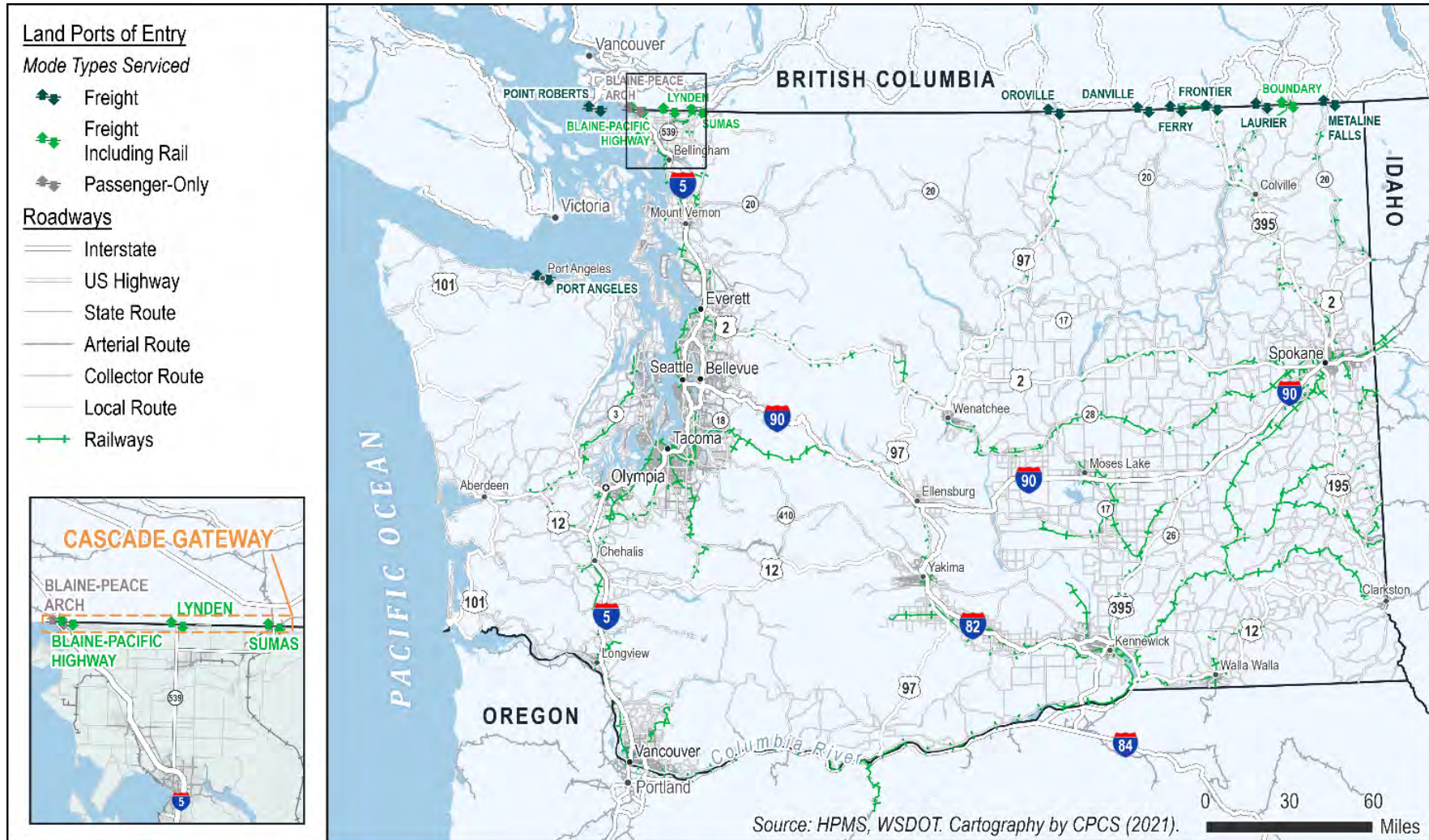


Source: CPCS analysis of BTS Border Crossing/Entry Data, 2022.

Note: BTS does not report outbound trucks. 2021 data includes January–August 2021.

Note: Other POEs include Anacortes, Boundary, Danville, Ferry, Friday Harbor, Laurier, Metaline Falls, Nighthawk, Point Roberts, and Port Angeles.

Figure 37: Washington's land border crossing facilities



3. Washington's rail freight network

Key chapter takeaway

Washington's freight rail system consists of two Class I railroads and 27 short lines operating over the state's 3,200 miles of track. The freight rail system also accommodates passenger trains, including Amtrak's Empire Builder, Coast Starlight, and Cascades routes. Over half of the cargo railed in the state by tonnage and one-third by value is carried to and from domestic origins and destinations, and the rest is imported or exported through Washington's international freight gates, such as the maritime ports and land ports of entry. The freight rail operations in Washington are connected with other modes through 211 rail-served facilities, including 39 intermodal facilities, 22 transload facilities, 7 automotive facilities, and 143 grain facilities.

Rail freight system overview

Freight rail is an integral part of Washington's multimodal transportation system, offering an environmentally and economically efficient goods movement option to support the statewide economy. The state's freight rail system consists of two Class I railroads and 27 Class III railroads or short lines, operating on over 3,200 miles of track across the state.²² The railroad companies in Washington employed over 4,400 employees in 2019.²³

As Figure 38 shows, the Burlington Northern Santa Fe Railway (BNSF) and Union Pacific (UP) are the Class I rail operators in Washington, serving over 1,400 miles and 500 miles of track, respectively. In addition, the UP has trackage rights to operate on BNSF-owned tracks between Vancouver and Seattle. The short lines in the state operate over about 1,300 miles of track. Washington's freight rail activities are connected with other modes by 255 rail-served facilities.

The federal Surface Transportation Board (STB) classifies the freight railroads according to their annual operating revenues as:

- **Class I:** railroads earning revenue greater than \$900 million.
- **Class II:** railroads earning between \$40.4 M and \$900 million.
- **Class III:** railroads earning revenue less than \$40.4 million. Class III railroads are often colloquially referred to as "short lines."

Source: 49 CFR § 1201.

Figure 38: Washington's rail freight system



Source: CPCS analysis of data provided by WSDOT, 2021.

²² WSDOT, Washington State Rail Plan, 2019. <https://wsdot.wa.gov/rail/state-rail-plan/home>

²³ Association of American Railroads, Freight Railroads in Washington, 2021. <https://www.aar.org/wp-content/uploads/2021/02/AAR-Washington-State-Fact-Sheet.pdf>

Figure 39 shows the freight rail operators and routes in Washington. As shown, about 2,871 miles of track in the state is abandoned, while 135.8 miles is railbanked. A rail line that has no traffic for a prolonged period can go through STB's process for abandonment. Typically, the rail infrastructure from an abandoned rail line is removed, and the right of way is parceled for sale. Railbanking happens during the abandonment process to provide an opportunity for preserving the rail segment. Unlike abandoned lines, the railbanked segments can be maintained for future use.

Figure 40 provides the passenger rail operations on rail lines in Washington. Amtrak's Empire Builder and the Coast Starlight routes offer long-distance passenger rail service between Chicago, Seattle/Portland, and Los Angeles. Both of these routes operate on BNSF-owned tracks. The same BNSF tracks also accommodate Amtrak's Cascades trains, offering intercity passenger rail service between Eugene, Oregon, and Vancouver, British Columbia. This segment of the BNSF rail system is known as the Pacific Northwest Rail Corridor (PNWRC), which is federally designated as a higher-speed rail corridor that is projected to serve both passenger and freight trains with a maximum speed of 125 miles per hour (mph).²⁴ Increased passenger train activity and higher train speeds can create safety and capacity challenges along this corridor in the future.

The Central Puget Sound Regional Transit Authority (Sound Transit) offers the Sounder commuter rail service north and south of Seattle, operating on the BNSF's mainline tracks and Sound Transit's Lakeview Subdivision (also known as Point Defiance bypass) between Dupont and Tacoma. BNSF sold the Lakeview Subdivision to Sound Transit in 2004 to primarily serve the Sounder commuter trains; however, BNSF retains an easement to operate its freight trains along the segment.²⁵

²⁴ Pacific Northwest Rail Corridor - Washington State, USDOT, 2020. <https://railroads.dot.gov/environment/environmental-reviews/pacific-northwest-rail-corridor-washington-state>

²⁵ Sound Transit, Staff Report, 2003. https://www.soundtransit.org/st_sharepoint/download/sites/PRDA/FinalRecords/2003/Motion%20M2003-135.pdf

Figure 39: Washington's rail freight network



Figure 40: Passenger rail activity along the rail freight network in Washington

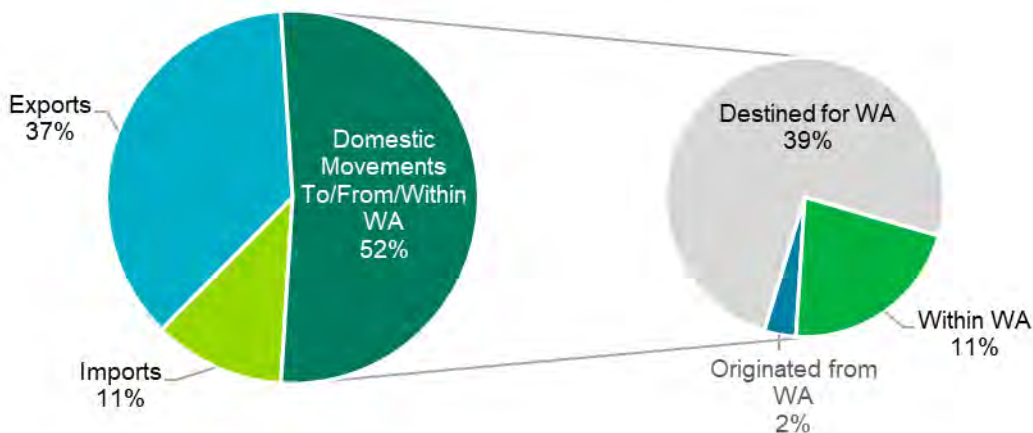


The freight rail system in Washington primarily serves domestic commodity flows, both in terms of annual cargo tonnage and value. As Figure 41 and Figure 42 show, in 2017, about 37 percent of the cargo tonnage railed in Washington was exported and about 11 percent was imported. By comparison, 33 percent of the value of domestic and international freight carried by rail in the state was export cargo, while about 34 percent was import cargo. As shown by these figures, international trade is a significant driver of the demand for freight rail in Washington.

Additionally, in 2017, a large portion of the domestic freight carried by rail in Washington was destined to the state both in terms of tonnage (39 percent) and value (27 percent). Nearly 54 percent of the domestic cargo railed to Washington comprised cereal grains and other agricultural products shipped to ports for export, while about 15 percent was crude petroleum shipped to refineries across the state.²⁶ Agricultural and energy products are key export industries shipping their cargo through Washington's seaports. Both of these industries heavily rely on rail for efficient and cost-effective movement of cargo, primarily originating from the U.S. Midwest.²⁷

The tonnage and value of freight moved by rail in Washington is forecast to remain very similar trade type composition in 2022, with 1 percent decrease in domestic movements by tonnage and 1 percent increase in domestic movements by value.

Figure 41: Tonnage of freight carried by rail in Washington by trade type, 2017

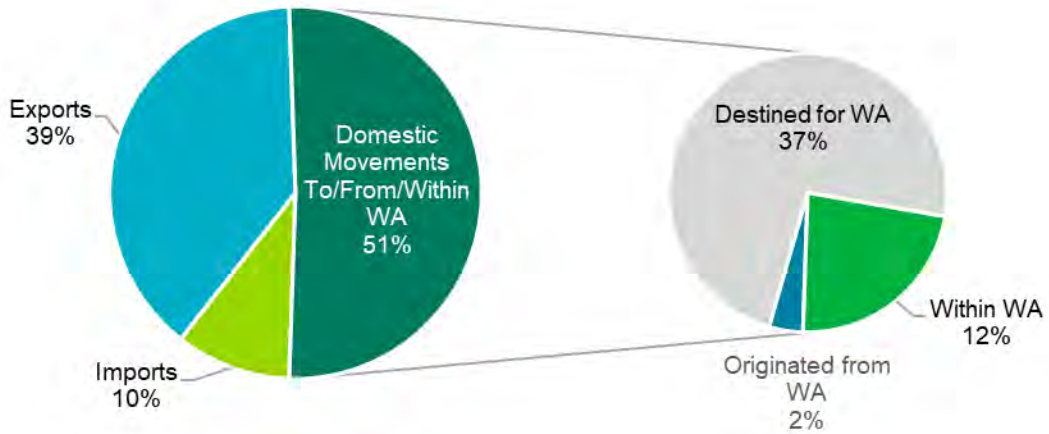


Source: CPCS analysis of FAF5 data, 2022.

²⁶ CPCS analysis of FAF5 data, 2021.

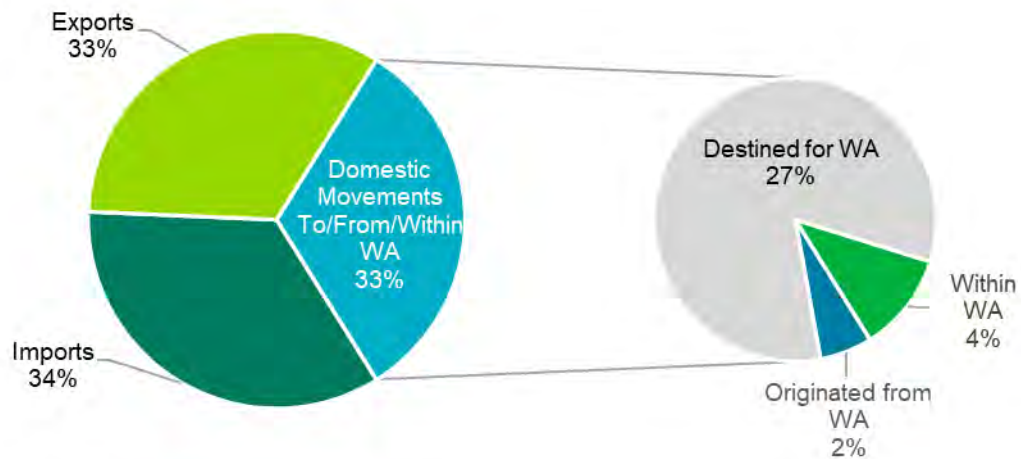
²⁷ Washington State Rail Plan, WSDOT, 2019.

Figure 42: Tonnage of freight carried by rail in Washington by trade type, 2022



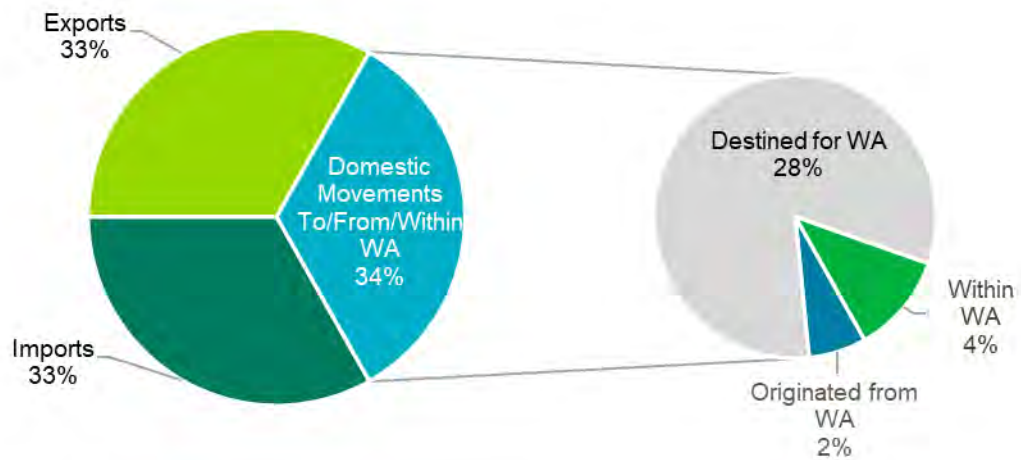
Source: CPCS analysis of FAF5 data, 2022.

Figure 43: Value of freight carried by rail in Washington by trade type, 2017



Source: CPCS analysis of FAF5 data, 2022.

Figure 44: Value of freight carried by rail in Washington by trade type, 2022



Source: CPCS analysis of FAF5 data, 2022.

Washington's rail operators

Class I railroads

Burlington Northern Santa Fe Railway

BNSF operates more than 44 percent of the freight rail system in Washington (about 1,335 route miles owned and 122 route miles trackage rights²⁸). The railroad offers freight service along seven major corridors, including three east-west corridors consisting of Fallbridge, Yakima Valley, Stampede, Columbia River, and scenic subdivisions; a north-south corridor (PNWRC) roughly parallel to I-5 including the Seattle, Bellingham, Sumas, and Cherry Point subdivisions; and another north-south corridor parallel to I-90 and US 395 consisting of Lakeside, Spokane, and Kettle Falls subdivisions.

The three east-west BNSF corridors in Washington are part of the Great Northern Corridor, which starts from Chicago and connects several population centers in Midwest and Pacific Northwest. The Corridor is a critical asset for the agricultural and energy industry businesses in Illinois, Wisconsin, Minnesota, North Dakota, Montana, Idaho, Oregon, and Washington as it provides an option for accessing the ports on the Pacific Coast.²⁹

BNSF has three intermodal facilities (Seattle, Seattle International Gateway, Spokane) and 12 railyards (Auburn, Bellingham, Centralia, Everett, Pasco, Seattle, Spokane, Tacoma, Vancouver, Wenatchee, Wishram, Yakima) in Washington and operates at three automotive facilities in Orillia, Port of Tacoma, and Spokane. In 2019, BNSF carried over 496,100 carloads originating from Washington and about 964,520 carloads destined to Washington and handled over 1,769,300 carloads within the state. Grain and other agricultural products such as corn, soybeans, and apples as well as coal and aerospace products are major commodities carried by BNSF trains in Washington.³⁰

Union Pacific Railroad

UP operates more than 16 percent of the freight rail system in Washington (over 540 route miles). UP also has trackage rights on BNSF tracks from Lakeside Junction to Spokane and between Portland and Tacoma. UP trains operate on UP-owned tracks between Tacoma and Tukwila but have trackage rights to operate on BNSF tracks between Tukwila and Seattle.

The railroad also serves shippers in western Washington via its tracks on the south shore of the Columbia River, opposite the BNSF tracks on the Washington side. Once in Portland, the UP connects to facilities and ports in Washington via its trackage rights on BNSF tracks.

UP has two intermodal facilities (Seattle and Tacoma) and two automotive facilities (Kent and Spokane) in Washington and serves several ports in the state, including Seattle, Tacoma, and Kalama. In 2019, UP trains carried 248,277 railcars originating from Washington and 243,828 railcars terminating in the state.³¹

Short lines

Short line railroads connect the state's farmer community and businesses with the Class I rail system. Some short lines are switching or terminal railroads that serve other railroads within a

²⁸ Trackage right is an agreement between a railroad company and rail track owner(s) to grant operation rights along a segment in return for an agreed upon annual compensation.

²⁹ The Corridor, Great Northern Corridor Coalition, (n.d.). <https://greatnortherncorridor.org/>

³⁰ BNSF Railway in Washington, BNSF, (n.d.). <https://bnsfnorthwest.com/washington/>

³¹ Union Pacific in Washington, Union Pacific, (n.d.).

https://www.up.com/cs/groups/public/@uprr/@corprel/documents/up_pdf_natedocs/pdf_washington_usguide.pdf

terminal facility or a switching rail yard. Washington has 25 short lines railroads, of which nine are switching and terminal lines.

Short lines contribute to Washington's economy by serving key freight-related industries, including agriculture, oil and gas extraction, and industrial manufacturing. Infrastructure preservation and business stability of short line railroads are key investment considerations for WSDOT, driven both by the visions of the Freight Mobility Strategic Investment Board of the Washington state Legislature and through inputs collected from freight stakeholders during the development of the State Rail Plan 2019.³²

As Figure 45 shows, approximately 297 miles of Washington's short line system is owned by the state but operated by private companies, including Palouse River and Coulee City (PCC), Washington Eastern, and Spokane, Spangle, and Palouse Railroads. The PCC Rail Authority (PCCR) is an intergovernmental entity overseeing the economic development side of state-owned rail operations, while WSDOT holds the regulatory oversight role.^{33,34}

Figure 45: Short line railroads in Washington

Name	Parent Company	Route Miles Operated
Puget Sound & Pacific Railroad	Genesee & Wyoming	158
Cascade & Columbia River Railroad	Genesee & Wyoming	145
Washington Eastern Railroad*	The Western Group	109
Columbia Basin Railroad	Columbia Basin Railroad Company	106
Tacoma Rail	City of Tacoma	94
Spokane, Spangle and Palouse*	Omaha Track	87
Palouse River & Coulee City Railroad*	Watco Companies	84
Columbia-Walla Walla Railway	Columbia Rail	82
Pend Oreille Valley Railroad	Port of Pend Oreille	80
Great Northwest Railroad	Watco Companies	78
Central Washington Railroad	Columbia Basin Railroad Company	71
St. Paul & Pacific Northwest Railroad	Progressive Rail	69
Rainier Rail	Rainier Rail	40
Kettle Falls International Railway	OmniTRAX	36
The Washington Royal Line	Columbia Rail	26
Yakima Central Railway	Columbia Rail	22
Eastside Freight Railroad	Ballard Terminal	14
Portland Vancouver Junction Railroad	Portland Vancouver Junction Railroad	14
Longview Switching Company	Union Pacific and BNSF	9
Meeker Southern Railroad	Ballard Terminal	5
Olympia & Belmore Railroad	Genesee & Wyoming	5
Ballard Terminal Railroad	Ballard Terminal	3
Mount Vernon Terminal Railway	Mount Vernon Terminal Railway	3
Kennewick Terminal Railway	Columbia Rail	2
Port of Chehalis Rail	Port of Chehalis	1

Source: Washington State Rail Plan, WSDOT, 2019.

(*) Part of the PCCR System line, owned by WSDOT and operated by a private operator.

³² Washington State Rail Plan, WSDOT, 2019.

³³ PCC membership includes Grant, Lincoln, Spokane, and Whitman Counties.

³⁴ Washington State Rail Plan, WSDOT, 2019.

Washington Grain Train Program³⁵

The Grain Train is a statewide program established by WSDOT in collaboration with ports of Moses Lake, Walla Walla, and Whitman County to support short line operations, ensure efficient movement of grain, and support Washington's economy. The Grain Train program currently has 98 state-owned cars and 18 cars owned by the Port of Walla Walla and transports wheat and barley grown in the state to Columbia River barge terminals and other export facilities.

Watco Companies, LLC operates Port of Walla Walla railcars and 44 of the state-owned cars along the Blue Mountain Railroad (BLMR) lines east of Wallula, on UP-owned tracks between Wallula and the PV Hooper Branch, and the PV Hooper Line of the PCCR system running east of the Hooper Junction. The Wallula barge slip (part of Port of Walla Walla facility operated by Northwest Grain Growers) is equipped with a grain elevator to store and transfer grain between trains and barges, which move the grain down the Columbia River to several export facilities.³⁶

The Eastern Washington Gateway Railroad (EWG) operates 29 of the state-owned cars to collect grain along the CW Line of the PCCR system to deliver at the HighLine facility for transfer onto shuttle trains. The rest of the state-owned cars (25 railcars) are operated by the Columbia Basin Rail (CBRW) short line from Moses Lake to Connell, where they join BNSF's larger trains for transport to Washington's seaports.

Rail-served multimodal facilities

The integration of rail with other modes of transport is vital to the transfer and movement of freight. The efficient transfer of goods to export terminals plays a critical role in enabling Washington's economic competitiveness in regional and global markets. There are several types of rail-served multimodal facilities that enable this transfer of goods between various modes of transport (Figure 46).

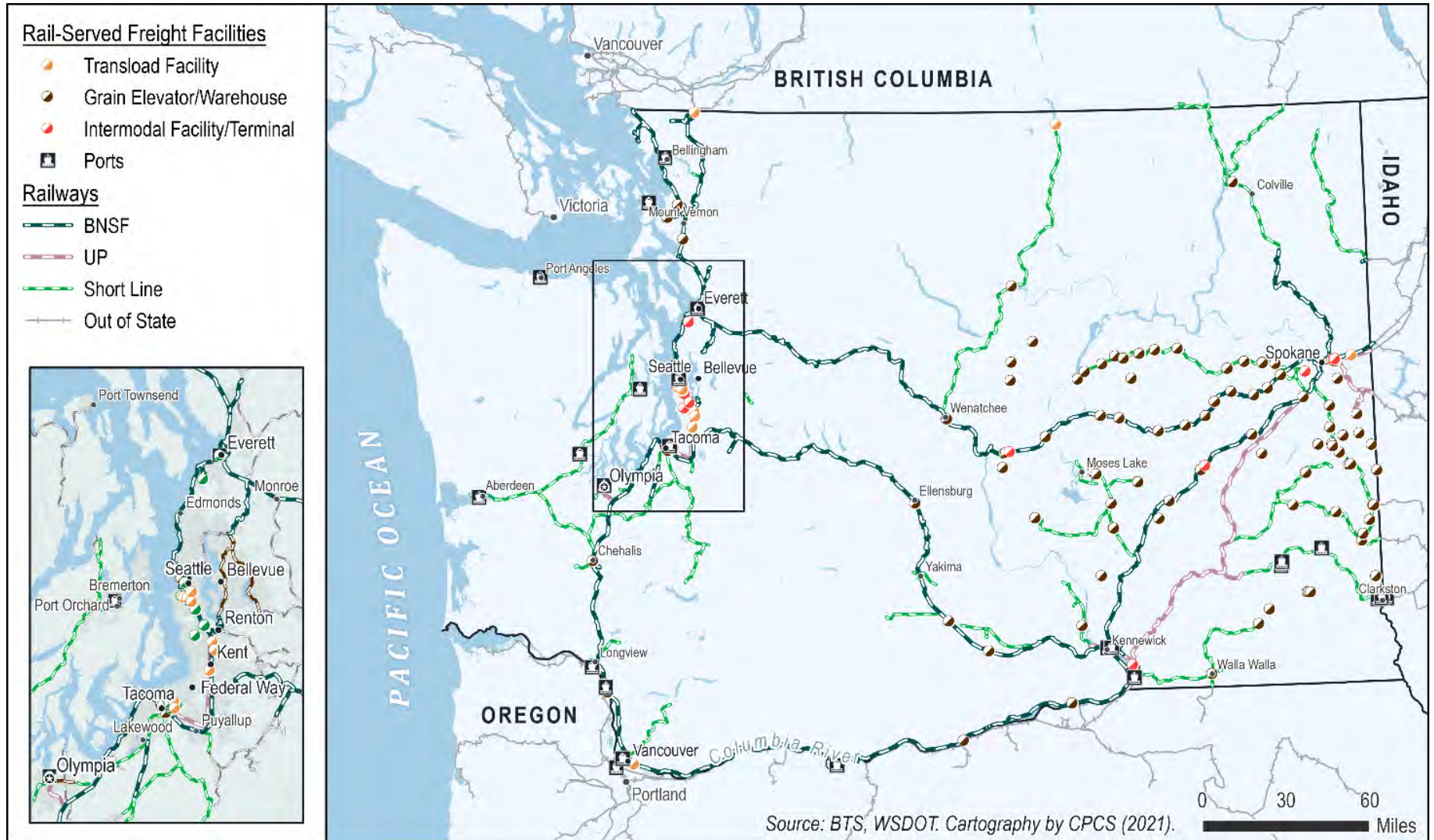
Intermodal terminals provide connectivity to rail and other modes carrying intermodal containers of various sizes. There are 39 intermodal facilities in Washington operated largely by BNSF and UP railroads in addition to several short line rail companies. Seven of these facilities are marine-rail facilities, and six are facilities that accommodate trailer-on-flatcar and container-on-flatcar (TOFC/COFC) rail transportation.

Rail transload terminals transfer carload freight between rail cars and trucks, primarily serving commodities such as lumber and other dry or liquid bulk goods. There are 22 transload facilities operated by BNSF, UP, Cascade and Columbia River Railroad (CSCD), and Tacoma Municipal Belt railway (TMBL).

³⁵ 2017-2027 Grain Train Strategic Plan, WSDOT, 2017. <https://wsdot.wa.gov/sites/default/files/2008/01/18/Nov-2017-Grain-Train-2017-2027-Strategic-Plan.pdf>

³⁶ Accomplishments, Port of Walla Walla, (n.d.). <https://www.portwallawalla.com/port-information/accomplishments>

Figure 46: Rail-served facilities in Washington



Autos

Automotive facilities accommodate the loading and unloading of vehicles and vehicle parts to and from auto manufacturing plants. The state's automotive rail facilities are located in Kent, Renton, Vancouver, Seattle, Spokane, Tacoma, and Grays Harbor. Most of the facilities are operated by BNSF and UP, except for two short line operators: the Tacoma Municipal Belt Line (TMBL) in Puget Sound and Pacific Railroad (PSAP) in Grays Harbor. Figure 47 lists the automotive facilities located in Washington.

Figure 47: List of rail-served automotive facilities

Facility Name	Operator	City	Manufacturer	Service Type
Kent Automotive Distribution Facility North Lot	UP	Kent	Chrysler, GM	Unloading
Orillia Automotive Facility	BNSF	Renton	Ford, Honda, Toyota, Volkswagen	Unloading
Vancouver Port Automotive	BNSF	Vancouver (port)	Subaru	Loading/Unloading
Spokane Automotive Facility Wisconsin Ave	BNSF	Spokane	Ford, Honda	Unloading
Spokane Automotive Facility Alki Ave	UP	Spokane	Chrysler, GM	Unloading
Tacoma Automotive Facility	TMBL, BNSF, UP	Tacoma	Multiple	Loading/Unloading
Grays Harbor Automotive Facility	PSAP, UP	Grays Harbor	Chrysler	Unloading

Source: TTCI, Automotive Facility Guide, 2021.

Grain

Grain elevators are specialized multimodal facilities designed to handle and store grain and link producers to distribution channels. The majority of rail-served grain elevators in Washington are located in the eastern part of the state, along the Grain Train, which traverses the Adams, Grant, Lincoln, Spokane, and Whitman Counties. This vast network of grain elevators, serviced largely by short lines (BLMR, CBRW, PV Hooper, EWG) that link up to Class I railways (UP, BNSF), helps carry thousands of tons of grain to ports along the Columbia River and Puget Sound for shipment to ports along the Pacific Rim.³⁷

In the last 20 years, the Grain Train and its supporting facilities have evolved so that there are fewer and larger grain elevators; this plan's review counted 106 grain elevators and 60 grain warehouses. The Grain Train operates as a "scoot" train delivering grain from local rural elevators to grain shuttle facilities, which transload grain from smaller capacity cars into larger jumbo hopper cars—larger cars are then transported by mainline railroads to export terminals. In recent years, the quantity of grain delivered by rail for export has increased with the addition of five shuttle facilities. Shuttle train rail cars cycle 2.5 to three times for every cycle of a standard train rail car,³⁸ and their covered hopper cars have a larger cubic capacity. These efficiency gains lead to lower transportation costs for farmers.

Containers

Rail-served port terminals are equipped with on-dock or near-dock facilities that enable efficient handling, storage, and transfer of intermodal containers carried by vessels and trains. Without such facilities, trucks have to carry containers mounted on a chassis between the marine terminal and the railroad ramp (off-dock system), potentially increasing terminal congestion and gate processing

³⁷ Freight & railway business programs, WSDOT. <https://wsdot.wa.gov/business-wsdot/freight-railways>

³⁸ Washington State Grain Train Program Strategic Plan, WSDOT, 2017.

times. Figure 48 provides a list of port terminals in Washington that offer on-dock or near-dock rail access for intermodal container shipments.

Figure 48: Rail-marine terminal connections in Washington

Port Facility	Railroad	Type of Rail Access Equipment
Port of Seattle – Terminals 5 and 18	BNSF and UP	On-dock
Port of Seattle – Terminals 30 and 46	BNSF and UP	Near-dock
Port of Tacoma – Terminals 7, EB-1, Husky, East Sitcum, Pierce County, and Washington United	BNSF and UP	On-dock
Port of Tacoma – Terminal West Sitcum	BNSF and UP	Near-dock
Port of Everett – Pacific, Mount Baker, and Pier 1 North & South Terminals	BNSF	On-dock
Port of Everett – South Terminal	BNSF	Near-dock
Port of Olympia Marine Terminal	BNSF and UP	On-dock
Port of Grays Harbor – Terminal 4	BNSF and UP	On-dock
Port of Vancouver* – Terminals 1 and 5	BNSF and UP	On-dock

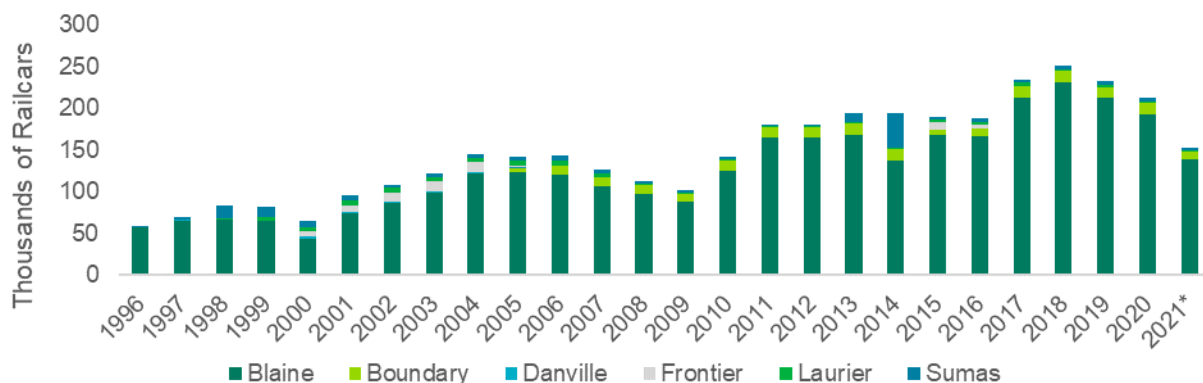
Source: CPCS analysis of data provided on ports' websites, 2021.

*There are discrepancies in the USACE and PIERS data in terms of the types of commodities handled at the Port of Vancouver. CPCS has contacted the Port to validate the data and will update this section when more information becomes available.

Land border crossing facilities

Washington and British Columbia share 13 land ports of entry (POE), and the Cascade Gateway handles most of the traffic between the two regions.³⁹ Among the 13 land POEs shared by Washington and British Columbia, five handled railcars in 2019 – Blaine, Boundary, Danville, Laurier, and Sumas. As Figure 49 shows, inbound railcars crossing the Washington-British Columbia land border, across all POEs, grew by nearly 174,000 railcars, or 296 percent, from 59,000 in 1996 to 232,000 in 2019.

Figure 49: Inbound railcars crossing the Washington-British Columbia border by land POE



Source: CPCS analysis of BTS Border Crossing/Entry Data, 2021.

Note: BTS does not report outbound railcars. *2021 data includes January-August 2021.

³⁹ Cascade Gateway includes Peace Arch-Douglas, Sumas-Abbotsford, Lynden-Aldergrove, and Pacific Highway (Blaine). Of these, Peace Arch-Douglas is a passenger traffic-only border crossing.

4. Washington's maritime network

Key chapter takeaway

Washington's maritime system consists of three distinct subsystems: the Pacific Coast, the Salish Sea, and the Snake-Columbia River system, each playing a critical role in connecting the state's freight-reliant industries to raw materials, suppliers, and customers. Approximately 828 miles of maritime corridor miles serve the state's waterborne activities. Marine Highways 5 and 84 run along the Pacific coast and the Columbia-Snake River systems, respectively, while 13 deep-draft ports and nine shallow-draft ports are located across all the maritime subsystems.

Maritime system overview

Washington's maritime network connects Asian and North American trade and supports the state's role as a key international trade gateway for the U.S., supporting freight-reliant industries such as oil and energy production and agriculture.

The state's maritime network (Figure 50) consists of three subsystems:

- The Salish Sea: An inland sea consisting of Puget Sound as well as several other small and large bodies of water such as the Strait of Juan de Fuca and the Strait of Georgia.
- The Snake-Columbia River System: A 465-mile inland waterway system consisting of the Columbia and Snake rivers. The Columbia-Snake River route is designated as the Marine Highway (M-84) corridor.
- The U.S. Pacific Coast: Most of the state's border is formed by the Pacific Ocean coast, along which the M-5 corridor runs, starting from San Diego, California, to the U.S.-Canada border north of Seattle, connecting harbors, ports, and navigation channels along the West Coast.

Both M-84 and M-5 corridors connect at the mouth of the Columbia River, near Chinook. Given their fundamentally different geographic settings and markets, each of the maritime network's subsystems has its own operations, customers, and commodity mixes, which are discussed in the following sections.

Figure 50: Washington's maritime system

828	624	1	7	10
Marine Freight Economic Corridor Miles	Marine Highway Miles	Seaport on the Pacific Coast	Puget Sound/ Salish Sea Ports	Columbia-Snake River Ports

Source: CPCS analysis of data provided by WSDOT, 2021.

Figure 56 illustrates the ports and other water-served facilities in Washington, along with the marine highways and marine Freight Economic Corridors (FECs). WSDOT classifies the state's maritime corridors according to their capacity, condition, and significance to the supply chains system to help develop performance measures to benchmark and improve maritime system freight mobility. As shown in the map, Washington's maritime FECs are classified into the following tiers:

- W1: more than 25 million tons per year.

- W2: 10 million to 25 million tons per year.
- W3: 5 million to 10 million tons per year.
- W4: 2.5 million to 5 million tons per year.
- W5: 0.9 million to 2.5 million tons per year.

Shipping on Washington's maritime system is conducted by ocean-going vessels serving the deep-draft ports on the Pacific coast, Columbia-Snake River system, and the Salish Sea, while barges also call at both deep-draft and shallow-draft ports along the river and the sea systems.⁴⁰

America's Marine Highway system

America's Marine Highways are navigable waterways that have been designated by the U.S. Secretary of Transportation and have a demonstrated ability to help relieve congestion from land-side transportation modes. Each Marine Highway has a corridor designation that reflects the congested corridor it parallels. Washington has two marine highway designations: M-5 along the Pacific Coast, and M-84 along the Columbia River. Designated transportation projects along these routes have the ability to create new marine highway services or expand existing services, and designated projects receive preferential treatment from USDOT and MARAD. These projects are designated by MARAD. There are NUMBER marine highway projects that directly affect Washington:

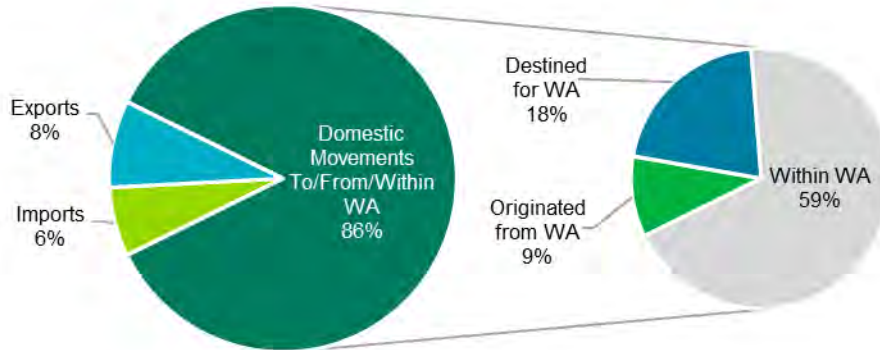
- **M-5 Everett Puget Sound Container on Barge Service:** A project to support service for movement of aerospace cargo between Port of Everett, Mount Baker Terminals, and the Northwest Seaport Alliance.
- **M-5 Coastal Connector:** A planned service to transport goods on barges between Bellingham, Oregon, and San Diego, with the goal of reducing truck traffic along I-5.
- **M-5 Northwest Connect: Critical Lifeline Between Alaska, Hawaii, and Washington:** This project includes all of the domestic container services at the NWSA and Port of Alaska. This route is the only cost-effective way to transport goods between Washington and Alaska and Hawaii.
- **M-5 Seattle-Bainbridge Island Ferry Service:** This service is Washington State Ferries' busiest route, and offers a faster, more-reliable, and safer alternative to circuitous road connections that would otherwise travel along I-5, SR 16, SR 3, and SR 305.

An estimated 26.3 million tons of freight traveled on Washington's maritime freight system in 2017. As Figure 51 and Figure 52 show, the vast majority of these waterborne freight activities by tonnage (86 percent) and value (79 percent) are domestic in nature. Similar to other modes, Figure 52 and Figure 54 demonstrate minor changes in trade type in 2022 by tonnage and value. While the maritime system is important for Washington shippers, the state's ports play a large role in supporting international trade in the U.S. The state's ports handle a variety of commodities, from grain to consumer goods and petroleum to transportation equipment, that move between the state's ports and locations in other parts of the country. When accounting for these shipments that flow through the state using the maritime transportation network, nearly 110 million tons of freight moved through the state's marine terminals in 2020. Washington ranks 5th in the U.S. in terms of overall maritime volumes behind only Texas, Louisiana, California, and New Jersey. Demonstrating the importance of Washington's role as an export gateway, the state handles the 3rd largest volume of waterborne exports (by weight) in the country.⁴¹

⁴⁰ Deep-draft ports are geographic areas that include one or more terminals and can serve large vessels and have a draft depth of 35 feet or more. Ports with less draft depth are called shallow-draft or small-draft and can accommodate smaller vessels such as barges. Source: USACE, Definitions, accessed November 2021.

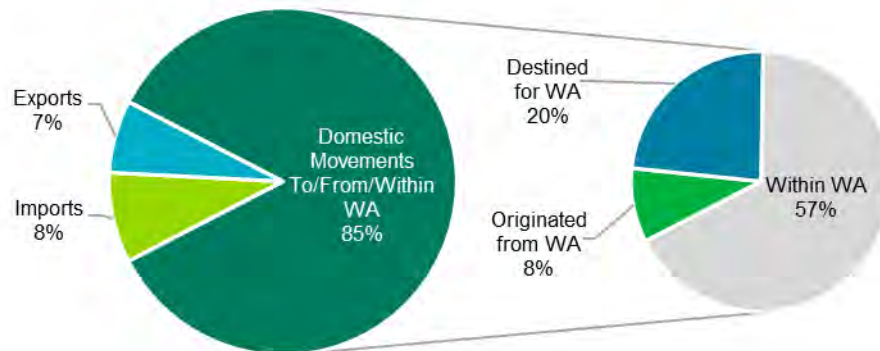
⁴¹ Waterborne tonnage for principal U.S. ports and all 50 states and U.S. territories; Waterborne tonnages for domestic, foreign, imports, exports and intra-state waterborne traffic, U.S. Army Corps of Engineers Waterborne Commerce Statistics Center, 2020. <https://usace.contentdm.oclc.org/digital/collection/p16021coll2/id/7447>

Figure 51: Tonnage of freight carried by water in Washington by trade type, 2017



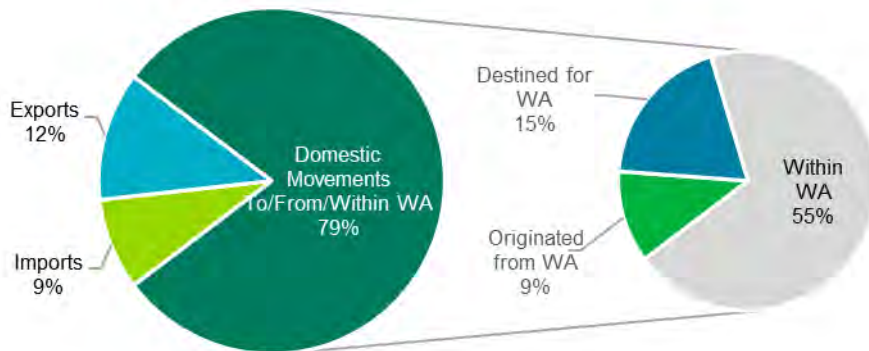
Source: CPCS analysis of FAF5 data, 2022.

Figure 52: Tonnage of freight carried by water in Washington by trade type, 2022



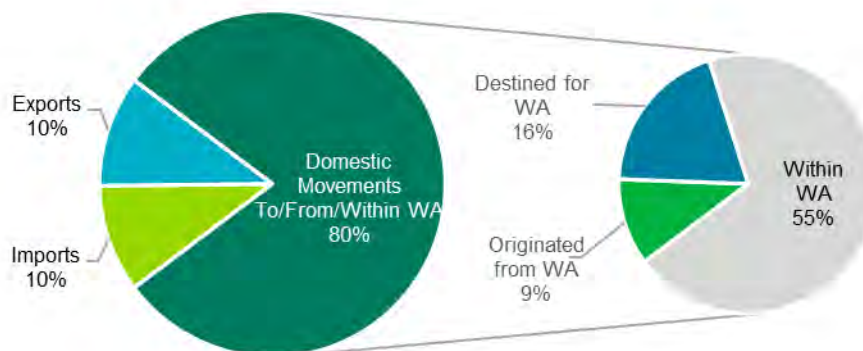
Source: CPCS analysis of FAF5 data, 2022.

Figure 53: Value of freight carried by water in Washington by trade type, 2017



Source: CPCS analysis of FAF5 data, 2022.

Figure 54: Value of freight carried by water in Washington by trade type, 2022



Source: CPCS analysis of FAF5 data, 2022.

Figure 55 shows the port traffic (number of trips) in 2019 and 2020 in Washington. As shown, the ports of Seattle, Tacoma, Vancouver, Anacortes, and Everett had the highest number of trips in both 2019 and 2020. A more detailed overview of port activities in Washington is provided in the following sections.

Public and private port facilities

Figure 50 above identifies 18 ports in Washington with maritime service capacity, deep-draft or inland barge. These are public ports that are public agencies, accountable to the citizens of the counties in which they operate. These ports own the land on which public port terminals and facilities sit. The ports can both operate the terminals themselves or enter into operating agreements with private terminal operators to operate those facilities on their behalf. In some locations the public port entity may own most or nearly all of the port facilities, and in other cases there is a mix of public port terminals and privately held terminals. Private terminals are located on privately held land and not tied to the public port. These facilities are typically used by a single firm for its own benefit. As examples, concrete, petroleum, scrap metal, and aggregate facilities, and sometimes grain elevators as well as log and lumber terminals, are most likely to move across the docks at private maritime terminals.

As described in more detail in the box below, the data from this section comes from the U.S. Army Corps of Engineers (USACE). This data does not distinguish between public and private facilities. Depending on the port, this data may show volumes greater than reported by the public port when there is a large volume of cargo moving across private terminals. The commodities described may also be broader than what public ports handle, depending on the variety of cargo types private terminals handle in that area.

The port traffic volume and commodity information presented in this chapter are calculated based on the **Waterborne Commerce of the United States (WCUS) Ports and Waterways Database** provided by the **U.S. Army Corps of Engineers (USACE)**. WCUS combines data of domestic and international waterborne commerce moved on the U.S. waterways as reported by the vessel operators. WCUS reports present waterborne cargo tonnage by region, state, the body of water, and port.

According to USACE, a port is a geographic area consisting of docks, terminals, storage areas, and industrial land real estate. Depending on the body of water, the definition of a port takes different forms; for instance, on the Salish Sea, ports are designated based on the sections of the waterway system (bays, lakes, canals, etc.) they serve. In that essence, the port tonnage data includes those private facilities that are not owned by the port but operate within its waterway system. Meanwhile, on the Columbia-Snake River system, several terminals are spread out over the length of the two rivers, and a port is typically a statistical area representing the economic activity of a given segment of the river system.

Source: CPCS analysis of USACE WCUS data, 2021.

Figure 55: Port traffic In Washington

Port	2019 Traffic			2020 Traffic		
	Inbound	Outbound	Total	Inbound	Outbound	Total
Anacortes	1,748	1,788	3,536	1,672	1,806	3,478
Bellingham	935	955	1,890	471	529	1,000
Blaine	NA	NA	NA	2	1	3
Clallam County Port District	556	551	1,107	594	606	1,200
Everett	1,373	1,377	2,750	1,573	1,491	3,064
Grays Harbor Port District	120	143	263	134	160	294
Jefferson County Port	371	360	731	382	378	760
Port Angeles	NA	NA	NA	NA	NA	NA
Port Gamble	9	5	14	22	25	47
Port of Kalama	1,051	1,202	2,253	1,193	1,310	2,503
Port of Longview	1,266	1,267	2,533	1,143	1,186	2,329
Port of Olympia	48	48	96	53	56	109
Port of Vancouver	2,231	2,133	4,364	2,494	2,565	5,059
Seattle	13,944	14,061	28,005	11,118	10,959	22,077
Tacoma	5,304	5,295	10,599	3,961	3,892	7,853

Source: CPCS analysis of USACE WCUS data, 2022. NA means that data is not available.

Figure 56: Water served facilities in Washington



Salish Sea maritime systems and facilities

The Salish Sea is composed of several small and large bodies of water: the Strait of Juan de Fuca, the Strait of Georgia, and Puget Sound joined by smaller bays, straits, inlets, canals, and other navigable waterways. Nine deep-draft ports capable of handling ocean-going vessels and several other ports and private industrial terminals operate on the Salish Sea's maritime system (Figure 57).

Figure 57: Ports and primary marine cargo on the Salish Sea system

Body of Water	Port	Primary Commodities
Guemes Channel	Anacortes	Petroleum coke
Strait of Juan de Fuca	Port Angeles	Logs and lumber
Bellingham Bay	Bellingham	Bulk and break bulk
Sinclair Inlet	Bremerton	Military, fuel
Possession Sound	Everett	Aircraft parts, logs
Budd Inlet	Olympia	Lumber, logs, breakbulk, grain, livestock, heavy lift
Elliott Bay	Seattle	Dry containers, refrigerated containers, breakbulk, roll-on/roll-off, grain, seafood, logs
Oakland Bay	Shelton	Lumber
Commencement Bay	Tacoma	Containers, breakbulk, roll-on/roll-off, grain, seafood, logs

Source: Washington State Marine Ports and Navigation Plan, WSDOT, 2017 | Google Maps, 2021.

Additionally, the Salish Sea's maritime system includes the Hiram M. Chittenden (Ballard) Locks located on the Lake Washington Ship Canal and connecting Puget Sound with Lake Washington, Lake Union, and Salmon Bay. The two-lock complex serves both recreational and commercial vessels and is operated by the USACE. About 7,500 commercial vessels transit the locks each year.⁴²

Northwest Seaport Alliance (Ports of Tacoma and Seattle)

The Northwest Seaport Alliance is a marine cargo operating partnership of the Port of Seattle and the Port of Tacoma, the public port authorities for King and Pierce Counties. The NWSA was the fourth-largest container gateway in North America measured by total TEUs, serving both Washington state and the nation. Under a port development authority, the NWSA manages the container, breakbulk, auto, and some bulk terminals in Seattle and Tacoma.

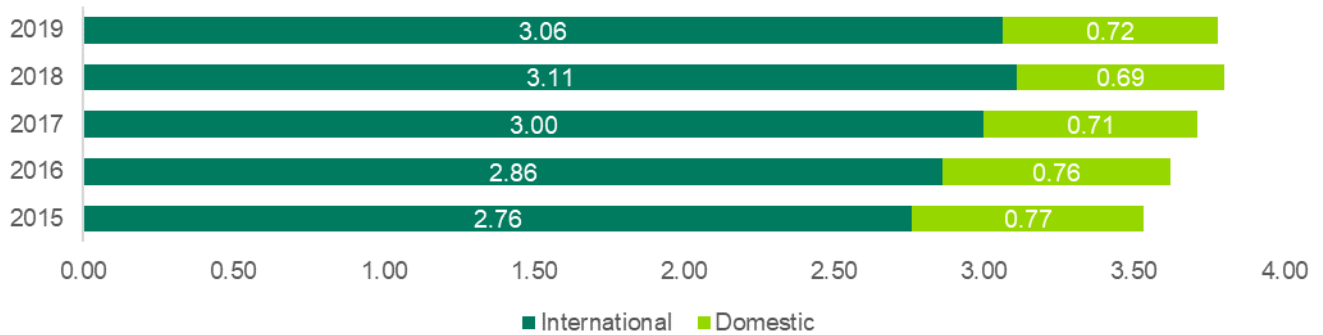
The NWSA handled over 1,800 vessel calls and more than 3.7 million twenty-foot equivalent units (TEUs) in 2019, down 0.6 percent compared to 2018's record. According to the NWSA Annual Trade Reports, the increase in 2018 and decline in 2019 were due to international shippers sending their cargo in 2018, ahead of tariffs in 2019 (Figure 58). After a COVID-related drop in volumes in 2020, cargo movement rebounded in 2021.

The NWSA is the leading U.S. export gateway for a variety of containerized agricultural products and is the nation's second largest gateway for containerized refrigerated exports. The NWSA also handles liquid bulk, breakbulk, molasses, and automobiles. The gateway is served by 17 international container lines (Reference Chapter C) as well as four domestic carriers who provide weekly services to Alaska and Hawaii. NWSA's domestic terminals handle more than 80 percent of

⁴²Economic Impacts of the Hiram M. Chittenden Locks, Lake Washington Ship Canal Users Group, 2017. <https://www.mcdowellgroup.net/wp-content/uploads/2017/06/ballard-locks-economic-impacts.pdf>

containerized ocean shipments between Alaska and the Lower 48 states as well as cargo to/from Hawaii.

Figure 58: NWSA containerized cargo volumes



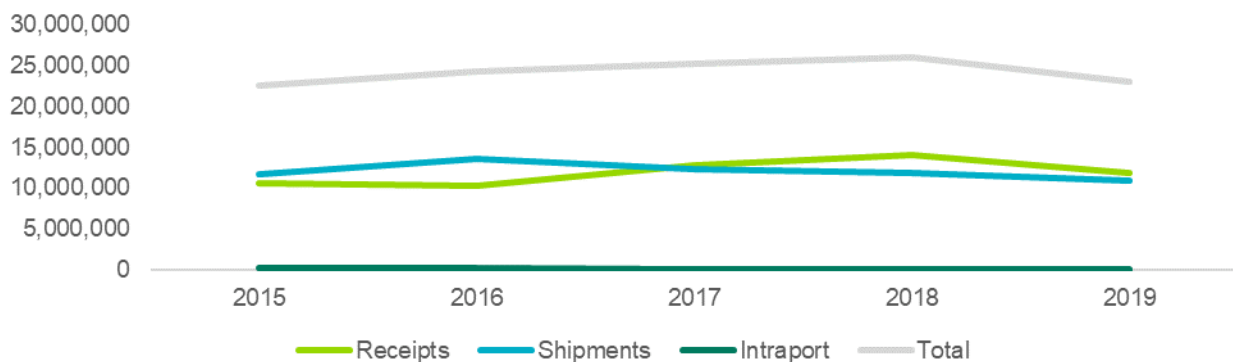
Source: NWSA analysis of PIERS data, 2019.

Port of Seattle

According to the USACE statistical data collection, the Port of Seattle's operational boundary encompasses the Elliott Bay, East Waterway, West Waterway, and Duwamish Waterway, Lake Washington Ship Canal, Salmon Bay, Lake Union, Lake Washington, and Kenmore Navigation Channel. However, not all of the marine cargo facilities located on these waterways are owned or operated by the Port of Seattle or its tenants; some are privately owned and operated. The statistics that follow include cargo operating through both publicly and privately owned terminals.

The Port of Seattle is the 29th largest port in the U.S. and the highest-ranked maritime facility in Washington in terms of the annual handled cargo tonnage. As Figure 59 shows, over 20 million tons of cargo moves through the Port of Seattle annually, with a balance between shipments and receipts (only 0.5 percent of the Port's tonnage is intraport traffic).

Figure 59: Port of Seattle tonnage trends



Source: CPCS analysis of USACE data, 2021.

Figure 60 shows the top commodities that move through the Port of Seattle region by tonnage. As shown, sand and gravel, soybeans, and manufactured products are the primary types of commodities carried through the Port. While sand and gravel are typically bulk commodities, soybeans and manufactured products are primarily carried in intermodal containers.

Figure 60: Port of Seattle top waterborne commodities by tonnage, 2019

Commodity	2019 Tonnage	Percent of Total
Sand & Gravel	3,378,054	14.7%
Soybeans	2,403,583	10.4%
Manufactured Products	1,862,726	8.1%
Corn	1,277,398	5.6%
Hay & Fodder	1,085,234	4.7%
Cement & Concrete	1,061,258	4.6%
Vegetables & Prod.	920,217	4.0%
Limestone	864,842	3.8%
Pulp & Waste Paper	577,357	2.5%
Unknown or NEC	501,668	2.2%
Gypsum	457,153	2.0%
Fab. Metal Products	419,111	1.8%
Residual Fuel Oil	412,533	1.8%
Fish (Not Shellfish)	383,760	1.7%
Slag	366,996	1.6%
Lumber	362,402	1.6%
Textile Products	353,348	1.5%
Machinery (Not Elec)	348,206	1.5%
Food Products NEC	304,727	1.3%
Other Commodities	5,668,700	24.6%
All Commodities	23,009,273	100%

Source: CPCS analysis of USACE data, 2021.

In addition to oceangoing vessels, barges carrying containerized or bulk cargo are served at six barge terminals in Seattle, located on the Lower Duwamish Waterway. These barges primarily carry cargo between Washington and Alaska, Hawaii, and Canada, as well as Pacific Coast origins and destinations in Oregon and California.⁴³ This activity is well-served by landside transportation.

Port of Seattle (Public Port Authority)

The public port authority, the Port of Seattle, owns multiple facilities within this operational boundary, as an economic development authority for King County, established in 1911. The Port's maritime cargo complex consists of several marine terminals and a grain terminal, located along the northern and southern shores of Elliott Bay and the Lake Washington Ship Canal. The Port is governed by five commissioners selected by King County voters for four-year terms, with maritime, aviation and economic development activities. As described above, the Port's container and some maritime industrial properties are managed by the NW Seaport Alliance. In addition, the maritime portion of the Port of Seattle also includes piers for cruise ships and workboats, a grain terminal, recreational boating marinas, public access parks, and other industrial

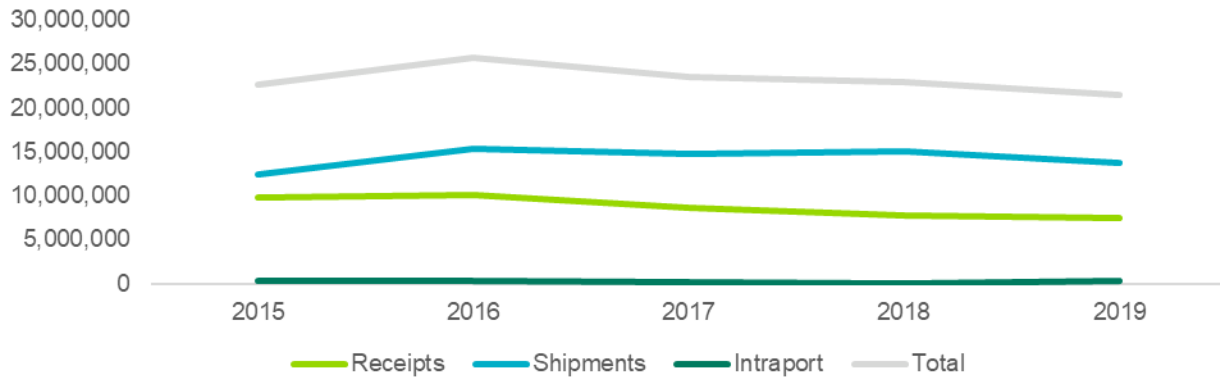
Port of Tacoma

The USACE's Port of Tacoma region includes facilities not owned and operated by the public port district, similar to the Port of Seattle. In terms of total cargo tonnage, the regional port complex handles over 20 million tons of cargo annually. As shown in Figure 61, the share of shipments going out of the Port is twice the share of the Port's receipts, while less than 2 percent of the Port's annual

⁴³ Marine Ports and Navigation Plan, WSDOT, 2017.

cargo tonnage is intraport traffic. Over two-thirds of the intraport traffic is associated with carrying sand and gravel.

Figure 61: Port of Tacoma tonnage trends



Source: CPCS analysis of USACE data, 2021.

The top commodities carried at the Port of Tacoma by tonnage are manufactured products, soybeans, and sand and gravel. While sand and gravel are typically bulk commodities, soybeans and manufactured products are primarily carried in intermodal containers (Figure 62).

Figure 62: Port of Tacoma top waterborne commodities by tonnage, 2019

Commodity	2019 Tonnage	Percent of Total
Manufactured Products	2,164,311	10.07%
Soybeans	2,034,352	9.46%
Sand & Gravel	1,907,451	8.87%
Corn	1,798,485	8.37%
Hay & Fodder	1,162,573	5.41%
Iron & Steel Scrap	1,002,321	4.66%
Vehicles & Parts	871,234	4.05%
Vegetables & Prod.	717,925	3.34%
Animal Feed, Prep.	653,631	3.04%
Machinery (Not Elec)	611,415	2.84%
Distillate Fuel Oil	506,208	2.35%
Logs	498,792	2.32%
Fab. Metal Products	485,719	2.26%
Electrical Machinery	478,292	2.22%
Pulp & Waste Paper	448,315	2.09%
Rubber & Plastic Pr.	432,507	2.01%
Textile Products	391,258	1.82%
Paper & Paperboard	322,320	1.50%
Unknown or NEC	305,736	1.42%
Fruit & Nuts NEC	299,165	1.39%
Residual Fuel Oil	293,752	1.37%
Other Commodities	4,110,815	19.00%
All Commodities	21,496,577	100.00%

Source: CPCS analysis of USACE data, 2021.

The Port of Tacoma is currently (as of November 2021) developing the Puget Sound Liquefied Natural Gas (LNG) Terminal, which will provide shoreside access for loading a bunker barge to deliver fuel to ships calling at the Port. LNG is a cleaner fuel alternative for marine vessels, with 100 percent less sulfur (SO_x), 90 percent lower particulate matter and nitrogen dioxide (NO_x) emission, and 35 percent less carbon dioxide (CO₂) emission compared to diesel or bunker fuel. In addition to the environmental benefits, the Puget Sound LNG Terminal can operate as a reserve facility for commercial and residential customers during the coldest days of the year.⁴⁴

Port of Tacoma (Public Port Authority)

The Port of Tacoma is a county-wide port authority established in 1918 serving Pierce County. It owns multiple facilities within this political boundary. The Port's maritime cargo complex consists of several marine container and breakbulk terminals and a grain terminal, located in Commencement Bay. The Port is governed by five commissioners selected by Pierce County voters for four-year terms, guiding its maritime, real estate and economic development activities. As described above, the Port's container and some maritime industrial properties are managed by the NWSA. In addition, the Port of Tacoma also includes piers for breakbulk, including automobiles and heavy machinery, workboats, a grain terminal, real estate dedicated to a variety of industrial uses, including warehousing and distribution, and public access parks and other industrial piers.

Port of Everett

The Port of Everett is located on Port Gardner Bay east of Possession Sound. The Port of Everett directly serves the Boeing Company assembly plant in Snohomish County. While the Port primarily serves as a breakbulk cargo facility, handling aerospace, construction, manufacturing, agriculture, energy, and forest products, it is also Washington's third-largest container port after Seattle and Tacoma.⁴⁵ As with Seattle and Tacoma, the USACE data for Everett includes both the Port of Everett's public terminals as well as private terminals in the vicinity.

The Port of Everett public port has eight cargo berths, as well as waterfront industrial land. The Pacific Terminal is the Port's primary container and breakbulk facility, with direct access to the BNSF rail line. The South Terminal carries container, RoRo, breakbulk, and project cargo.⁴⁶ The Port's Mount Baker Terminal located in South Everett at the Edgewater Beach Park is a barge-to-rail facility that supports oversized aerospace container movements between Japan and Everett. The Hewitt Terminal encompasses two finger piers (Piers 1 and 3), supporting containerized, breakbulk, RoRo, project cargo, bulk cement, and forest products. The Port is currently (as of November 2021) developing the Norton Terminal to serve general cargo and provide additional cargo storage space.⁴⁷ There are also private terminals handling a variety of cargo in the vicinity.

In 2019, the Port of Everett handled more than 2,760 import containers, primarily carrying aircraft, spacecraft, and vehicle parts coming from Northeast Asia, the Mediterranean, and Northern Europe. Almost 90 percent of the containerized cargo received at Everett is shipped to Blaine, Washington.⁴⁸

In terms of the total cargo tonnage handled at the Port, as Figure 63 shows, there has been an almost 50 percent drop in both shipped and received tonnage in 2018, and despite a 15 percent increase in 2019, the Port's total cargo tonnage has remained significantly lower than tonnage in 2017. The Port's reduced tonnage in 2018 was primarily gasoline, residual oils, and soybean cargo.

⁴⁴ Puget Sound Energy LNG Facility, Port of Tacoma, (n.d.). <https://www.portoftacoma.com/puget-sound-energy-lng-facility>

⁴⁵ Port of Everett Website. <https://www.portofeverett.com/seaport/>

⁴⁶ Large, heavy, high-value, over-sized, and/or complex pieces of cargo that require special handling equipment. Project cargo handled at Everett is primarily associated with aerospace sector.

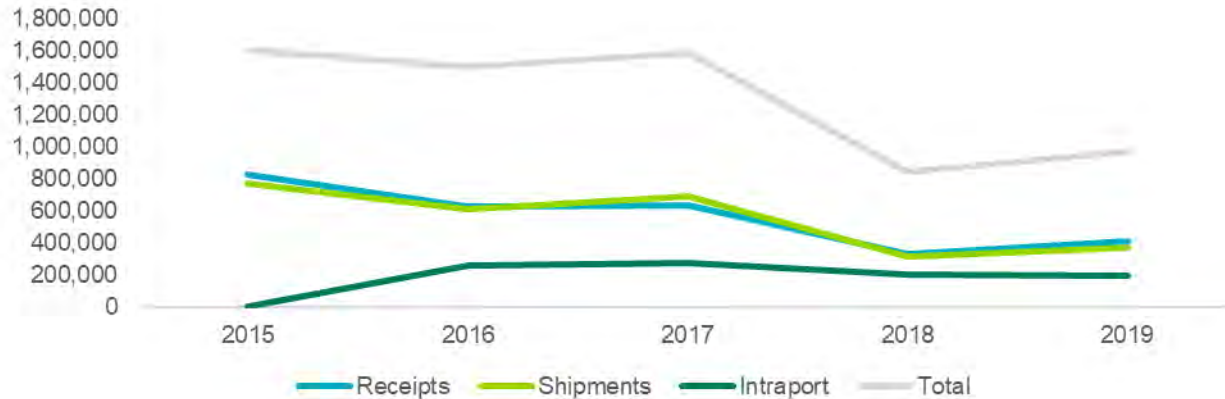
⁴⁷ Port of Everett Website. https://cms9.revize.com/revize/everett/seaport/seaport_facilities.php

⁴⁸ HIS Markit, Port Import/Export Reporting Service (PIERS) data analysis, 2019. There are discrepancies in the USACE and PIERS data in terms of the types of commodities handled at the Port of Everett. CPCS has contacted the Port to validate the data and will update this section when more information becomes available.

The reduction in the Port's tonnage can also be linked to the startup of several modernization projects, including new road access to Fisherman's Harbor as well as rail improvements and other rehabilitation projects at the South Terminal.

As shown in Figure 64, the top commodities carried at the Port of Everett in terms of annual tonnage are wood chips, logs, and cement and concrete.

Figure 63: Port of Everett tonnage trends



Source: CPCS analysis of USACE data, 2021.

Figure 64: Port of Everett top waterborne commodities by tonnage, 2019

Commodity	2019 Tonnage	Percent of Total
Wood Chips	453,804	46.9%
Logs	187,066	19.3%
Cement & Concrete	138,263	14.3%
Sand & Gravel	69,112	7.1%
Vehicles & Parts	28,498	2.9%
Unknown or NEC	15,834	1.6%
Fab. Metal Products	13,306	1.4%
Slag	13,228	1.4%
Machinery (Not Electronics)	11,668	1.2%
Aircraft & Parts	8,825	0.9%
Other Commodities	27,962	2.9%
All Commodities	967,566	100.00%

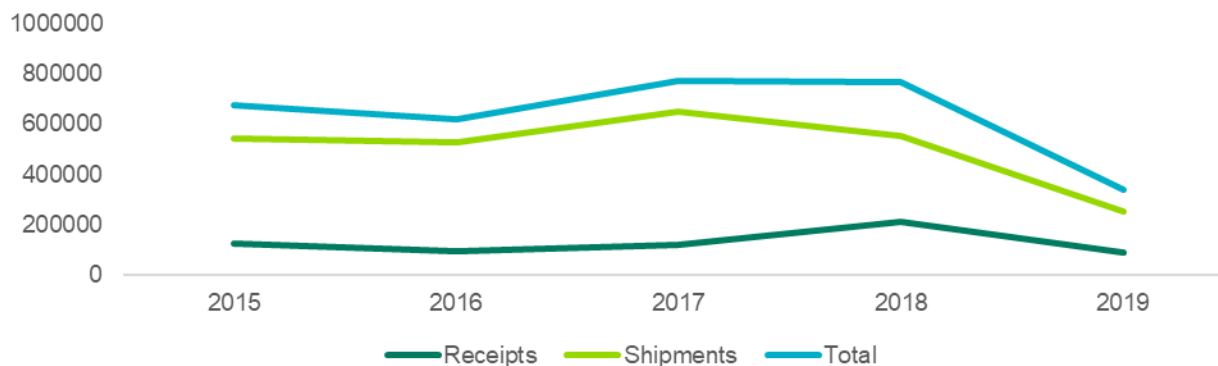
Source: CPCS analysis of USACE data, 2021.

Port of Port Angeles

The Port of Port Angeles is located on the southern shore of the Salish Sea in Clallam County. The Port cargo complex includes three cargo terminals, a boatyard, a log yard, the newly-developed Marine Trades Industrial Park, and the William R. Fairchild International Airport (CLM). Terminal 1 accommodates general cargo and provides vessel inspection and repair services, while Terminal 2 provides passenger and vehicle ferry service to Victoria, BC. The primary cargo loading facility at the Port of Port Angeles is Terminal 3, which is next to the Port's log yard and where forest products are stored and loaded on ships and barges for shipment to international and domestic destinations. Terminal 4 is currently leased by Arrow Marine Services, which is a private warehousing and logistics service provider.

As Figure 65 shows, the Port handled about 767,600 tons of cargo in 2018, but tonnage declined by 55 percent in 2019. According to the Port's financial reports, this significant decrease can be associated with increased price competition in log shipment to China between the U.S. West Coast and European ports, an increase in ocean shipping rates, and the ongoing trade dispute between the U.S. and China.⁴⁹

Figure 65: Port of Port Angeles tonnage trends



Source: CPCS analysis of USACE data, 2021.

Port Angeles is a global hub for the storage and shipment of forest products. As Figure 66 shows, over 82 percent of the cargo tonnage handled at the Port of Port Angeles are forest products, including logs, wood chips, and lumber.

Figure 66: Port of Port Angeles top waterborne commodities by tonnage, 2019

Commodity	2019 Tonnage	Percent of Total
Logs	248,326	72.99%
Residual Fuel Oil	50,967	14.98%
Wood Chips	27,779	8.17%
Distillate Fuel Oil	7,412	2.18%
Lumber	5,732	1.68%
All Commodities	340,216	100.00%

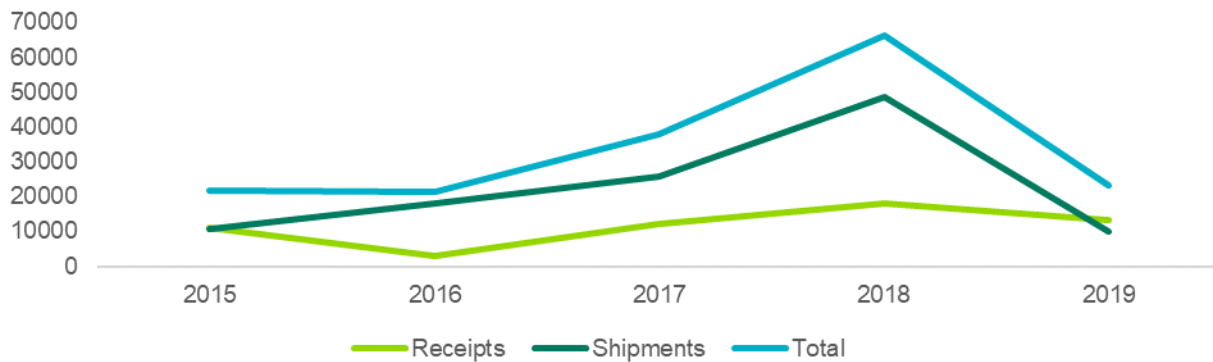
Source: CPCS analysis of USACE data, 2021.

Port of Bellingham

Port of Bellingham in Whatcom County operates two marinas, the Bellingham International Airport, as well as several marine trades businesses and terminals in the county, including Fairhaven Shipyard, Bellingham Shipping Terminal, C Street Terminal, three marine industrial parks (Whatcom Waterway, Blaine and Fairhaven), and Squalicum and Blaine harbors. The Bellingham Shipping Terminal (BST) specializes in handling bulk and breakbulk cargo and offers berthing space for large vessels. The Port of Bellingham handles over 46,000 tons of cargo annually, over two-thirds of which are fish and limestone (Figure 68).

⁴⁹ Budget Variance Report, 2019 and 2020 Quarterly reports, Port of Port Angeles. <https://www.portofpa.com/106/Financial-Reports>

Figure 67: Port of Bellingham tonnage trends



Source: CPCS analysis of USACE data, 2021.

Figure 68: Port of Bellingham top waterborne commodities by tonnage, 2019

Commodity	2019 Tonnage	Percent of Total
Fish (Not Shellfish)	12583	50.0%
Limestone	4189	27.3%
Gypsum	4189	9.1%
Animal Feed, Prep.	794	9.1%
Unknown or NEC	632	1.7%
Sugar	471	1.4%
Textile Products	229	1.0%
All Commodities	46,174	100.00%

Source: CPCS analysis of USACE data, 2021.

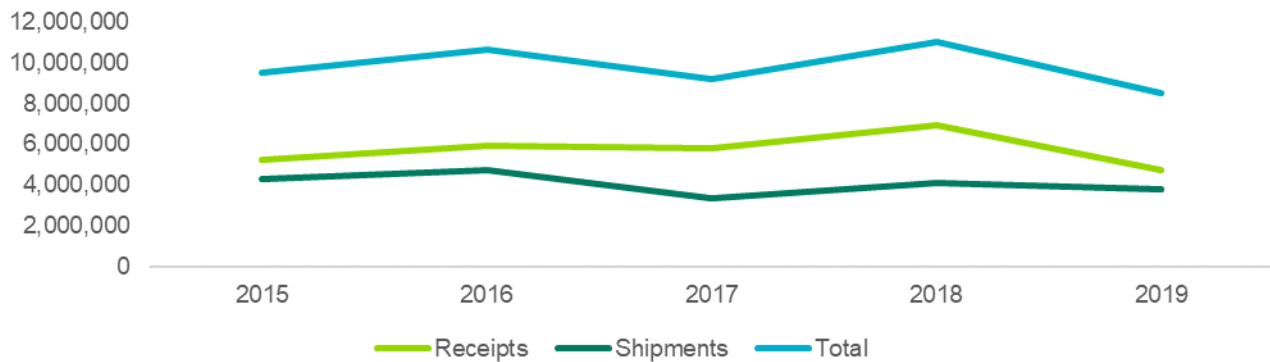
In 2019 and 2021, the Port of Bellingham completed or progressed several large capital projects, including cleanups in the Fairhaven area and the I&J Waterway, solar panel installation projects, building a public fishing area, and making several shipping terminal pier repairs.⁵⁰ The port also received a \$6,854,770 grant award from MARAD under the PIDP program (FY20). The port will use the funds for two tasks: (1) dredging of the BST piers to increase depth and vessel service area, and (2) straightening of the BST Central & North Piers. This will allow a greater range of vessels to access the BST facilities and a more extensive variety of commodities to be handled.

Port of Anacortes

The Port of Anacortes is a deep-water port located on the north side of the Fidalgo Island on the Guemes Channel. Pier 1 at the Port's marine terminal accommodates Dakota Creek Industries, which is a shipbuilding and repair company. Meanwhile, Pier 2 is primarily used for dry bulk cargo shipments, and Curtis Wharf docks commercial ships and provides vessel moorage for U.S. Navy ships and other tenants staging project cargo. The Port of Anacortes handles about 8.5 million tons of cargo annually (Figure 69), over 96 tons of which are crude petroleum, fuel oils, and other petroleum products (Figure 70).

⁵⁰ 2020 Draft Strategic Budget, Port of Bellingham, 2019. <https://www.portofbellingham.com/ArchiveCenter/ViewFile/Item/1000>

Figure 69: Port of Anacortes tonnage trends



Source: CPCS analysis of USACE data, 2021.

Figure 70: Port of Anacortes top waterborne commodities by tonnage, 2019

Commodity	2019 Tonnage	Percent of Total
Crude Petroleum	4,293,245*	50.32%
Distillate Fuel Oil	1,743,070	20.43%
Gasoline	1,431,692	16.78%
Kerosene	270,699	3.17%
Residual Fuel Oil	256,488	3.01%
Petroleum Coke	207,983	2.44%
Sulphur, (Dry)	122,111	1.43%
Other Commodities	207,020	2.40%
All Commodities	8,532,308	100.00%

Source: CPCS analysis of USACE data, 2021.

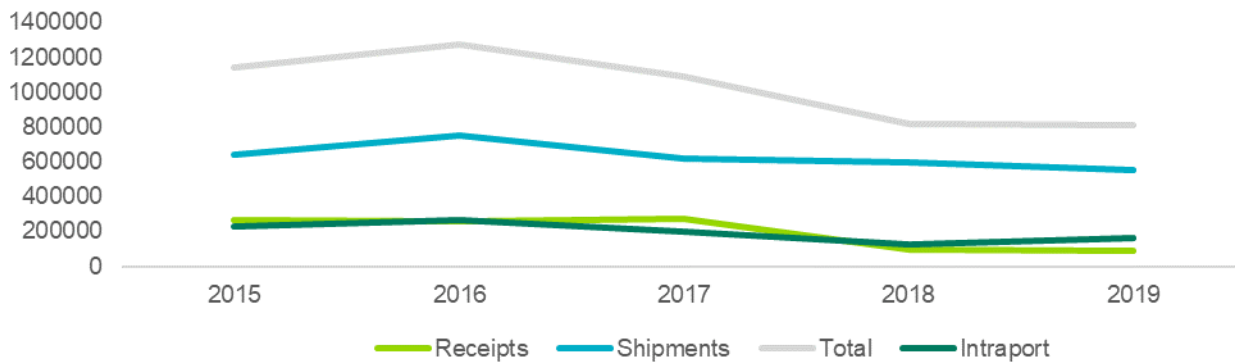
*Note: Port of Anacortes public terminals do not handle crude oil but there are facilities handling crude oil within the geographical area that USACE data identifies as Port of Anacortes.

Port of Olympia

The Port of Olympia is located on the West Bay portion of Budd Inlet. The Port's Seaport Terminal has three deep-water berths and on-dock rail access and can accommodate bulk, breakbulk, heavy lift, and project cargo.

As Figure 71 shows, the Port of Olympia handled about 820,000 tons of cargo in 2018 and 2019, about 25 percent lower than 2017 tonnage and 35 percent lower than 2016 tonnage. Figure 72 shows that the Port primarily handles longs and lumber.

Figure 71: Port of Olympia tonnage trends



Source: CPCS analysis of USACE data, 2021.

Figure 72: Port of Olympia top waterborne commodities by tonnage, 2019

Commodity	2019 Tonnage	Percent of Total
Logs	734,843	90.96%
Lumber	66,687	8.25%
Other Commodities	6,349	0.79%
All Commodities	807,879	100.00%

Source: CPCS analysis of USACE data, 2021.

Coastal maritime systems and facilities

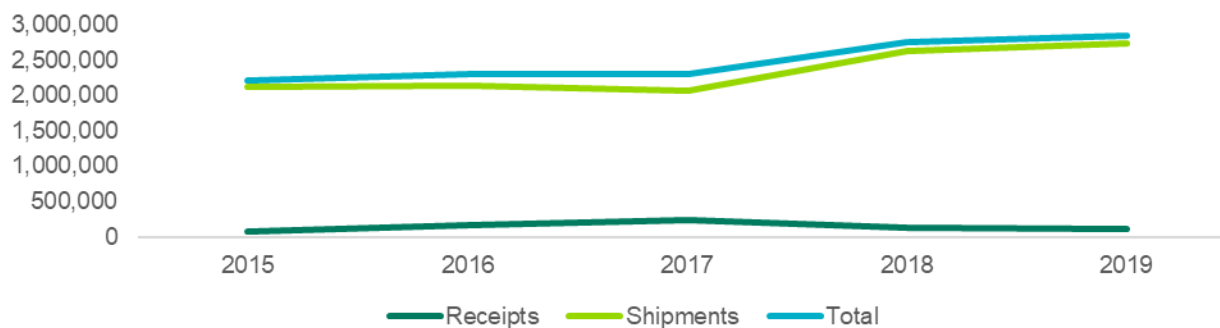
Port of Grays Harbor

Grays Harbor is Washington's only deep-draft port located on the Pacific Coast. The port is capable of handling ocean-going vessels and operates four deep-water marine terminals, the Westport Marina, a commercial seafood landing terminal, and the Satsop Business Park. All of the Port's marine terminals serve both BNSF and UP trains through the Puget Sound and Pacific Railroad tracks. Both Terminals 1 and 2 serve bulk cargo. Renewable Energy Group and BWC Terminals are the primary customers of Terminal 1; both companies provide bulk fuel storage and logistics services. Terminal 2's main customer is Ag Processing Inc., a firm providing processing and transportation services for oilseeds, grain, and related products. Terminal 3 is currently available for industrial park development and lease to new customers. Marine Terminal 4 is the Port's primary general cargo terminal and is equipped with an on-dock intermodal container handling system with direct discharge capability, as well as four parallel rail spurs. US 101 serves the Port through 22nd St. and Bay Ave., and US 12 connects the Port to I-5.

In 2020, the Port of Grays Harbor ranked as the top U.S. West Coast port in terms of soybean meal (for animal feed) exports and the leading Washington seafood landing port. As Figure 73 shows, the Port of Grays Harbor primarily serves export cargo, and while the total tonnage handled at the Port stayed around 2.2 million tons from 2015 to 2017, there was an approximately 20 percent increase in the Port's cargo tonnage in 2018, a record that was maintained in 2019. This significant increase in tonnage can be associated with an increase in oilseed tonnage. In addition to oilseeds, animal feed (primarily soybean meal), vehicles and parts, and wood chips are the top commodities handled at the Port (Figure 74).⁵¹

⁵¹ CPCS analysis of USACE data, 2021.

Figure 73: Port of Grays harbor tonnage trends



Source: CPCS analysis of USACE data, 2021.

Port of Grays Harbor handled 3.2 million tons of cargo in 2020, which was 8 percent higher than the 2019 record. During the same year, the Port received a \$50,000 grant from the Washington state Community Economic Revitalization Board (CERB) to develop a plan for the East Terminal 4 Cargo Yard Expansion project. The Port will match the grant by 40 percent to study. The project aims to expand the Terminal 4 operations by revitalizing the pontoon construction site, which was acquired from WSDOT in 2018. When completed, the project will increase the Port's terminal space by 50 percent.^{52, 53}

Figure 74: Port of Grays harbor top waterborne commodities by tonnage, 2019

Commodity	2019 Tonnage	Percent of Total
Oilseeds NEC	1,966,315	69.2%
Animal Feed, Prep.	579,994	20.4%
Vehicles & Parts	116,697	4.1%
Wood Chips	65,349	2.3%
Vegetable Oils	53,696	1.9%
Logs	30,697	1.1%
Unknown or NEC	18,025	0.6%
Machinery (Not Elec)	6,857	0.2%
Lumber	2,597	0.1%
Manufac. Prod. NEC	2,234	0.1%
Other Commodities	303	< 0.1%
All Commodities	2,843,420	100.0%

Source: CPCS analysis of USACE data, 2021.

Columbia-Snake River maritime systems and facilities

The Columbia-Snake River System is a 465-mile inland waterway system composed of the Columbia and Snake rivers. The deep-water navigation channel (43 feet deep) begins at the mouth of the Columbia River at the Pacific Ocean and continues to the Portland and Vancouver harbors. Above those two ports, a shallow river channel (14 feet in depth) continues up the river to the Tri-Cities. There, at the mouth of the Snake River, the channel continues up the Snake River to Lewiston, Idaho.

⁵² Port of Grays Harbor awarded \$50,000 grant for East Terminal 4 Cargo Yard Expansion Plan, KBKW, Dave Haviland, July 2020. <https://kbkw.com/port-of-grays-harbor-awarded-50000-grant-for-east-terminal-4-cargo-yard-expansion-plan/>

⁵³ Port of Grays Harbor applies for grant to repurpose former 520 pontoon casting site, *The Daily World*, Dan Hammock, October 2021. <https://www.thedailyworld.com/news/port-of-grays-harbor-applies-for-grant-to-repurpose-former-520-pontoon-casting-site/>

The Columbia-Snake River System is the nation's largest wheat export and second-largest corn export gateway.⁵⁴ The system is also unique in that it requires the use of two pilots: one to cross the treacherous Columbia River bar entering and exiting the river and one to navigate the river channel to the vessel's destination. The river handles deep-draft ocean-going vessels as well as tugboats moving river barges designed and built specifically for the river system. Imports, exports, domestic ocean barges, and intra-inland waterway cargoes move up and down the system.

The M-84 Corridor of the Marine Highway System, shown in Figure 75, includes Columbia, Willamette, and Snake Rivers, connecting commercial navigation channels, ports, and harbors in Oregon, Washington, and Idaho.

Figure 75: M-84 Corridor



Source: USDOT MARAD, America's Marine Highway Route Designations, August 2021.

Deep-draft ports

In Washington, three deep-draft ports handle ocean-going vessels along the Columbia-Snake River System. Figure 76 provides a list of these ports, along with the primary commodities handled at each.

Figure 76: Deep-draft ports on the Columbia-Snake River system

River	Port	Primary Commodities
Columbia River	Vancouver	Grain, autos, steel, heavy lift
Columbia River	Kalama	Grain, steel
Columbia River	Longview	Grain, bulk, heavy lift, general cargo, petroleum coke, logs

Source: WSDOT, Washington State Marine Ports and Navigation Plan, 2017.

Port of Vancouver

The Port of Vancouver is located along the Columbia River in Vancouver, Washington. The port is owned by the Port of Vancouver, USA, an independent public agency, which manages and develops over 1,600 acres of public property, primarily for marine and industrial development. The Port is primarily a bulk import and export facility while also handling breakbulk and roll-on/roll-off (RoRo) cargo, such as autos.

The Port of Vancouver has thirteen facilities across four terminals. Terminal 1 includes facilities that support breakbulk, heavy lift, bulk export, liquid bulk, dry bulk, and RoRo, in addition to a grain elevator operated by United Grain Corporation. Two mobile harbor cranes operate at the port's breakbulk berths, with a lifting capacity of 140 metric tons each or 210 metric tons in tandem. Berths at Terminal 3 support multiple uses. Terminal 4 accommodates lay berthing, as well as auto and RoRo cargo. The terminal is also home to a Subaru of America import auto facility. An additional 82

⁵⁴ Columbia-Snake River System Facts, Pacific Northwest Waterways Association, 2020. <https://portoflewiston.com/wp-content/uploads/2021/03/CSRS-2020.pdf>

project-ready acres at Terminal 5 are available for future expansion, with three 8,500-foot-long loop tracks to accommodate unit trains carrying bulk cargo within the port's internal rail complex.⁵⁵

The Port of Vancouver provides rail connections, with 42 miles of internal rail track and access to both western U.S. transcontinental railroads (BNSF and UP). The port is also located close to interstates (I-5 and I-84) for efficient road access to and from inland destinations. In 2019, the Port of Vancouver ranked within the top 50 ports in the U.S. by tonnage, handling almost 11 million tons of goods – a 30 percent increase over 8.4 million tons in 2015 (Figure 77). During this time, the port saw increases in copper ore, sand, and gravel, as well as in oilseeds, soybeans, and wheat. Figure 78 identifies the top commodities moving through the Port of Vancouver in 2019 by tonnage. Among all vessels arriving inbound to or departing outbound from the Port of Vancouver in 2019, 46 percent are towboats, 41 percent are dry cargo barge, and 10.5 percent are self-propelled dry. When excluding towboats, dry cargo barge makes up the largest share of vessels (76 percent) at the Port of Vancouver, followed by self-propelled dry (19 percent), as displayed in Figure 79.

Figure 77: Port of Vancouver tonnage trends

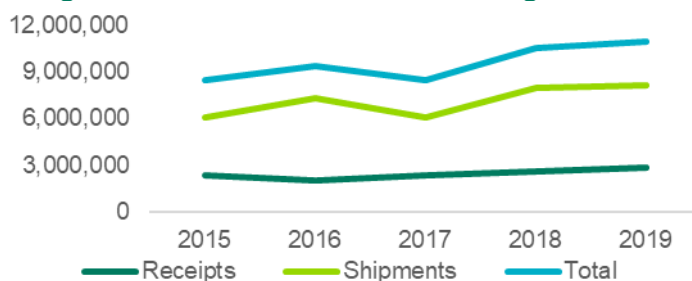
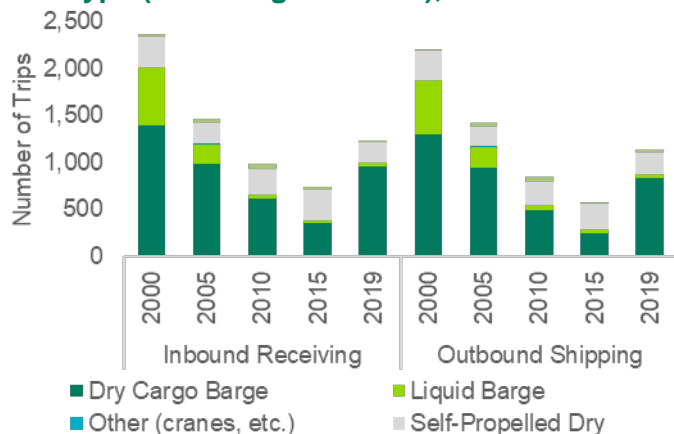


Figure 78: Port of Vancouver top commodities by tonnage, 2019

Commodity	2019 Tonnage	Percent of Total
Wheat	4,380,143	40.0%
Soybeans	2,005,259	18.3%
Corn	943,827	8.6%
I&S Primary Forms	664,261	6.1%
Sand & Gravel	475,259	4.3%
Iron & Steel Scrap	359,313	3.3%
Waste & Scrap NEC	309,583	2.8%
Copper Ore	262,194	2.4%
Sodium Hydroxide	202,714	1.8%
Metallic Salts	145,233	1.3%
Vehicles & Parts	143,433	1.3%
Clay & Refrac. Mat.	129,353	1.2%
Potassic Fert.	122,801	1.1%
Distillate Fuel Oil	110,420	1.0%
Other Commodities	705,920	6.4%
All Commodities	10,959,713	100%

Figure 79: Port of Vancouver trips by vessel type (excluding towboats), 2000-2019



Source: CPCS analysis of USACE data, 2021.

Port of Kalama

The Port of Kalama is located on the lower Columbia River between the Ports of Vancouver and Portland, just upriver and nearby Port of Longview downstream. There are five marine terminals at the Port of Kalama – the North Port Marine Terminal and four privately operated terminals, which includes two grain elevators (TECMO and Kalama Export). These terminals handle commodities for manufacturing companies, storage facilities, distribution businesses, exporters, recycling agents, and

⁵⁵ Marine Guide, Port of Vancouver USA, 2019. https://www.portvanusa.com/assets/POV_MarineGuide_2019.pdf | Bulk, Port of Vancouver USA, 2019. <https://www.portvanusa.com/marine/bulk/> | Break Bulk, Port of Vancouver USA, (n.d.). <https://www.portvanusa.com/marine/break-bulk/> | RoRo, Port of Vancouver USA, (n.d.). <https://www.portvanusa.com/marine/ro-ro/>

trucking companies, among other companies. The port provides its customers with multimodal connections through the BNSF and UP rail networks, as well as I-5 located nearby.⁵⁶

The Port of Kalama ranked 36th among ports nationwide for tonnage handled in 2019, with over 17 million tons of goods moving through the port – a 28 percent increase over 13.3 million tons in 2015, with the fastest growth between 2015 and 2016, as shown in Figure 79. Among all vessels arriving inbound to or departing outbound from the Port of Kalama in 2019, 44 percent are towboats, 39 percent are dry cargo barge, and 16 percent are self-propelled dry. When excluding towboats, dry cargo barge makes up the largest share of vessels (69 percent) at the Port of Kalama, followed by self-propelled dry (29 percent).

The primary commodities moving through the port are wheat, soybeans, and corn (Figure 81). In 2020, Kalama exported the most soybeans among all U.S. West Coast ports, making up 33 percent of all West Coast soybean exports.⁵⁷ This surge was due to shifts in tonnage from the Mississippi River system. Soybeans arrived at Oregon's Port of Morrow by rail and then transferred to barge for the final movement to the Port of Kalama.⁵⁸ This additional soybean tonnage made Kalama the third largest export tonnage port on the West Coast, trailing only Los Angeles and Long Beach.

Figure 80: Port of Kalama tonnage trends

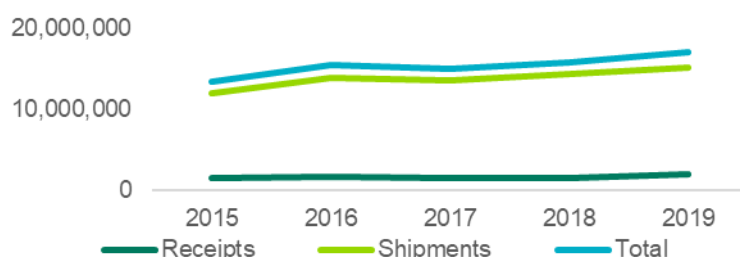
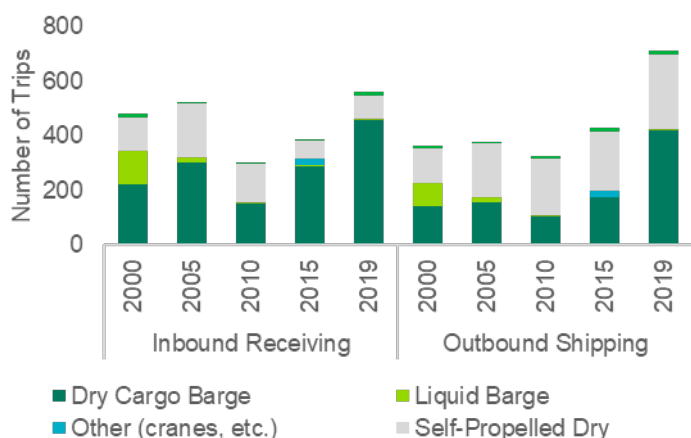


Figure 81: Port of Kalama top waterborne commodities by tonnage, 2019

Commodity	2019 Tonnage	Percent of Total
Wheat	8,442,501	49.6%
Soybeans	5,280,757	31.0%
Corn	2,613,863	15.4%
I&S Plates & Sheets	192,747	1.1%
Sorghum Grains	170,349	1.0%
Wheat Flour	124,561	0.7%
I&S Primary Forms	72,905	0.4%
Benzene & Toluene	28,008	0.2%
Unknown or NEC	27,859	0.2%
Asphalt, Tar & Pitch	27,423	0.2%
Metallic Salts	26,626	0.2%
Vehicles & Parts	10,625	0.1%
Other Commodities	3,422	< 0.1%
All Commodities	17,021,646	100%

Figure 82: Port of Kalama trips by vessel type (excluding towboats), 2000-2019



Source: CPCS analysis of USACE data, 2021.

⁵⁶ Port of Kalama. <https://portofkalama.com/>

⁵⁷ Surge of soybean exports at Port of Kalama sets new record, Port of Kalama, May 2021. <https://portofkalama.com/surge-of-soybean-exports-at-port-of-kalama-sets-new-record-2/>

⁵⁸ Interview with Heather Stebbings, Shaver Transportation, November 2021. CPCS has contacted the Port to validate the data and will update this section when more information becomes available.

Port of Longview

The Port of Longview is the deep-draft port closest to the Pacific Ocean. The port is home to 835 acres of waterfront industrial property. There are eight marine terminals at the port that handle a variety of cargos, including bulk cargos, breakbulk commodities, containers, general cargo, grain, and RoRo.⁵⁹

The **Export Grain Terminal (EGT)** at the Port of Longview is a state-of-the-art export grain terminal that handles corn, wheat, soybeans, soybean meal, and dried distillers grains (DDGs) through both barge and rail. Opened in 2012, EGT was the first export grain terminal constructed in the U.S. in 25 years, with over \$200 million invested in the terminal. The facility can accommodate six 110-car shuttle trains without decoupling locomotives and can unload 120,000 bushels of grain per hour. The terminal averages more than 100 vessels calling on the port, driving economic activity and generating \$5 to \$8 million in annual revenue for the port. As of 2017, EGT made up three-fourths of the Port's export tonnage. By 2019, EGT had driven the Port of Longview to increase its revenues by 55 percent and support 57 percent more jobs than it did in 2012.

Source: EGT Grain. <http://www.egtgrain.com/facilities/> | Tenant Overview, Port of Longview. <https://www.portoflongview.com/282/Tenants> | Industrial Rail Corridor (IRC) Expansion Project, Port of Longview, <https://www.portoflongview.com/DocumentCenter/View/646/IRCE-Tiger-2017-Final-Draft?bidId=>

The Port of Longview provides its customers with rail connections, with connections to BNSF and UP, in addition to a 1.5-mile-long Industrial Rail Corridor. The port is also located close to I-5.

In 2019, the Port of Longview ranked within the top 50 ports in the U.S. by tonnage, handling almost 9.7 million tons of goods – a 30 percent decrease from 13.7 million tons the year prior, as shown in Figure 83. Among the Port of Longview's top commodities, which are listed in Figure 84, wheat tonnage increased between 2018 and 2019, while soybeans, corn, and logs tonnage declined. Among all vessels arriving inbound to or departing outbound from the Port of Kalama in 2019, 52 percent are towboats, 31 percent are dry cargo barge, and 16 percent are self-propelled dry. When excluding towboats, dry cargo barge makes up the largest share of vessels (66 percent) at the Port of Longview, followed by self-propelled dry (34 percent), as displayed in Figure 85.

⁵⁹ Marine Facilities, Port of Longview. <https://www.portoflongview.com/180/Marine-Facilities>

Figure 83: Port of Longview tonnage trends

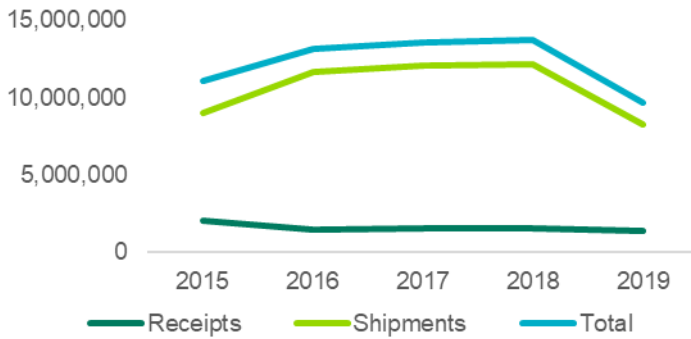
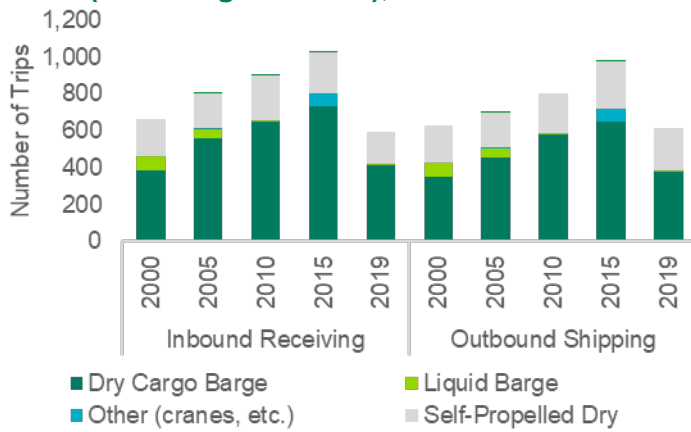


Figure 84: Port of Longview top waterborne commodities by tonnage, 2019

Commodity	2019 Tonnage	Percent of Total
Wheat	2,815,036	29.1%
Logs	1,603,513	16.6%
Soybeans	1,311,177	13.6%
Corn	1,187,532	12.3%
Petroleum Coke	831,301	8.6%
Metallic Salts	562,159	5.8%
Wood Chips	516,945	5.3%
Iron & Steel Scrap	281,558	2.9%
Salt	129,001	1.3%
Animal Feed, Prep.	92,155	1.0%
Oilseeds NEC	69,492	0.7%
Lumber	54,022	0.6%
Iron Ore	46,174	0.5%
Other Commodities	169,193	1.7%
All Commodities	9,669,258	100%

Figure 85: Port of Longview trips by vessel type (excluding towboats), 2000-2019



Source: CPCS analysis of USACE data, 2021.

Shallow-draft ports

Nine shallow-draft ports in Washington handle barges along the Columbia-Snake River System. This includes five ports along the Snake River – the Port of Clarkston, Port of Wilma (Port of Whitman County), Port of Almota (Port of Whitman County), Port of Central Ferry (Port of Whitman County), and Central Ferry Site (Port of Garfield County). There are also four ports along the Columbia River – the Port of Benton, Port of Pasco, Port of Walla Walla, and Port of Klickitat. Figure 86 provides a list of these ports, along with the primary commodities handled at each.

Figure 86: Shallow-draft ports on the Columbia-Snake River system

River	Port	Primary Commodities	Details
Snake River	Clarkston ⁶⁰	Forest products, heavy lift, containers	<ul style="list-style-type: none"> Located in Clarkston, WA next to the Washington-Idaho border Operating port with a 120-acre waterfront site
Snake River	Whitman-Wilma ⁶¹	Grain, agricultural chemicals, wood products	<ul style="list-style-type: none"> A property of the Port of Whitman County, and located across from the Port of Clarkston near the Washington-Idaho border 280 acres of developed industrial property (with 230 acres divided into 24 lots) and 76 acres of undeveloped property One public port site (15 acres), with docks and dolphins

⁶⁰ Port of Clarkston. <https://portofclarkston.com/>

⁶¹ Port of Whitman County, Port of Wilma. <https://www.portwhitman.com/port-properties/port-of-wilma>

River	Port	Primary Commodities	Details
			<ul style="list-style-type: none"> • 10-12 million bushels of wheat pass through the port each year • Truck (county road) and rail (Camas Prairie Railroad, Port-owned spur line) access
Snake River	Whitman-Almota ⁶²	Grain	<ul style="list-style-type: none"> • A property of the Port of Whitman County, and located in Almota, WA 4 miles downriver of the Lower Granite Lock and Dam • 10.5 acres • Major grain-shipping terminal, with a storage capacity of 3.7 million bushels • Public port with sheet pile dock and dolphins • Utilities available • Truck (maintained access road) access
Snake River	Whitman-Central Ferry ⁶³	Grain, fertilizer	<ul style="list-style-type: none"> • A property of the Port of Whitman County, and located in Central Ferry between Walla Walla and Colfax • 147 acres of developed land, divided into 18 industrial lots • Major grain-shipping terminal, with a storage capacity of 7.2 million bushels • Major site for manufacturing and wholesaling of fertilizer • Truck and rail (Great Northwest Railroad Line)
Snake River	Garfield-Central Ferry ⁶⁴	Grain	<ul style="list-style-type: none"> • A property of the Port of Garfield County, located near the Central Ferry Bridge • Central Ferry Site includes 85.6 acres • Pomeroy Grain Growers lease the 3.5 acres where grain elevators are located, and exclusively lease dock and dolphins • Truck (SR 127) access
Columbia River	Benton ⁶⁵	Military, heavy lift	<ul style="list-style-type: none"> • Encompasses two-thirds of Benton County, including North Richland, Benton City, and Prosser • 1 barge slip and 1 high dock, leased and controlled by the U.S. Navy, with industrial access allowed upon authorization • Multimodal, unit, and manifest capable cargo handling capabilities • 250 acres of waterfront • Truck (highways, state routes, interstates), rail (16-mile short-line rail owned by port, served by two Class I railroads), air (Tri Cities Airport) access • FTZ (FTZ subzone) #203
Columbia River	Pasco ⁶⁶	Containers, refrigerated, heavy lift	<ul style="list-style-type: none"> • Located in Pasco just west of where the Columbia and Snake Rivers meet • Container terminal is a multimodal facility on the River • Marine Terminal – 28-acre riverfront site – is undergoing environmental cleanup efforts prior to redevelopment. • Truck (major highway systems), rail (BNSF), air (Tri Cities Airport) access

⁶² Port of Whitman County, Port of Almota. <https://www.portwhitman.com/port-properties/port-of-almota>

⁶³ Port of Whitman County, Port of Central Ferry. <https://www.portwhitman.com/port-properties/port-of-central-ferry>

⁶⁴ Port of Garfield County. <https://portofgarfield.com/>

⁶⁵ Port of Benton. <https://portofbenton.com/>

⁶⁶ Port of Pasco. <https://www.portofpasco.org/>

River	Port	Primary Commodities	Details
Columbia River	Walla Walla ⁶⁷	Grain, refrigerated	<ul style="list-style-type: none"> Facilities include industrial parks and sites, business parks, and regional airports located in Walla Walla County, including inland and along waterways. Most marine facilities are located on the Columbia River, with some facilities at Burbank with access to both the Columbia and Snake Rivers Commodities handled at marine facilities include grain, food ingredients, steel and related products, animal feeds, wine, paper, and soil, among others. Truck (including US 12, US 395/US 730), rail (BNSF, UP, port-owned rail infrastructure), and air (Walla Walla Regional Airport) access
Columbia River	Klickitat ⁶⁸	Logs	<ul style="list-style-type: none"> Located in the Columbia Gorge/Mid-Columbia Region of Washington Facilities at two business/industrial parks – Bingen Point Business Park zoned for commercial and light industrial use near Bingen, and Dallesport Industrial Park zoned for light and heavy industrial use in Dallesport. Truck (I-84, SR 14), rail (BNSF), and air (Portland International Airport) access

Source: WSDOT, Washington State Marine Ports and Navigation Plan, 2017.

Columbia-Snake River system docks

Figure 87 list the locks along the Columbia-Snake River system and their associated upbound and downbound cargo tonnages in 2021. Figure 88 shows the types of commodities that move on the River system. Since the commodities may move through multiple locks, the total commodity tonnages may have been counted multiple times. In general, food and farm commodity is moved in large quantities along the River system.

Figure 87: Tonnage by lock and direction, 2021

	Lock Name	Upbound (KTons)	Downbound (KTons)	Total (KTons)
Columbia River	Bonneville	1,902	6,196	8,098
	Dalles	1,803	5,171	6,974
	John Day	1818	5,112	6,930
	McNary	1,271	3,784	5,055
Snake River	Ice Harbor	177	2,782	2,959
	Lower Monumental	175	2,222	2,397
	Little Goose	179	1,919	2,098
	Lower Granite	171	1039	1,210

Source: CPCS analysis of USACE Lock Performance Monitoring System (LPMS) Tonnage Report, 2022.

⁶⁷ Port of Walla Walla, <https://www.portwallawalla.com/> | Comprehensive Port Plan, Port of Walla Walla, December 2012. https://www.portwallawalla.com/images/pdf/port_information/Adopted-Port-of-Walla-Walla-Comprehensive-Port-Plan.pdf

⁶⁸ Port of Klickitat, <http://portofklickitat.com/facilities/>

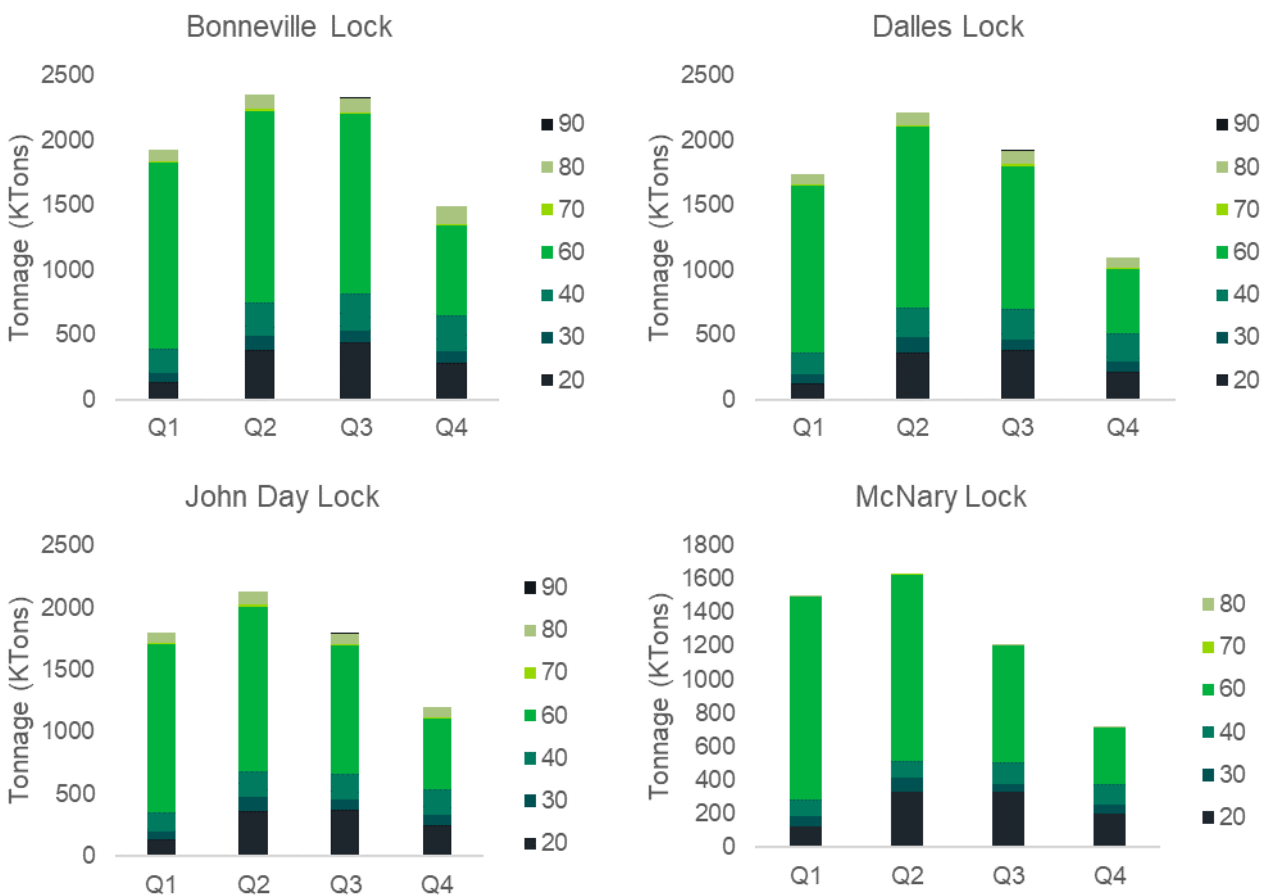
Figure 88: Commodities ranked by total tonnage through lock, 2021

Rank	Commodity Code	Commodity Description	Tonnage (KTONs)
1	60	Food and farm products	24,252
2	20	Petroleum products	4,475
3	40	Crude materials, inedible, except fuels	4,201
4	30	Chemicals and related products	1,461
5	80	Waste material, garbage, landfill, sewage sludge, and wastewater	1,181
6	50	Primary manufactured goods	6.1
7	90	Others, NEC	0.6

Source: CPCS analysis of USACE Lock Performance Monitoring System (LPMS) Tonnage Report, 2022.

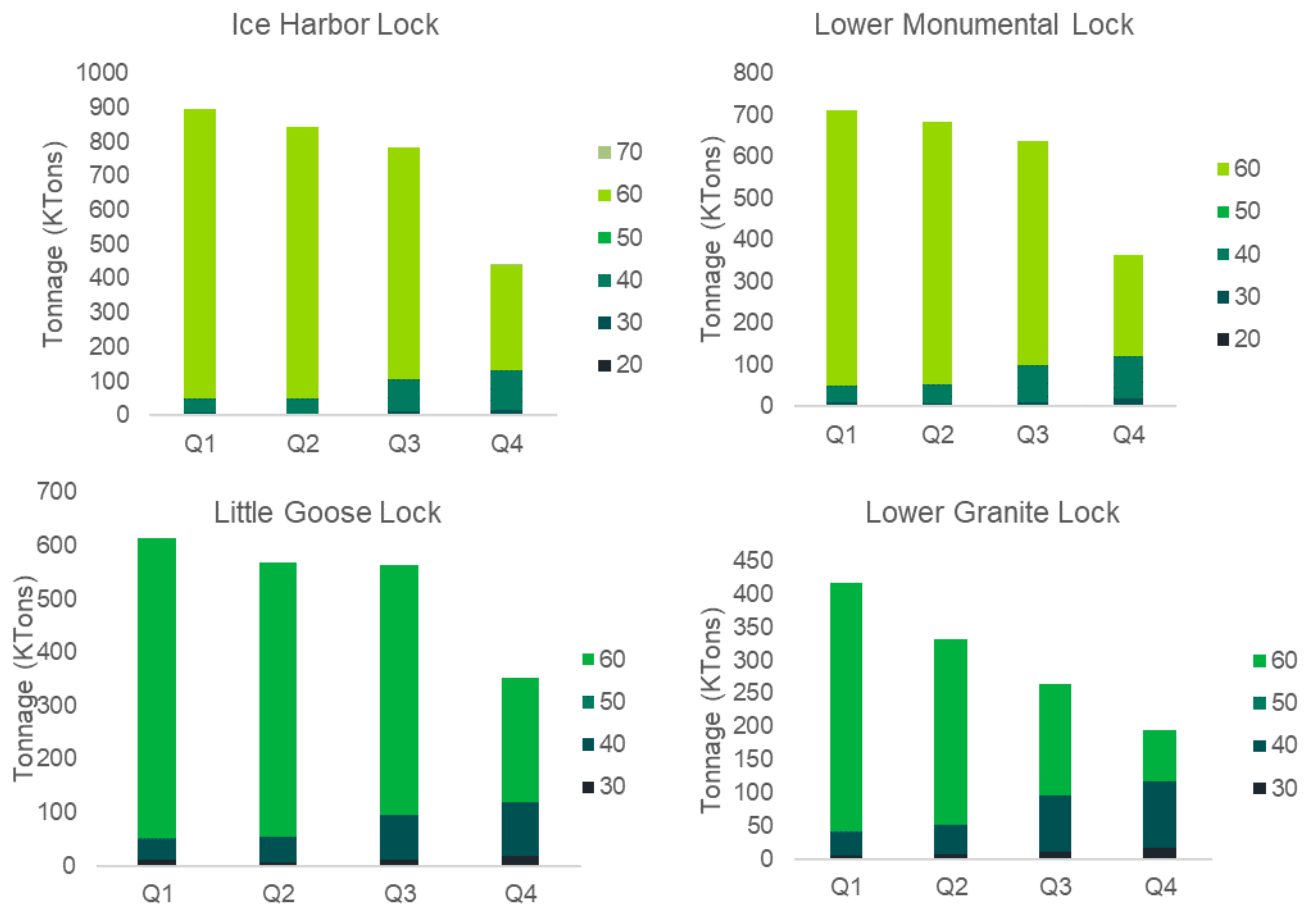
Figure 89 and Figure 90 show the tonnages moved through the Columbia-Snake River locks in 2021. As shown, commodity group 60 (food and farm product) is carried in large quantities through all the locks. In terms of seasonality, April through September (quarters 1 and 2 of the calendar year) see the highest cargo tonnages being carried along the Columbia-Snake River system.

Figure 89: Columbia River locks, 2021: tonnages by commodity code



Source: CPCS analysis of USACE Lock Performance Monitoring System (LPMS) Tonnage Report, 2022.

Figure 90: Snake River locks, 2021: tonnages by commodity code



Source: CPCS analysis of USACE Lock Performance Monitoring System (LPMS) Tonnage Report, 2022.

Nearby ports handling cargo for Washington shippers

Port of Vancouver / Vancouver Fraser Port Authority

The Port of Vancouver/Vancouver Fraser Port Authority is a major maritime cargo hub, operating containers, bulk, breakbulk, and auto facilities in and around the Vancouver, BC, metro area. Although its terminals at Deltaport, near Surrey, are particularly close to the border and offer northwest Washington shippers an alternative to container facilities in Tacoma and Seattle, there is little cross-border movement of containers. According to a WPS 2020 container cargo forecast commissioned by the Port of Vancouver, trucking costs limit the amount of container traffic trucked across the border. As a result, the Port of Vancouver would serve limited numbers of containers moving to and from Washington, and Washington container terminals would handle only limited numbers of containers moving to and from the lower mainland of British Columbia.⁶⁹

Port of Portland and Portland Harbor

The Port of Portland is a deep-water inland port located on the Oregon side of the Columbia River, roughly opposite the Port of Vancouver. Its most active terminals are Terminals 4 and 5 on the Willamette River, just upriver of its confluence with the Columbia and Terminal 6 on the Columbia

⁶⁹ FINAL REPORT Long-Term Container Traffic Forecast 2020-2060, WSP, October 2020, p. 37. <https://www.portvancouver.com/wp-content/uploads/2021/03/WSP-container-forecast-final-report.pdf>

River. Between these three terminals, the Port handles containers, autos, grain, mineral bulks, and can handle breakbulk cargoes. All three terminals serve Washington shippers.

In addition to the Port's facilities, there are several private facilities and terminals in the Portland harbor handling a wide range of bulk and breakbulk commodities. Many of these also serve Washington shippers as well.

Containers

Terminal 6 (T6) is the only deep-water container terminal on the Columbia-Snake River system. The addressable container market for T6 was most of southern Washington. When carriers at T6 suspended service in 2015, all of those shipments shifted north to Tacoma and Seattle. Just as Portland serves Washington shippers, Tacoma and Seattle serve Oregon shippers. With the service suspension, all Oregon container shipments began moving via the Northwest Seaport Alliance ports.

According to the Oregon Trade and Logistics Initiative's Trade and Logistics Report, the year before the loss of container service, 2014, T6 handled 22,139 export containers and 36,934 import containers moving to and from Oregon locations.⁷⁰ All of these containers switched to moving either by trucks on I-5 or I-82/I-90 or by rail on both the BNSF and UP between Puget Sound and Oregon origins and destinations. While not included in the Trade and Logistics Report, T6 served shippers across southern Washington, given its proximity and container-on-barge service. Similar to Oregon container shipments, all of these containers that had moved across T6 switched to Puget Sound ports, accessed via truck or rail.

Early in 2020, container service resumed in Portland and has expanded again in 2021. SM Line, who initiated service in 2020, expanded service in 2021, and MSC launched service at T6 in 2021 as well. Some of these services will serve the addressable market, while some are focused on intermodal service into Chicago to address current supply chain issues.⁷¹ Given the recency of the service resumption and the varying types of service (regional vs. inland intermodal), there is not sufficient data to quantify the impact this resumed service will have on serving Washington shippers.

Grain

Historically, the Port of Portland and the Portland harbor have a major wheat export gateway. In 2000, Centennial Mills' elevator on the Willamette River ceased operations, and in 2019, Louis-Dreyfus announced plans to divest of its elevator on the Willamette River near downtown Portland as shippers favored new or upgraded export elevators elsewhere on the river system, including at the Port of Portland's Terminal 5. While tonnage in the Portland harbor may be down, T5 continues to be a prominent export elevator. The Port of Portland reported exporting 2 million tons of grain in 2019, an unusually low tonnage, and rebounded to 3.3 million tons in 2020. Along with the other major export facilities on the lower Columbia River, Columbia Grain at T5 likely receives barge shipments of wheat from Washington farmers along the Columbia River.

Autos

While Portland is the largest auto-export gateway on the West Coast, its relevance to the Washington freight system is as an auto import center. The fifth-largest in the U.S., the Port of Portland, handles Honda, Hyundai, and Toyota imports, which move not only throughout the Pacific

⁷⁰ Trade and Logistics Report: Research Analysis, The Tioga Group, Inc., February 2016, pp 9 and 11. <https://popcdn.azureedge.net/pdfs/TL-Report-Appendix-1.pdf>

⁷¹ Port of Portland Welcomes New Service to Terminal 6, Port of Portland, September 2021. <https://www.portofportland.com/Newsroom/Port-of-Portland-Welcomes-New-Service-Terminal-6-Marine>

Northwest by truck, but into the mountain states and beyond by rail.⁷² Those rail shipments handled by BNSF move east along the BNSF tracks on the Washington side of the Columbia River.

Mineral Bulk

The Port of Portland handles several bulk products, including potash and soda ash. While neither product originates in nor is destined for Washington, the potash exports pass through eastern Washington on Union Pacific tracks in between Spokane and Hinkle, Oregon.

Port of Lewiston

The Port of Lewiston, an inland river port 465 miles from the Pacific Ocean, is home to Lewis-Clark Terminal. The terminal is a grain cooperative, serving some 2,000 wheat farmers in a 17,000-square-mile area of eastern Washington and Idaho.⁷³ The Port handled about 700,000 tons of wheat in 2020.⁷⁴ Wheat from the Port of Lewiston moves downriver by barge to export elevators in Portland, Vancouver, and Longview.

⁷² FreightWaves Classics: Port of Portland Helps Serve the Pacific Northwest and Beyond, *Freight Waves*, Scott Mall, September 2021. <https://www.freightwaves.com/news/freightwaves-classics-port-of-portland-helps-serve-the-pacific-northwest-and-beyond>

⁷³ Lewis-Clark Grain Terminal, Port of Lewiston. <https://portoflewiston.com/our-rivers/lewis-clark-grain-terminal/>

⁷⁴ Shipping Reports, Port of Lewiston. <https://portoflewiston.com/our-rivers/shipping-reports/>

5. Washington's air cargo network

Key chapter takeaway

As of 2019, Washington had 22 airports that provided air cargo services. Four airports (Seattle-Tacoma International Airport, Spokane International Airport, King County International Airport, and Paine Field Airport) are considered to be the main cargo airports in Washington. Smaller airports, such as Grant County International Airport, Bellingham International Airport, Yakima Air Terminal, Tri-Cities Airport, and Friday Harbor Airport, also play crucial roles of transporting perishable food products and high-value commodities domestically and internationally.

Air cargo system overview

Shippers in Washington moved 340,000 tons of cargo by air that was worth \$53.6 billion in 2017. The 2050 air cargo volume and value forecasts show that the air cargo tonnage shipped to, from, and within the state is going to increase by 86.9 percent, reaching 636.7 thousand tons. In addition, the total value of air cargo will be about \$110.5 billion, a 106.2 percent increase from 2017.⁷⁵

Air cargo is crucial to Washington's economic development due to its efficiency and reliability when compared to other modes of freight transportation. Key Washington economic sectors, such as agriculture, aerospace manufacturing, and seafood, rely on fast transportation to ensure valuable and perishable goods to reach domestic and international markets in time. Moreover, the rise of e-commerce has increased the importance of air cargo. Consumers nowadays demand two-day or even same-day deliveries, which are often made possible by air cargo.

Figure 91: Washington's air cargo system

22	340,000	86.9%
Air Cargo Airports	Tons of Goods Transported by shippers to/from/within Washington in 2017	Forecasted Increase in Air Cargo Tonnage by 2050

Source: CPCS analysis of FAF 5 and BTS data, 2021.

Air cargo trade⁷⁶

The top commodities transported by air to and from Washington are usually high in value and low in tonnage. As listed in Figure 92, the top import commodities by tonnage include electronics, machinery, furniture, meat/seafood, and textiles/leather. Among these commodities, electronics is also the highest import commodity by value. The top export commodities by tonnage include transport equipment, mixed freight, milled grain products, newsprints/paper, and other agriculture products. However, the list is different when looking at the top commodities by value. Besides transport equipment and electronics, Washington's air cargo system exported a high value of machinery, precision instruments, and pharmaceutical products.

⁷⁵ Freight Analysis Framework 5, 2022. Note: FAF data focuses on shipment origins and destinations, regardless of transportation facilities used. For example, Seattle-Tacoma International Airport handled some 550,000 short tons in 2021. As a regional cargo hub, particularly for international shipments, the airport handles cargo originating in and destined for Oregon, Idaho, and other locations in the region.

⁷⁶ More information will be added after consultations with airports and validations of data.

By tonnage, Washington airports handled more imports (35 percent) than exports (30 percent) in 2017. The rest of 35 percent of domestic movements mostly originated from Washington, amounting to about 82.9 percent of overall movements within the U.S.

Air cargo commodities look quite differently by value. Exports account for almost half of the air freight values while imports contributed 12 percent of the total air cargo value in 2017. The value of the goods transported within the U.S. by air from Washington amounted to 82.5 percent of the total domestic air cargo values, which is similar to the percentage of outbound domestic air cargo tonnage.

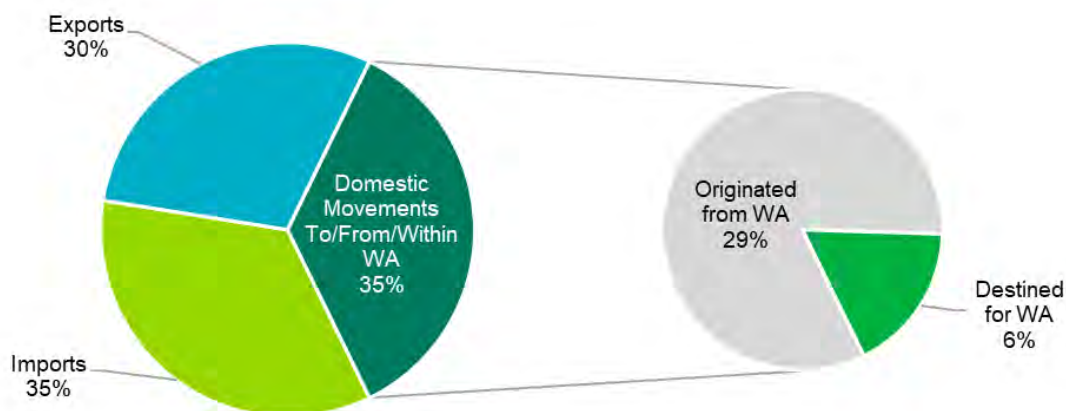
Although air cargo commodities by tonnage remains unchanged between 2017 and 2022, the value of exports moved by air is forecast to increase by 18 percent, while the domestic cargo originated from Washington will decrease by 7 percent.

Figure 92: Washington shippers' top export/import commodities by air cargo (thousand tons; million dollars)

Inbound				Outbound			
Commodity	Tonnage	Commodity	Value	Commodity	Tonnage	Commodity	Value
Electronics	63.17	Electronics	4,167.44	Transport Equipment	63.17	Transport Equipment	36,088.29
Machinery	25.52	Transportation Equipment	1,684.94	Mixed Freight	25.52	Electronics	1,975.38
Furniture	19.24	Precision Instruments	1,394.39	Milled grain products	19.24	Machinery	1,887.27
Meat/Seafood	18.34	Machinery	791.58	Newsprint/paper	18.34	Precision Instruments	1,151.89
Textiles/leather	15.33	Misc. Manufacturing Products	529.19	Other Agriculture Products	15.33	Pharmaceuticals	1,018.93

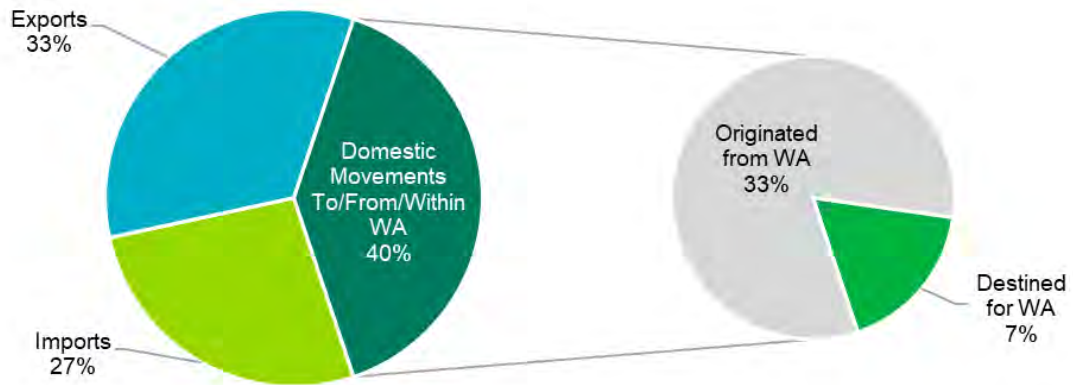
Source: Freight Analysis Framework 5, 2021. Note: This number accounts for shipments with initial origin or final destination in Washington regardless of if shipped in or out of a Washington airport; volumes handled by Washington airports account for volumes moved through their air cargo facilities regardless of state origin or destination.

Figure 93: Tonnage of freight carried by air in Washington by trade type, 2017



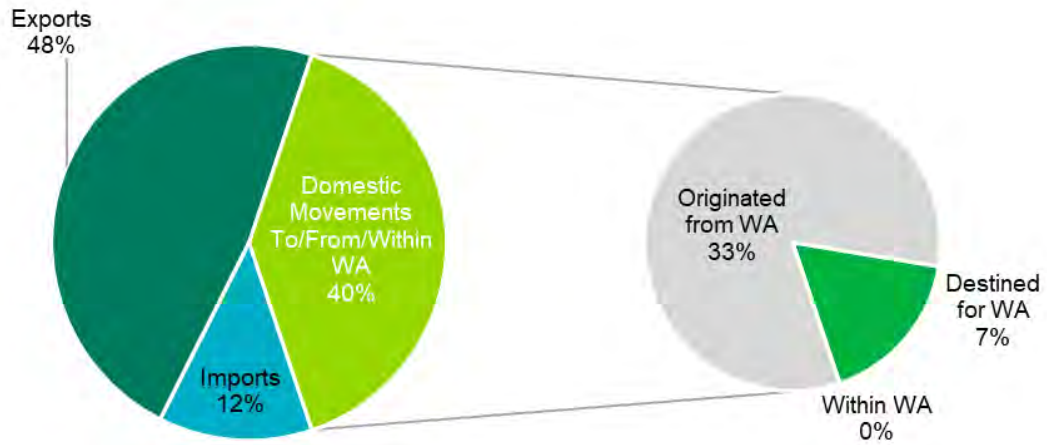
Source: CPCS analysis of FAF5 data, 2022.

Figure 94: Tonnage of freight carried by air in Washington by trade type, 2022



Source: CPCS analysis of FAF5 data, 2022.

Figure 95: Value of freight carried by air in Washington by trade type, 2017



Source: CPCS analysis of FAF5 data, 2022.

Figure 96: Value of freight carried by air in Washington by trade type, 2022



Source: CPCS analysis of FAF5 data, 2022.

Air cargo service types

Different air cargo services fulfill various freight transportation needs in Washington. All-cargo airlines provide domestic and international freight services and transport high-value and perishable goods. Those freight services dedicate main deck and belly cargo capacity to air cargo shipments, allowing them to handle air containers and other large items. Sometimes they also have dedicated freight routes.

Integrated/Express carriers, such as FedEx and UPS, play a crucial role in Washington's air cargo services. These carriers usually move a mix of high-value and lower-value products. Since the rise of e-commerce in recent years, integrated/express carriers have started to transport a larger volume of retail consumer goods. These carriers typically operate their own facilities at certain airports, such as SEA, Boeing Field, and Spokane, and usually use their own planes and trucks to complete the last mile of their delivery services.

Belly freight utilizes passenger flights' belly compartments to transport smaller manufactured items and some perishable goods. Even though space is limited due to prioritizing passenger luggage over cargo, belly cargo provides air cargo service to airports without integrated/express carrier service. Some wide-body international passenger routes also offer opportunities for international freight movements.

Figure 97: Air cargo service types in Washington

Type	Major Carriers in WA	Description
All-cargo Airlines	Kalitta, Cargolux, Polar, NCA, etc.	All-cargo airlines provide airport-to-airport freighter service utilizing a network of air cargo terminal operators and freight forwarders. There are few limits on the size and or type of cargo carried by the traditional all-cargo airlines.
Integrated/Express Carriers	FedEx, UPS, DHL, etc.	Integrated/Express carriers provide door-to-door small package, time-definite service typically using their own aircraft, truck, and package sorting facilities.
Belly Freight	Alaska, Delta, United, American, Southwest, etc.	Belly freight provides airport-to-airport air cargo service for freight forwarders utilizing the lower deck of their passenger aircraft.

Source: Washington State Air Cargo Movement Study, 2018.

Air cargo airports in Washington⁷⁷

Washington's four key air cargo facilities are Seattle-Tacoma International Airport (SEA), King County International Airport (BFI), Spokane International Airport (GEG), and Paine Field Airport (PAE). As Figure 101 illustrates, GEG is the only airport located outside of the Puget Sound Area among the four facilities. Based on the air cargo data from Port of Seattle, Spokane International Airport, and Bureau of Transportation Statistics (BTS), these four airports generate the majority (98.1 percent) of Washington's air cargo activities. These airports also handle cargo originating in or destined for Oregon, Idaho, and other locations throughout the west. The statistics in this section describe cargo volumes handled at Washington airports, including out-of-state volumes, rather than volumes moved by Washington shippers. As a result, the numbers for some airports and the overall total will be larger than discussed in earlier sections using state of origin and destination data.

According to BTS data, five regional air cargo airports provide critical air cargo connections for shippers and communities around the state. Service at these airports typically connects to the state's

primary cargo airports to access domestic and international markets. Each of these nine airports handled at least 1,000 tons of air cargo in 2019. These airports include:

- Yakima Air Terminal (YKM)
- Tri-Cities Airport (PSC)
- Bellingham International Airport (BLI)
- Grant County International Airport (MWH)
- Friday Harbor Airport (FRD)

Figure 98 shows the air cargo trends at Washington's largest air cargo airports.

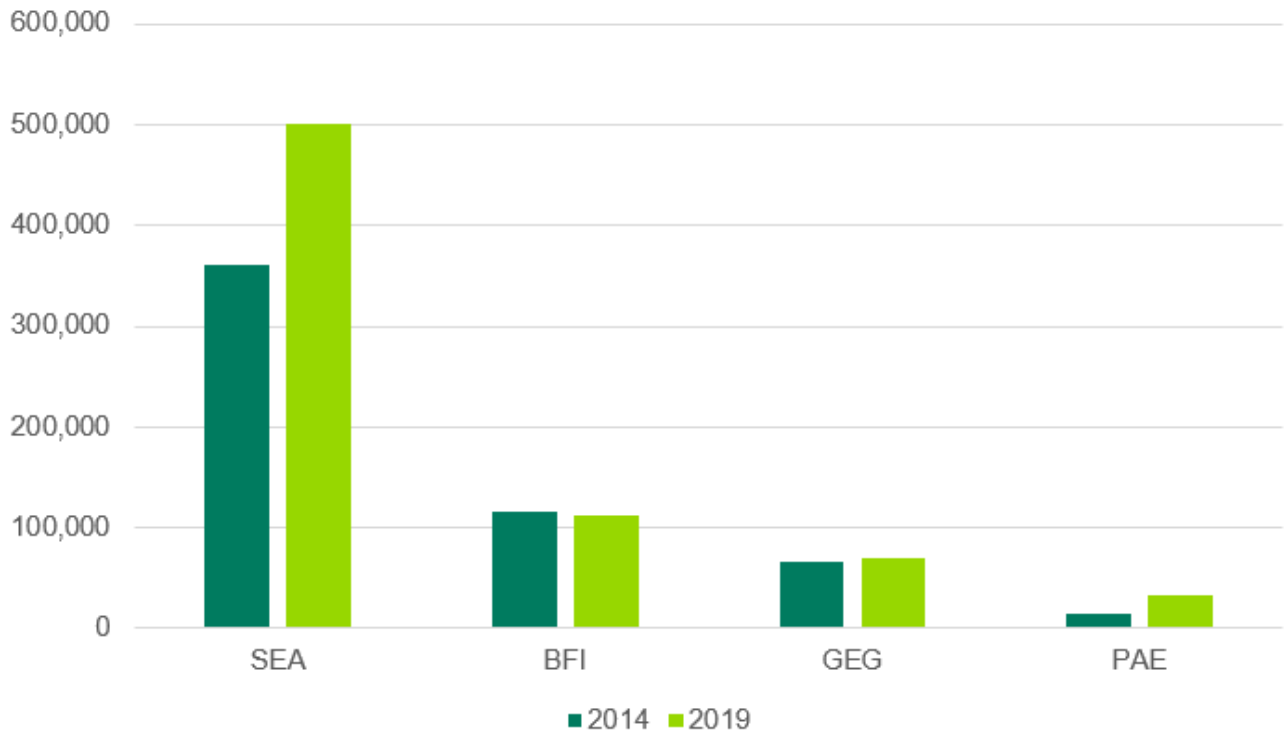
Figure 98: Top nine air cargo facilities in Washington

Cargo Airports	Air Cargo Type	2019 Tonnage (short tons)	% Change between 2014 and 2019
Seattle-Tacoma International Airport	Domestic and international belly cargo; domestic and international freighter cargo, and integrator/express cargo (FedEx)	499,957	38.6%
King County International Airport	Integrator and all-cargo carrier (UPS)	112,391	-3.3%
Spokane International Airport	Integrator/express cargo (FedEx and UPS); belly cargo	69,001	5.2%
Paine Field Airport	Wide-body freighters; integrator/express cargo	33,814	127.0%
Yakima Air Terminal / McAllister Field	Integrator/express cargo (FedEx and UPS)	2,426	14.8%
Tri-Cities Airport	Integrator/express cargo (FedEx and UPS); belly cargo	1,652	-33.4%
Bellingham International Airport	Integrator/express cargo (FedEx); belly cargo	1,716	42.1%
Grant County International Airport	Integrator/express cargo (FedEx), seasonal freighter service	1,521	278.4%
Friday Harbor Airport	Integrator/express cargo (FedEx); seaplane cargo	1,353	525.2%

Source: CPCS analysis of T-100 Market Data, 2021 | Port of Seattle | Spokane International Airport, 2021.
 Note: T-100 does not include Ameriflight data and might be double-counting FedEx volumes.

Except for BFI, all the other three largest cargo airports all experienced growth in air cargo tonnage between 2014 and 2019, among which SEA and PAE had significant growth, increasing by 38.6 percent and 127.0 percent, respectively.

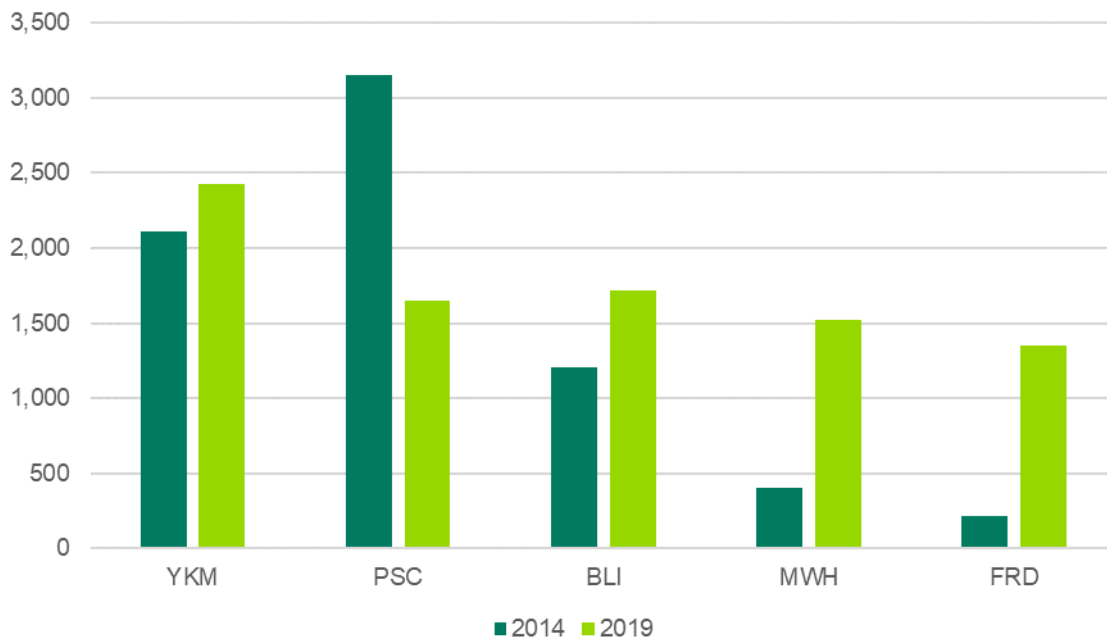
Figure 99: Largest air cargo airport tonnage, 2014 - 2019



Source: CPCS analysis of T-100 Market Data, 2021 | Port of Seattle | Spokane International Airport.

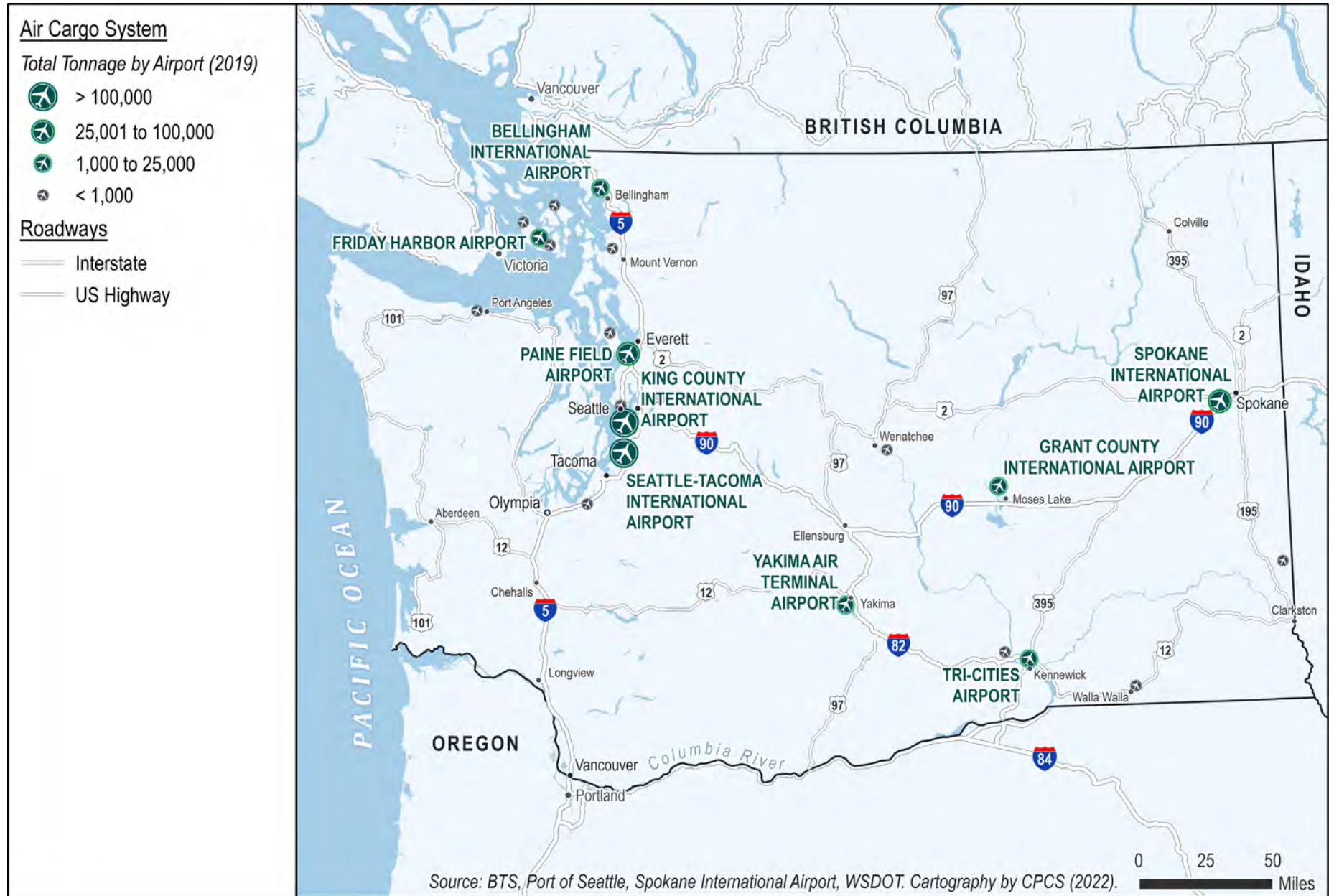
Between 2014 and 2019, all airports saw growth in air cargo tonnage, except for PSC.

Figure 100: Regional air cargo airport tonnage, 2014 - 2019 (tons)



Source: CPCS analysis of T-100 Market Data, 2021.
 Note: T-100 doesn't include Ameriflight data and might be double-counting FedEx volumes.

Figure 101: Air cargo facilities in Washington



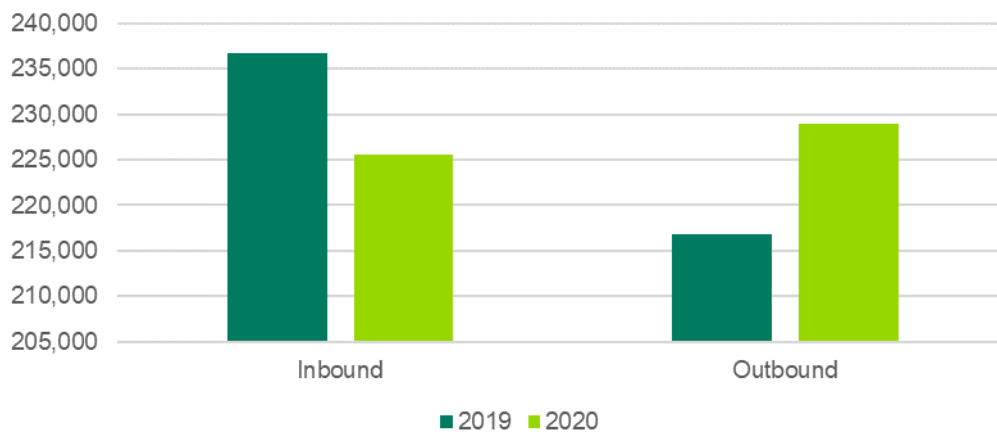
Large air cargo facilities

Seattle-Tacoma International Airport

Seattle-Tacoma International Airport (SEA) is located approximately 14 miles south of the Seattle downtown area and 18 miles north of downtown Tacoma. Owned by the Port of Seattle, SEA is a large hub that provides both passenger and cargo services to various domestic and international destinations. In 2019, SEA handled 499,957 tons (453,547 metric tons) of cargo, ranking as the 17th largest cargo airport in the U.S.⁷⁸ In 2021, the airport's cargo volume grew to nearly 550,000 tons (498,741 metric tons). Figure 102 compares the total SEA cargo tonnage in 2019 and 2021.

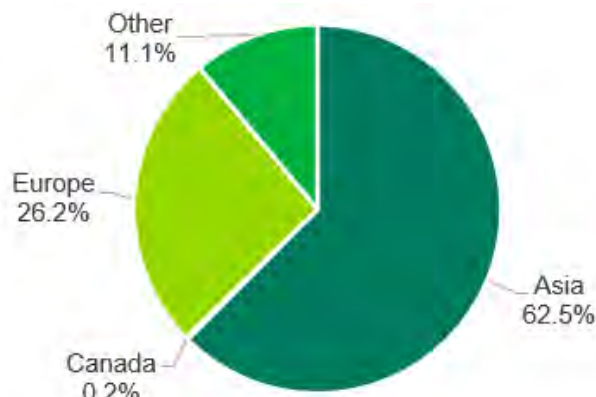
Figure 103 shows the SEA's international air cargo by market share. Given its geographical location, 70.3 percent of air cargo at SEA moved to or from Asia, with 29.5 percent moving to or from Europe. The largest international carriers serving the airport include Delta Airlines, EVA Air, China Airlines, FedEx, Korean Air, Cargolux, Asiana Airlines, British Airways, Japan Airlines, and All Nippon Airways.

Figure 102: SEA cargo tonnage, 2019 vs 2021 (in tons)



Source: Port of Seattle Website, 2022.

Figure 103: SEA international cargo tonnage by market (2019)



Source: Port of Seattle Website, 2021.

⁷⁸ Cargo Statistics, Port of Seattle.

Market area and commodities

Many of Washington's high-value exports, such as cherries and seafood, are shipped by air out of SEA. Given the high value and high perishability of these exports, international cargo service to overseas destinations is critical. With the level of international dedicated freighter service at SEA, the airport not only attracts cargo from shippers in Washington but from across the Northwest as well. As a primary air cargo hub for the region, SEA handles high value perishable products such as Washington and Oregon cherries, fresh seafood from coastal communities in the northwest, high tech products from Washington, Oregon, and Idaho, as well as growing volumes of e-commerce.

Air cargo facility and future requirements

SEA currently has 14 cargo warehouses and five cargo hardstand areas. Figure 104 lists the tenants, the type of air cargo service provided, and the sizes of leased warehouses. The five cargo hardstand areas can accommodate a range of aircraft sizes up to the Boeing 747F. Of SEA's 19 hardstands, five can accommodate the Boeing 747F.

SEA's air cargo tonnage is forecast to grow in the future. This calls for SEA to be prepared for the increasing needs for air cargo warehouses and hardstands.^{79,80} The Port of Seattle's Century Agenda sets a goal for the airport to handle 750,000 metric tons by 2036.

Congested ground access and limited landside capacity

Congested off-airport roadways have been of particular concern for the airport's growth. The state and regional highways surrounding the airport, such as I-5, I-405, SR 518, and SR 509, and local roads, such as SR 99 / International Boulevard, S. 188th St, S. 170th St, and S. 160th St, provide access to and from the airport. The congestion on those key access roadways poses barriers to the efficiency of SEA's cargo operations.

An evaluation of SEA's landside cargo facilities discovered that SEA will have a growing need for cargo handling space in the future. The limited on-airport space and growing competition between passenger and cargo use could exacerbate the expected resource issue.

Future development

Both the Washington State Air Cargo Movement Study and the Seattle-Tacoma International Airport Sustainable Master Plan (SAMP) identified both redevelopment and new projects to prepare SEA for future air cargo growth. SAMP recommended the redevelopment of the north cargo area and the South Aviation Support Area to satisfy the increasing cargo needs.

Figure 104: Summary of air cargo warehouses and tenants at Seattle-Tacoma

Type of Tenant	Tenant (sq. ft.)	Warehouse (sq. ft.)	Airfreight (sq. ft.)	Integrator (sq. ft.)	Airmail (sq. ft.)
Airline, Single Tenant	FedEx	73,250	-	73,250	-
	Southwest	25,700	11,000	-	-
	Alaska Airlines	68,730	68,730	-	-
	Delta Air Lines	58,000	58,000	-	-
Cargo Handling Company	Hanjin	84,000	23,600	-	-
	CAS	48,520	48,520	-	-
	Swissport	31,560	31,560	-	-

⁷⁹ SEA Master Plan.

⁸⁰ Washington State Air Cargo Movement Study.

Type of Tenant	Tenant (sq. ft.)	Warehouse (sq. ft.)	Airfreight (sq. ft.)	Integrator (sq. ft.)	Airmail (sq. ft.)
	WFS	25,000	25,000	-	-
Other	Matheson	25,000	-	-	25,000
	FedEx and USPS	51,720	-	15,000	36,720
	Building #12	49,260	-	-	-
Total		549,740	266,410	88,250	61,720

Source: Sustainable Airport Master Plan, 2018.

Figure 105: Proposed air cargo redevelopment and south aviation support area



Source: Port of Seattle and Leigh Fisher.

King County International Airport

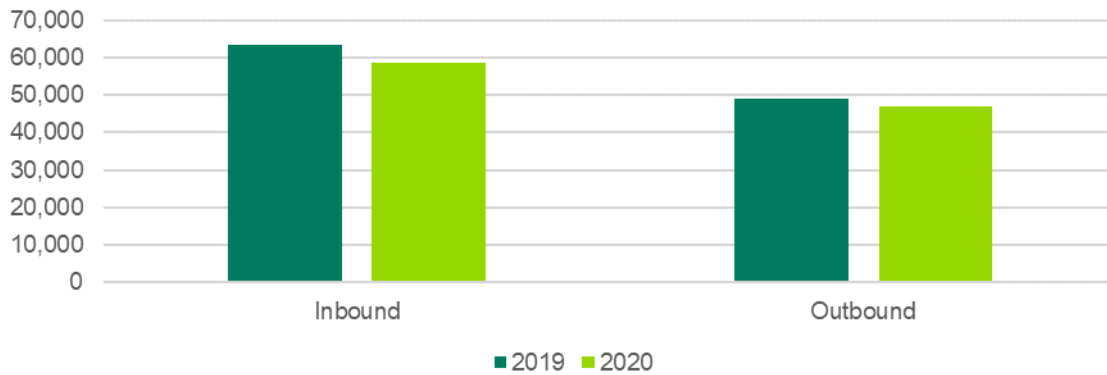
King County International Airport (BFI), also known as Boeing Field, is owned by King County and located 5 miles south of downtown Seattle. The airport is approximately 634 acres and processed about 112,391 tons of cargo in 2019.

BFI is a regional hub for UPS air cargo operations. UPS serves the Seattle market via BFI rather than SEA. The Washington Air Cargo Movement Study finds that BFI will require additional ramp space and a new cargo facility area to accommodate the forecasted cargo activity increase. In response, UPS started a \$125 million facility improvement project in August 2020. The project area includes building new facilities and reconstructing legacy buildings on the 14-acre UPS Primary Leasehold and rebuilding three parking gates that accommodate aircraft as large as Boeing 767s and MD-11s at the UPS Air Cargo Ramp Leasehold. In addition, the capital improvement project will also rehabilitate existing pavements. The new package sorting facility will be one of the few on-site sorting facilities outside of UPS's Louisville facility that allows efficient loading, unloading, and distribution of goods to its network of delivery vehicles.⁸¹

⁸¹ Plane Talk, King County International Airport, August 2020. <https://content.govdelivery.com/accounts/WAKING/bulletins/297c7e6>

While Boeing Field is the regional UPS hub, it is perhaps best known for activity related to the Boeing Company. Boeing currently uses BFI to land the 737s to prepare for final deliveries after the initial test flight in Renton.⁸²

Figure 106: BFI cargo tonnage, 2019 - 2020



Source: Bureau of Transportation Statistics, T-100 Market Data, 2021.

Spokane International Airport

Spokane International Airport (GEG) is situated about 7 miles southwest of downtown Spokane. It is the largest cargo airport in eastern Washington. GEG handled about 69,001 tons of cargo in 2019 and 74,835 tons of goods in 2020. About 97 percent of air cargo is generated by FedEx and UPS operations. According to the Spokane International Airport Master Plan, the airside and landside infrastructure is sufficient to accommodate future cargo operations.⁸³

In recent years, e-commerce giant Amazon has invested heavily in the Spokane area. After opening two mega distribution centers in Spokane, Amazon is partnering with GEG to develop a 30,750-square-foot facility with 10 truck docks and nearly 90 parking spaces on the east side of the airport. According to Amazon, this made Spokane become the second Amazon Air gateway in the nation.⁸⁴ While Amazon operates a hub facility in Cincinnati, the company's first air gateway is in nearby Wilmington, Ohio.

Even with the sufficient airside and landside infrastructure, GEG has explored expansion alternatives to better anticipate future cargo growth. The Master Plan developed preferred alternatives for infrastructure expansion in the North Cargo Area, where most of the cargo activity is located. The North Cargo Area can accommodate an additional 140,000 square feet of floor area as well as parking space for three 777-200s, four A310s, and multiple smaller cargo aircraft.

⁸² Boeing Commercial Airplanes 737 Manufacturing Site, Archive.gov.

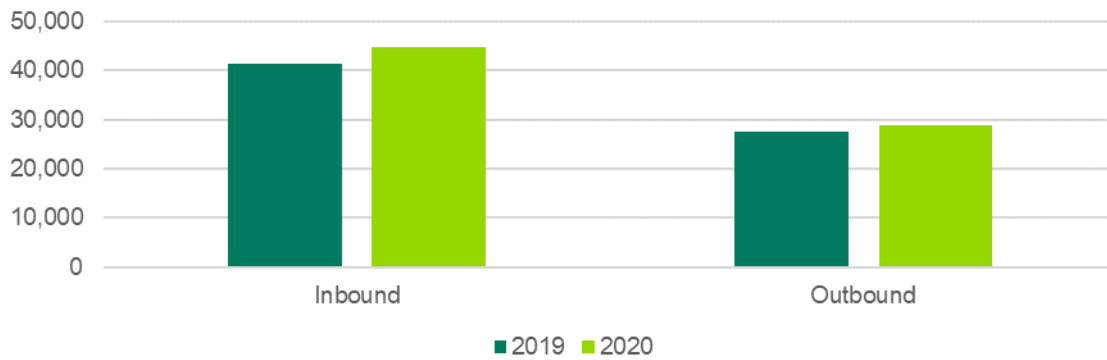
<https://web.archive.org/web/20090305005032/http://www.boeing.com/commercial/facilities/rentonsite.html>

⁸³ Spokane International Master Plan, Spokane International Airport, 2014. <https://business.spokaneairports.net/airport-master-plan/>

⁸⁴ Amazon launches air operations at Spokane International Airport, *The Spokesman-Review*, Amy Edelen, March 2021.

<https://www.spokesman.com/stories/2021/mar/18/amazon-to-lease-air-cargo-facility-at-spokane-inte/>

Figure 107: GEG cargo tonnage, 2019 - 2020



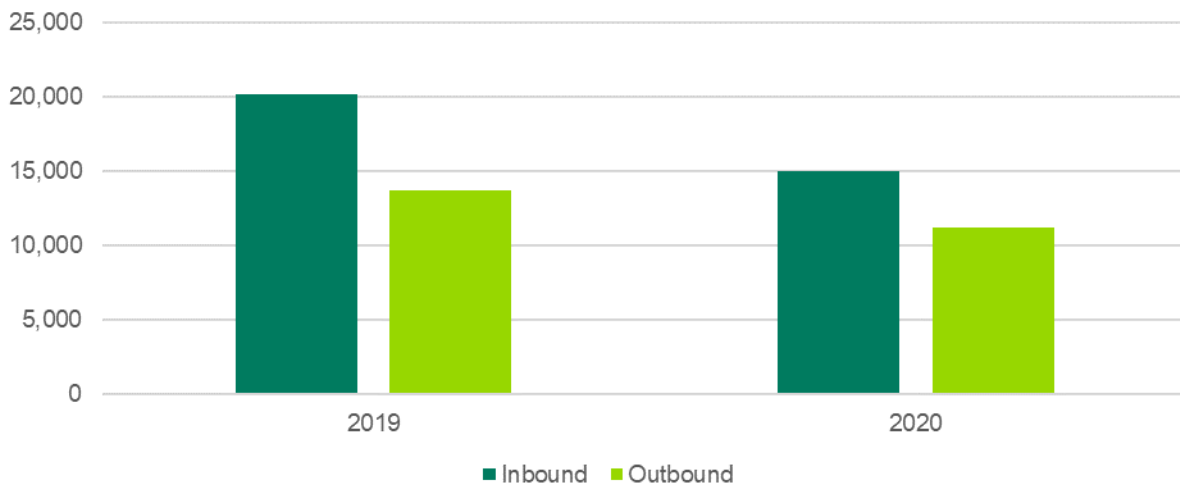
Source: Spokane International Airport Monthly Traffic Report, 2020.

Paine Field Airport

Paine Field Airport (PAE), also known as Snohomish County Airport, is located between Mukilteo and Everett, 25 miles north of Seattle. It is home to the Boeing Everett Factory and Aviation Technical Services, which is one of the largest aviation maintenance facilities in the U.S. PAE processed about 35,187 tons of cargo in 2019. The tonnage of air cargo decreased by 29.2 percent in 2020. The primary destinations and origins of PAE include Charleston International Airport (CHS), Chubu Centrair International Airport (NGO), McConnell Air Force Base (IAB), and Anchorage International Airport. Among those primary origins and destinations, CHS, NGO, and IAB are all involved in producing parts for Boeing. In February 2021, Boeing officially moved its 787 Dreamliner production from Puget Sound region to North Charleston, South Carolina, which may change the freight movements at PAE in the future.

In 2021, FedEx took over the former Boeing Dreamliner facilities, which consist of three parking spaces for large airplanes, 25,000 square feet of warehouse space, and an aviation refueling station. FedEx will start daily operations between PAE and its hub in Memphis on weekdays.⁸⁵ As a result, cargo tonnage at PAE could experience a potential increase in the future. This will complement and not replace the FedEx facility currently operating at SEA

Figure 108: PAE cargo tonnage, 2019 - 2020



Source: Bureau of Transportation Statistics, T-100 Market Data, 2021.

⁸⁵ FedEx to begin weekday flights between Paine Field, Memphis, *Herald Net*, Janice Podsada, August 2021. <https://www.heraldnet.com/business/fedex-to-begin-weekday-flights-between-paine-field-memphis/>

The importance of Washington airports to Boeing's operations

Boeing relies on air cargo to transport aircraft components and parts. This supports their manufacturing operations in the state and allows them to deliver completed aircraft as well as provide parts to customers around the globe. The airports in Washington state, such as Paine Field Airport, King County International Airport, Renton Airport, Grant County International Airport, and Seattle Tacoma International Airport, play different roles in the production and delivery of Boeing aircraft.

The Boeing Facility in Renton manufactures 737s while the other factory in Everett assembles wide-body aircraft, such as 747s, 767s, and 777s. The Paine Field Airport is the primary airport that receives major parts from overseas since it has the capacity to allow larger cargo aircraft, such as the Boeing 767 and Antonov. Those parts are often used for manufacturing wide-body aircraft in the Everett Factory before being delivered to airlines in Paine Field Airport.

Components for assembling 737s are usually delivered to Renton Airport through rail and trucking. After the completion of the manufacturing, the 737s go through test flights from Renton and conduct a touch-and-go at Grant County International Airport before finally landing in King County International Airport for final delivery.

Although Seattle-Tacoma Airport is not a part of Boeing's production process, it houses the largest spare parts distribution centers in the world. The center ships out parts to all around the world to meet the fixing needs of various Boeing aircraft.

Regional air cargo facilities⁸⁶

Grant County International Airport

Grant County International Airport (MWH) is about 6 miles northwest of Moses Lake in Grant County, Washington. Once the Larson Air Force Base, MWH is currently owned by the Port of Moses Lake. The Boeing Company, Japan Airlines, the U.S. military, and other entities use MWH as a testing facility and a training center. MWH also hosts a U.S. Forest Service Very Large Tank base for fire suppression operations. The uncongested and long runways and open-air space provide an ideal infrastructure for both commercial and military aviation. The 13,500-foot-long by 200-foot-wide runway can accommodate the existing large cargo aircraft up to the Antonov 225.⁸⁷ In addition, there is a local Foreign Trade Zone on site of the airport. The available infrastructure gives MWH the potential to welcome logistics and distribution opportunities in the future and made it suitable for electric and hydrogen powered aircraft testing.⁸⁸

In 2018, MWH started a pilot program to provide chartered air cargo service for cherry exports, transporting Washington cherries to East Asia destinations. MWH has sufficient cold storage, providing essential infrastructure for handling cherries and other perishable products. This program has continued to provide limited service to support cherry exports. Another unique service MWH provides is that it is one of the three Return-to-Service centers for Boeing.⁸⁹

The Port of Moses Lake is planning a major expansion at MWH, including the expansion of East Terminal Apron, doubling the size of the industrial wastewater facility, and building new warehouses

⁸⁶ Note: there is insufficient data or information about trends and operations for these regional airports. Discussions regarding air cargo data, trends, and operations on the books for Grant County, Yakima, and Pasco between now and mid-December.

⁸⁷ Comprehensive Scheme of Harbor Improvements, Port of Moses Lake, August 2019.

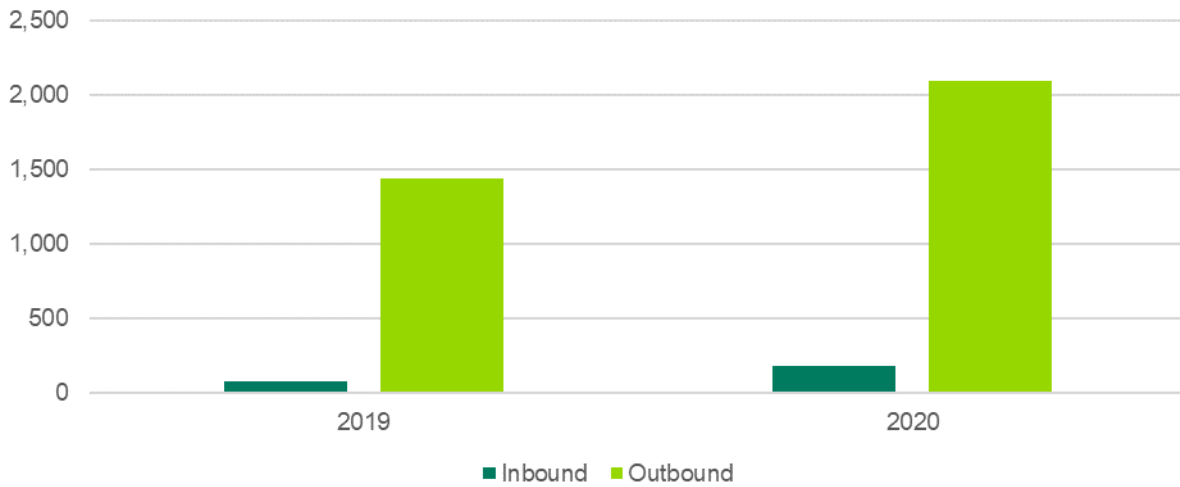
<https://www.portofmoseslake.com/project/uploads/2020/05/Port-of-Moses-Lake-Comp-Scheme-2019-Final.pdf>

⁸⁸ Grant County International Airport, Grant County Economic Development Council, (n.d.). <https://www.grantedc.com/site-selection/logistics/air/>

⁸⁹ Consultation notes.

for regional supply and distribution firms.⁹⁰ In 2020, a \$21-million runway improvement project was completed and removed a 6-foot-high obstacle on the 13,500-foot-long main runway.⁹¹

Figure 109: MWH cargo tonnage, 2019 - 2020

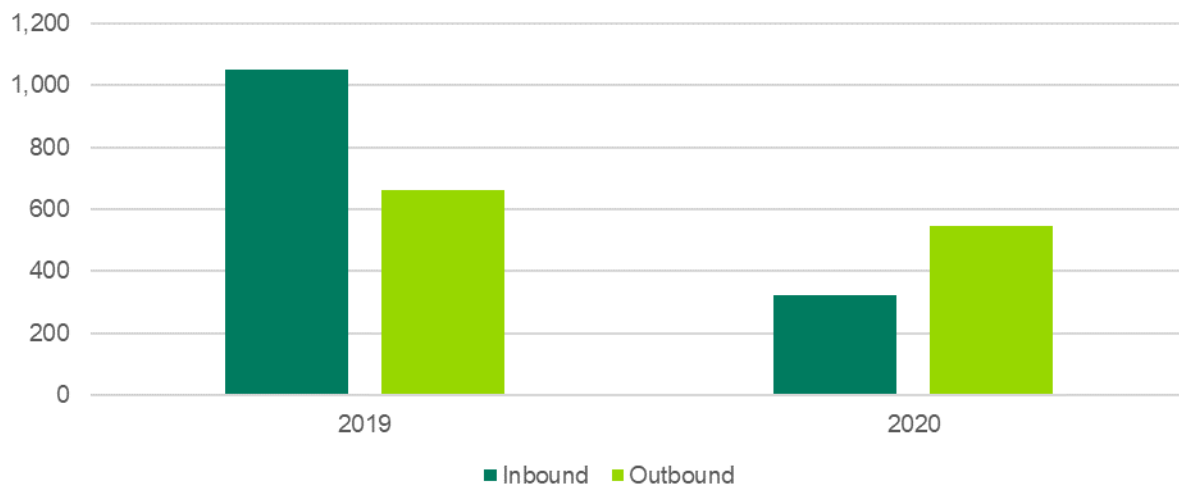


Source: Bureau of Transportation Statistics, T-100 Market Data, 2021.

Bellingham International Airport

Bellingham International Airport (BLI) is 3 miles northwest of Bellingham, Whatcom County, Washington. Major carriers, including FedEx and UPS, have presence in BLI. Figure 110 presents the cargo volume at BLI in 2019 and 2020. The decrease in inbound cargo volume might be a result of the COVID pandemic.

Figure 110: BLI cargo tonnage, 2019 - 2020



Source: Bureau of Transportation Statistics, T-100 Market Data, 2021.

⁹⁰ The Center of Washington Aviation, Port of Moses Lake (n.d.). <https://www.portofmoseslake.com/aeronautics/>

⁹¹ Port of Moses Lake Reopens Runway 14L/32R, Century West Engineering, June 2020. <https://centurywest.com/port-of-moses-lake-reopens-runway-14l-32r/>

Yakima Air Terminal-McAllister Field

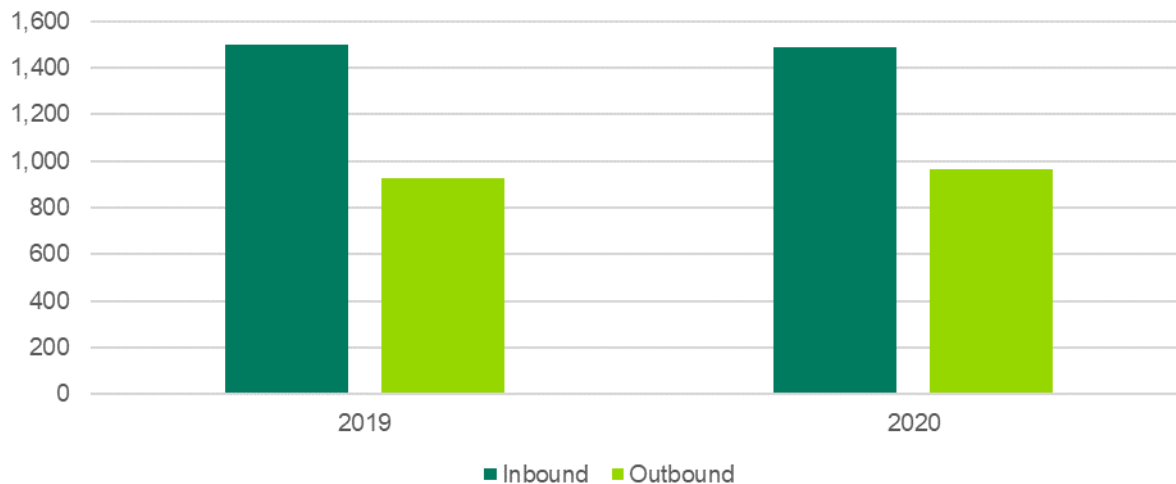
Yakima Air Terminal-McAllister Field (YKM) is owned by the City of Yakima and is located 3 miles south of Yakima in Yakima County, Washington. The Airfield is crucial to moving goods in and out the region during wintertime, when road conditions can be difficult for trucks. A variety of commodities, from small parts of heavy equipment to fruit products, are transported at YKM.^{92,93} Figure 111 demonstrates the cargo tonnage at YKM in 2019 and 2020, showing the outbound cargo volume increased slightly (0.7 percent).

As shown in Figure 111, YKM processed around 9,000 tons of cargo annually prior to the pandemic. The slight increase in tonnage in 2021 indicates that the air cargo service has been recovering from the COVID disruption. FedEx and UPS are the two main players in the air cargo service at YKM.

Yakima Valley hosts a variety of aerospace companies and the second largest aerospace manufacturing plant in Washington. YKM is also home to CubCrafters, a manufacturer of light sport and light utility aircraft. The infrastructure at YKM is a key resource that supports the growth of the aerospace industry in Yakima Valley and relies on the airport's cargo facilities and servicers.

The YKM Airport Layout Plan predicts significant growth in total annual aircraft operations, increasing by 23 percent (446,556 operations) from 39,444 annual operations in 2018 baseline year.⁹⁴ To prepare for the anticipated growth, YKM has begun its physical improvement projects. The nearly \$2 million rehabilitation of the West General Aviation Apron has been in progress since 2019. The project intends to repave the apron area, replace aging airfield lighting, improve the terminal building sewer system, and update the aircraft parking area.⁹⁵ The Airport is also planning to add a taxi lane to the south side of the airport to accommodate additional hangars.⁹⁶

Figure 111: YKM cargo tonnage, 2019 - 2020



⁹² Consultation notes.

⁹³ Yakima airport's 20-year plan projects significant growth, *Yakima-Herald-Republic*, Joel Donofrio, October 2021. https://www.yakimaherald.com/news/local/yakima-airports-20-year-plan-projects-significant-growth/article_c8926414-1790-55ac-9a68-41cef28f7956.html

⁹⁴ Yakima Air Terminal McAllister Field Airport Layout Plan, Century West Engineering, (n.d.). <https://centurywest.com/what-we-do/aviation-planning-projects/yakima-air-terminal-mcallister-field-airport-layout-plan/>

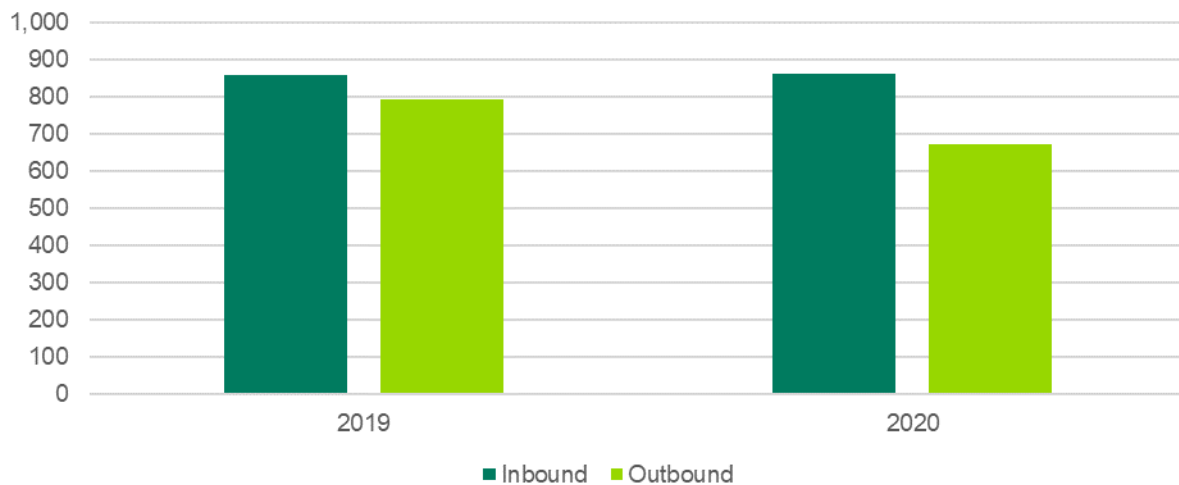
⁹⁵ Apron Project Begins at Yakima Airport, City of Yakima, John Fannin, April 2019. <https://www.yakimawa.gov/media/news/apron-project-begins-at-yakima-airport/>

⁹⁶ Consultation notes.

Tri-Cities International Airport

Tri-Cities International Airport (PSC) is a public airport that is about 2 miles northwest of Pasco, in Franklin County, Washington. It is also about a 2-hour drive from Spokane. FedEx and UPS both have a presence in the airport. In 2018, FedEx invested \$6 million to expand its facility in PSC from 14,000 square feet to 51,000 square feet. The new facility will have direct access to planes and allow an automatic conveyor to transport unloaded cargo to a raised sorting platform.⁹⁷ The inbound FedEx shipments consist of both residential and commercial shipments, including ecommerce, medical supplies, and auto parts. The outbound commodities are similar to inbound commodities with some specialty commodities, such as radioactive isotopes for cancer treatments.⁹⁸

Figure 112: PSC cargo tonnage, 2019 - 2020



Source: Port of Pasco.

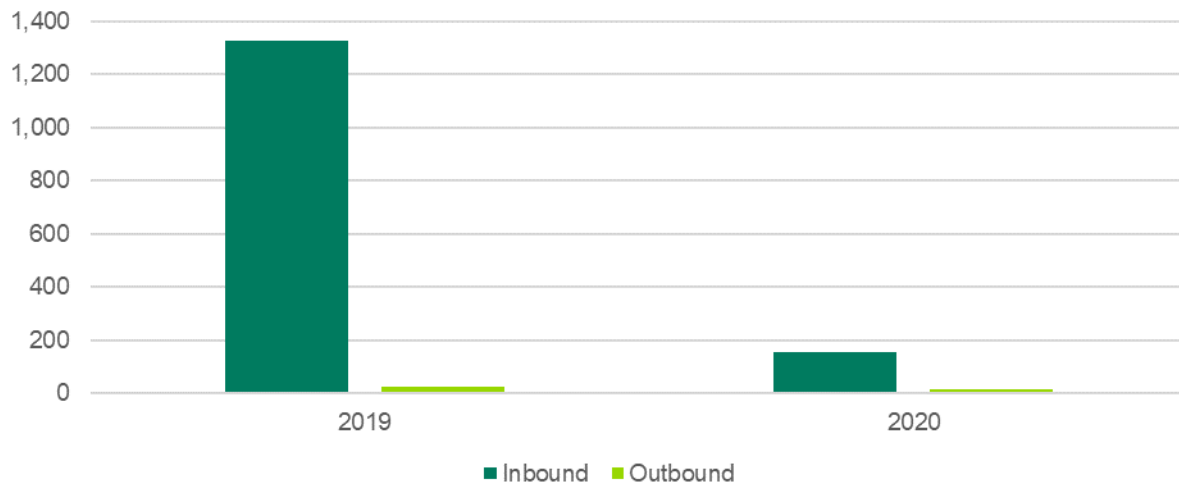
Friday Harbor Airport

Friday Harbor Airport (FHR/FRD) is a public airport owned by the Port of Friday Harbor and located southwest of Friday Harbor on San Juan Island, the second largest among the 172 islands in the northernmost stretch of Puget Sound. The Island is between Vancouver Island, Canada, and the Washington mainland. The Airport has one runway that is 3,402 feet long and 75 feet wide that has a pavement strength of 12,500-pound single wheel loading. The primary freight carrier at FHR/FRD is FedEx, followed by Kenmore Air. Figure 113 shows the cargo tonnage at FHR/FRD, presenting a sharp drop in inbound volume in 2020.

⁹⁷ FedEx facility gets \$6 million overhaul in Pasco, *Tri-Cities Area Journal of Business*, Robin Wojtanik, June 2018. <https://www.tricitiesbusinessnews.com/2018/06/fedex-expands/>

⁹⁸ Consultation notes.

Figure 113: FHR/FRD cargo tonnage, 2019 - 2020



Source: Bureau of Transportation Statistics, T-100 Market Data, 2021.

Nearby airports handling cargo for Washington shippers

In addition to the airports within Washington, two airports just across the border from Washington, Vancouver (BC) International (YVR) and Portland International (PDX), serve Washington shippers and shippers across the Pacific Northwest, providing access to domestic and global markets. One Washington commodity that provides an example of how the state relies upon the Pacific Northwest's air cargo system: cherries.

Cherry volumes are so large that, with the narrow production and harvest window, Washington cherry shippers make use of air cargo capacity at all three of the PNW's major cargo airports: Seattle, Vancouver, and Portland. Having the combined capacity of all three airports' cargo carriers enables Washington cherry exporters to ship their perishable, time-sensitive cargo to the overseas markets that are so critical to the industry. (Note: cherries also get trucked to California airports for export.)

Vancouver (BC) International Airport

Vancouver International (YVR) is located about 30 miles north of the U.S./Canada border just off BC 99 (the continuation of I-5 in British Columbia). The airport provides Washington shippers (as well as those in Oregon and British Columbia) with international cargo service on freighters and well as in belly compartments of passenger aircraft serving a variety of markets in Asia and Europe.

Cargo carriers at YVR carry cargo similar to that found at both SEA and PDX. Perishables, such as produce and seafood, as well as manufactured goods, are among the primary cargo types moving through the airport. While Portland serves as a consolidation hub for Asian e-commerce shipments due to the lack of sales tax, given the strong demand for e-commerce, YVR handles some of that cargo as well.

One of the unique elements of moving air cargo to or from the U.S. via YVR is the need to cross the border and clear customs. This can sometimes delay cargo delivery. However, in August 2019, the U.S. and Canada signed an agreement to expand pre-clearance for truck and rail cargo.⁹⁹ This would also allow air cargo to be pre-cleared before it is trucked across the border.

Portland International Airport

Both domestic and international cargo carriers serve Oregon and southern Washington out of Portland International Airport (PDX). Located at the final interchange on I-205 before crossing the Columbia River into Vancouver, PDX is well-positioned to serve southern Washington, particularly southwest Washington. Its location puts it closer to some Washington shippers than it is to some Oregon shippers. High tech shippers in eastern Vancouver and Camas are closer, both in distance and time to PDX than their counterparts in the Silicon Forest in the western Portland suburb of Hillsboro.

While PDX has both dedicated international freighter service and belly capacity on overseas passenger flights, the service is limited compared to both SEA and YVR. Cathay Pacific Cargo is currently the only freighter carrier serving PDX. During peak harvest, particularly around cherries, Cathay increases the number of flights it operates out of PDX as it carries Oregon and Washington cherries to markets in Asia. Although Delta Air Lines has historically provided wide-body passenger service to both Asia and Europe out of PDX, that service has been suspended during the pandemic. In addition to fresh fruits, international cargo flights out of PDX carry fresh seafood, computers and electrical equipment, and footwear components, among other commodities.

UPS, FedEx, and PrimeAir serve Washington shippers and customers via PDX, as the airport is closer to many southern Washington locations than other airports with scheduled cargo service. Historically, regional feeder carriers for UPS and FedEx have served Washington airports out of PDX, but route maps show that is not currently the case. Amazon has greatly increased its presence at PDX as it has SEA.¹⁰⁰ Between 2014 and 2019, PDX total cargo tonnage across all carriers grew nearly 40 percent.¹⁰¹

⁹⁹ US-Canada truck preclearance moves closer to reality, *The Journal of Commerce Online*, August 2019. https://www.joc.com/trucking-logistics/us-canada-truck-preclearance-moves-closer-reality_20190819.html

¹⁰⁰ Blue Skies for Amazon Air, Chaddick Institute for Metropolitan Development at DePaul University, Joseph P. Schwieterman, Borja González, Mitchell Hirst, and Abby Mader, September 2021. <https://drive.google.com/file/d/1777clMWs9Rzf3nPbqHS0QFSffMP3zVUj/view>

¹⁰¹ CPCS calculation using data from the Port of Portland's website

6. Washington's pipeline network

Key chapter takeaway

Washington supports an extensive pipeline system carrying natural gas, crude oil, and petroleum products. Over 46,000 miles of pipeline in 30 counties is managed by 36 operators. The state's pipelines transported about 7.5 billion gallons of oil in 2020. The state's five refineries are significant producers of gasoline, diesel, and jet fuel.

Pipeline system overview

There are over 46,000 miles of pipeline in Washington, carrying over \$22.8 billion worth of crude oil, petroleum, and natural gas through 30 of the state's 39 counties.¹⁰² In 2020, Washington's pipelines carried about 7.5 billion gallons of oil (Figure 114).¹⁰³

Figure 114: Washington's pipeline system

46,300 miles	7.5 billion gallons	30 counties	\$22.8B
Approximate length of pipeline in Washington, 2020	Approximate volume of oil moved by pipeline in Washington, 2020	House pipeline, out of Washington's 39 total, 2020	Approximate value of commodities moving through Washington pipelines, 2017

Source: CPCS analysis of USDOT, Pipeline and Hazardous Materials Safety Administration, State of Washington Department of Ecology, Washington Utilities and Transportation Commission, and FAF5 data, 2021.

Figure 115 provides an overview of the different types of pipeline in Washington, including each type's total mileage operator count. The vast majority of Washington pipeline mileage is used for natural gas distribution.

Figure 115: Washington pipeline miles and operators

Cargo Type	Pipeline Miles	Operators
Hazardous liquid	807.1	10
Gas transmission	1,946.4	18
Gas distribution	43,585.8	6
Liquid natural gas	N/A	2
Total	46,339.3	36

Source: CPCS analysis of the U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration data, 2021.

Washington's pipelines carried almost 100 million tons of fuel in 2017, worth over \$22.8 billion. As shown in Figure 116 and Figure 117, roughly 72 percent of the tonnage and 78 percent of the value of commodities traveling by pipeline in Washington were moving domestically. That is, they moved entirely within Washington, into the state from a domestic source or out of the state to a domestic destination. The remaining 28 percent of tonnage and 22 percent of value were comprised of

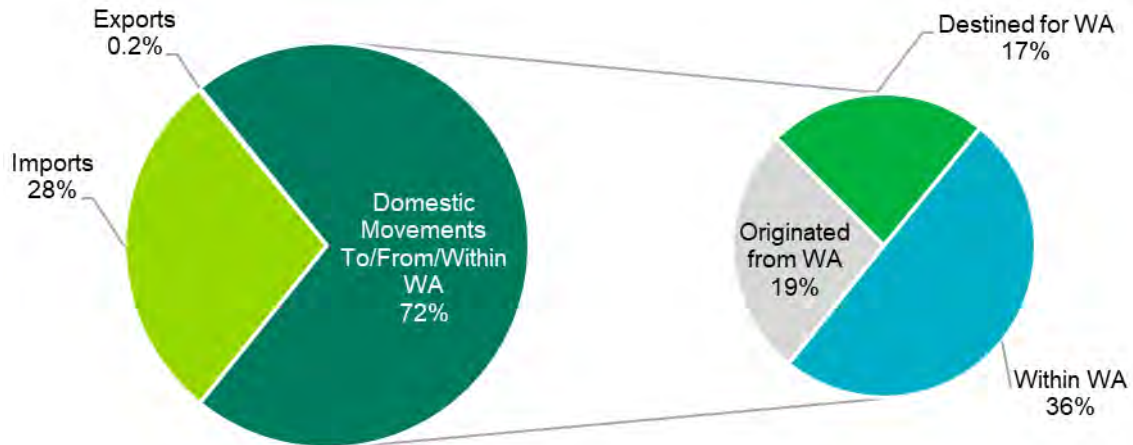
¹⁰² Pipeline Mileage and Facilities, Pipeline and Hazardous Materials Safety Administration, USDOT. <https://www.phmsa.dot.gov/data-and-statistics/pipeline/pipeline-mileage-and-facilities> | FHWA FAF 5 data | Pipeline Operators by County, Washington Utilities and Transportation Commission, (n.d.). <https://www.utc.wa.gov/pipeline-operators-county>

¹⁰³ Total Oil Moved by Year and Mode, State of Washington Department of Ecology, October 2021. <https://apps.ecology.wa.gov/publications/documents/1708014.pdf>

imported commodities. Of the pipeline commodities moving domestically, about 50 percent of their tonnage and 61 percent of their value moved entirely within Washington.¹⁰⁴

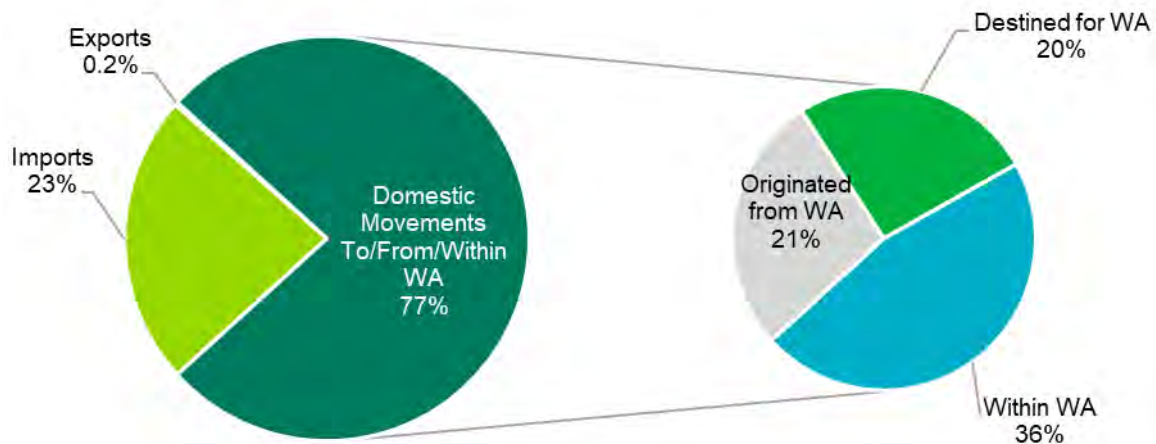
Compared to the tonnage and value of freight transported by pipeline in 2017, the domestic movements are predicted to increase in both volume (+5 percent) and value (+ 2 percent) in 2022.

Figure 116: Tonnage of freight carried by pipeline in Washington by trade type, 2017



Source: CPCS analysis of FAF5 data, 2022.

Figure 117: Tonnage of freight carried by pipeline in Washington by trade type, 2022



Source: CPCS analysis of FAF5 data, 2022.

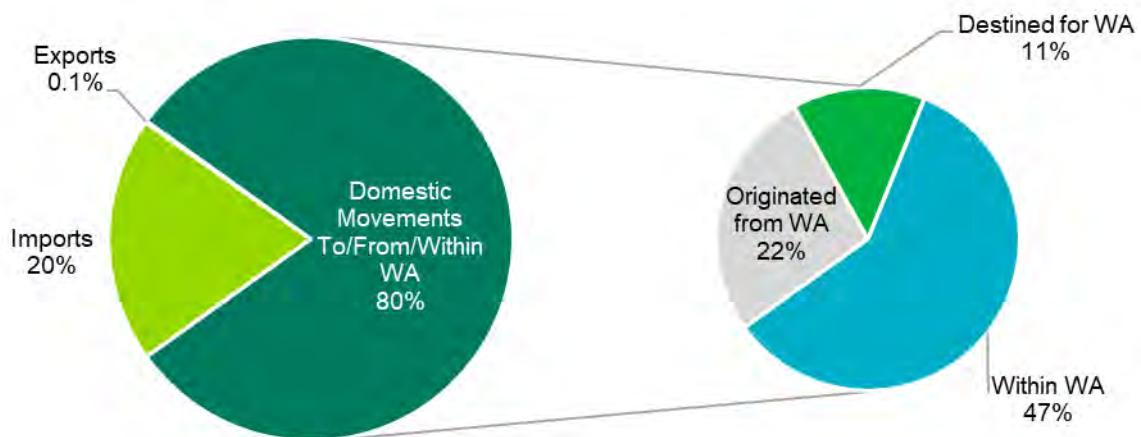
¹⁰⁴ National Transportation Research Center, Freight Analysis Framework Version 5. <https://faf.ornl.gov/faf5/>

Figure 118: Value of freight carried by pipeline in Washington by trade type, 2017



Source: CPCS analysis of FAF5 data, 2022.

Figure 119: Value of freight carried by pipeline in Washington by trade type, 2022



Source: CPCS analysis of FAF5 data, 2022.

Pipeline operators in Washington

A total of 36 operators manage the pipeline system in Washington. This count includes 24 operators of natural gas pipelines and six operators of hazardous liquid pipelines. There are also two operators of liquid natural gas facilities (Figure 120).¹⁰⁵ Three of Washington's most important operators are examined below in more detail.

BP's Olympic Pipeline is the longest in the state. The pipeline carries gasoline, diesel, and jet fuel originating at four refineries in Whatcom and Skagit counties. The fuels are delivered to locations including Seattle-Tacoma International Airport, Renton, Tacoma, Vancouver, Washington, and Portland, Oregon.¹⁰⁶

400 miles

Length of the longest pipeline in Washington (BP's Olympic pipeline), which runs from Blaine, Washington to Portland, Oregon.

Source: Washington Department of Ecology, 2021.

Williams Companies' Northwest Pipeline operates in 24 of Washington's counties.¹⁰⁷ The operator's 3,900 miles of transmission pipeline carry 3.8 million dekatherms¹⁰⁸ of natural gas per day between the states of Washington, Oregon, Idaho, Wyoming, Utah, and Colorado.¹⁰⁹

The Cascade Natural Gas Corporation operates in 17 of Washington's counties.¹¹⁰ Headquartered in Kennewick, Cascade's pipeline serves over 294,000 customers.¹¹¹

Natural gas pipelines

The natural gas pipeline runs throughout much of Washington. Over 45,000 miles of natural gas pipeline carry fuel throughout the state. Gas pipeline runs along a similar path as petroleum pipeline. In the western portion of the state, gas pipeline transports fuel from the Canadian border, east of the Puget Sound, towards Vancouver, Washington, and Portland, Oregon, in the south. Like petroleum pipeline, the natural gas pipeline also runs between Spokane, Moses Lake, and Kennewick in the eastern portion of the state. However, the natural gas pipeline also offers connections between eastern and western Washington via an east-west pipeline along the Washington-Oregon border.¹¹²

43%

Share of all oil movements traveling by pipeline in Washington, 2020.

Source: Washington Department of Ecology, 2021.

Of the state's 45,000 miles of natural gas pipeline, 43,000 miles are dedicated to distribution, and the remaining 2,000 or so are used for natural gas transmission.¹¹³ Distribution pipelines carry commodities to industrial, commercial, and residential consumers. Transmission pipeline, on the

¹⁰⁵ US Pipeline Mileage and Facilities, Pipeline and Hazardous Materials Safety Administration, USDOT. <https://www.phmsa.dot.gov/data-and-statistics/pipeline/pipeline-mileage-and-facilities>

¹⁰⁶ Our pipelines: Olympic Pipeline, BP, (n.d.). https://www.bp.com/en_us/united-states/home/products-and-services/pipelines/our-pipelines.html#accordion_olympic

¹⁰⁷ Pipeline Operators by County, Washington Utilities and Transportation Commission, (n.d.). <https://www.utc.wa.gov/pipeline-operators-county>

¹⁰⁸ A dekatherm (Dth) is a unit to measure the heating value of a certain volume of natural gas. One Dth is equal to a million thermal units. <https://www.definitions.net/definition/DEKATHERM>

¹⁰⁹ Northwest Pipeline, Williams Companies, (n.d.). <https://www.williams.com/operating-area/transmission-and-gulf-of-mexico/>

¹¹⁰ Pipeline Operators by County, Washington Utilities and Transportation Commission, (n.d.). <https://www.utc.wa.gov/pipeline-operators-county>

¹¹¹ About Us, Cascade Natural Gas Corporation, (n.d.). <https://www.cngc.com/in-the-community/about-us/>

¹¹² Ibid.

¹¹³ US Pipeline Mileage and Facilities, Pipeline and Hazardous Materials Safety Administration, USDOT. <https://www.phmsa.dot.gov/data-and-statistics/pipeline/pipeline-mileage-and-facilities>

other hand, transports fuels over extensive distances from processing and treatment plants. There is a third type of pipeline—gathering pipeline—but Washington does not have any in its network.

Figure 121 offers a schematic of these three types of pipelines and their locations in Washington. It is important to note that unlike natural gas pipelines, crude oil and petroleum product pipelines in western and eastern Washington do not connect. This restricts the state's pipeline system from moving fuel east-west, a gap which the rail system tends to fill. This lack of east-west movement on pipelines also presents a resiliency concern, as heavily-used rail lines are the only option to move this material east-west in Washington.

Figure 120: Pipeline system in Washington

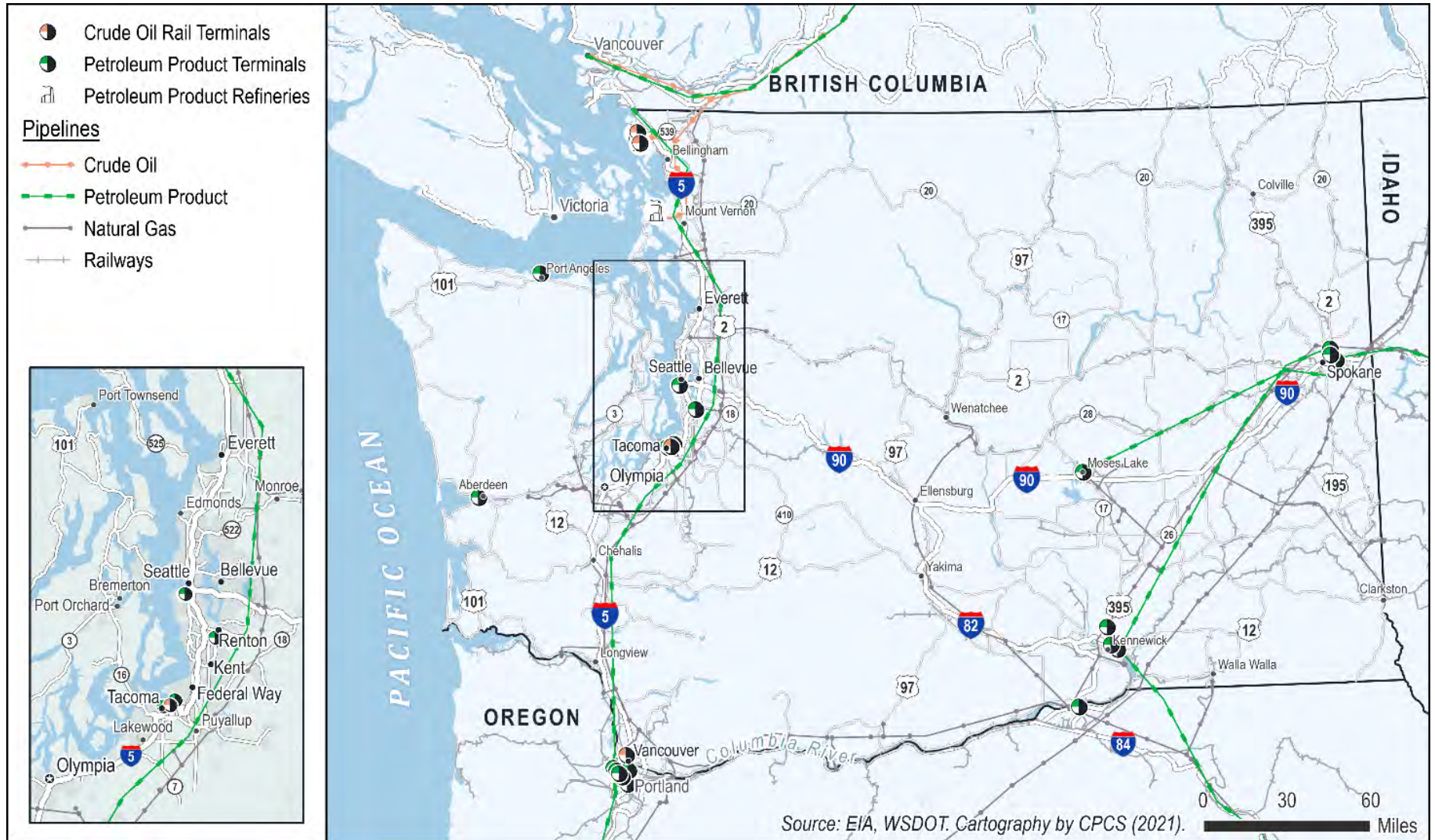
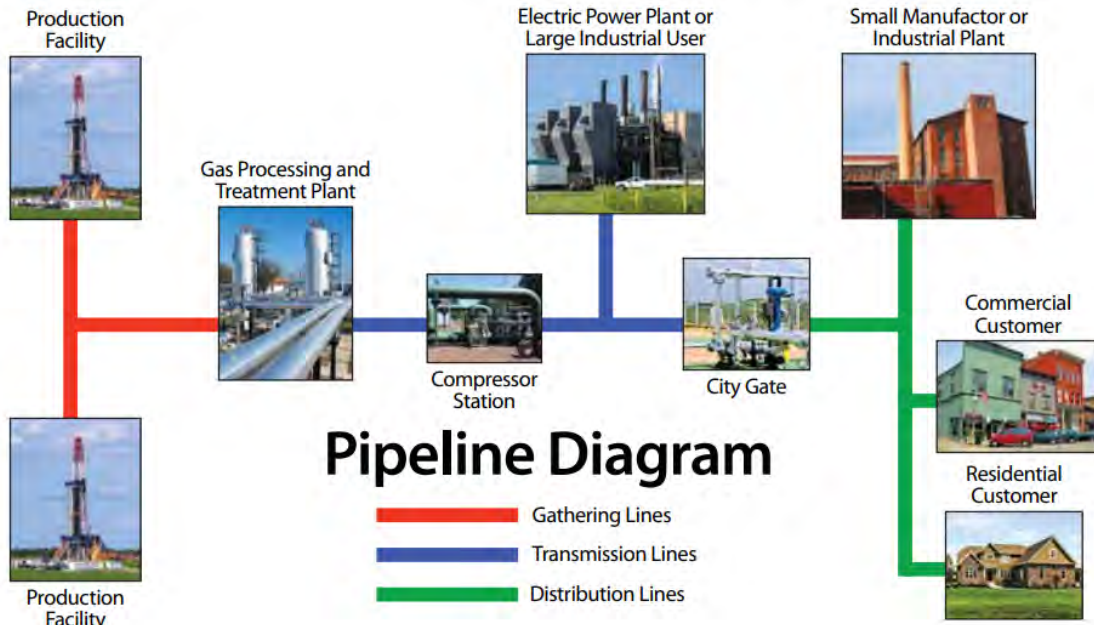


Figure 121: Types of pipeline in Washington



Source: Pipeline Safety Trust, Pipeline Safety in Washington State, 2018.

Pipeline terminals and refineries

Terminals

A pipeline terminal is a facility where oil and other fuels are stored before being transported to final consumers. In Washington, there are 18 petroleum product terminals in nine counties. Figure 122 shows the number of pipeline terminals in each of these nine counties.

Figure 122: Pipeline terminals in Washington

County	Number
Clallam	1
Clark	2
Franklin	3
Grant	1
Grays Harbor	1
King	4
Pierce	2
Spokane	3
Whatcom	1
Total	18

Source: CPCS analysis of WA Department of Ecology data, 2021.

Refineries

A refinery is a plant used to convert crude oil into consumer products like gasoline and jet fuel. Washington has five refineries. These refineries contributed 3.3 percent of the nation's refining capacity in 2017, processing about 652,000 barrels of crude oil every day.^{114,115} In fact, the state has the nation's fifth-largest refining capacity.¹¹⁶ Gasoline constitutes almost 46 percent of these refineries' production, and diesel and jet fuel are other top commodities produced.¹¹⁷ Figure 123 provides more information about the name and location of each of Washington's five refineries. All five are located in the northwest portion of the state.¹¹⁸

BP's Cherry Point refinery in Blaine is the largest in Washington, capable of processing about 242,000 barrels of crude oil every day.¹¹⁹ It is the only refinery in the Pacific Northwest that can produce diesel from biomass feedstocks. It is also the largest supplier of jet fuel to the international airports in Seattle, Washington, Portland, Oregon, and Vancouver, British Columbia.¹²⁰

Figure 123: Refineries in Washington

Owner/Name	City	County	Processing capacity (crude oil barrels per day)
BP Chery Point	Blaine	Whatcom	242,000
Phillips 66	Ferndale	Whatcom	105,000
Shell Oil	Anacortes	Skagit	145,000
Tesoro Marathon	Anacortes	Skagit	119,000
U.S. Oil	Tacoma	Pierce	40,700

Source: CPCS analysis of [WA](#) Department of Ecology and U.S. Energy Information Administration data, 2021.

¹¹⁴ The Economic Contribution of Washington State's Petroleum Refining Industry in 2017, 2019, Washington Research Council, February 2019. <https://researchcouncil.org/wp-content/uploads/2018-Refinery-Report-final.pdf>

¹¹⁵ US Energy Atlas, US Energy Information Administration, August 2021. <https://atlas.eia.gov/apps/natural-gas/explore>

¹¹⁶ Ibid.

¹¹⁷ The Economic Contribution of Washington State's Petroleum Refining Industry in 2017, 2019, Washington Research Council, February 2019. <https://researchcouncil.org/wp-content/uploads/2018-Refinery-Report-final.pdf>

¹¹⁸ Oil refinery requirements, State of Washington Department of Ecology, (n.d.). <https://ecology.wa.gov/Air-Climate/Air-quality/Business-industry-requirements/Oil-refinery-requirements>








¹¹⁹ Refinery Capacity Report, US Energy Information Administration, 2021. <https://www.eia.gov/petroleum/refinerycapacity/>








¹²⁰ Cherry Point Refinery Fact Sheet, BP, 2019. https://www.bp.com/content/dam/bp/country-sites/en_us/united-states/home/documents/eir-2019/cherry-point-refinery-factsheet.pdf

Reference Chapter A: Key road corridors for freight











Figure A-1 provides details about the key road corridors in Washington, including interstates, U.S. Highways, and state routes.













Figure A-1: Key road corridors in Washington






Corridor	Miles	Average Truck AADT *	Average Truck Share of Total AADT **	Description
Interstates				
	277 mi.	6,714	7.6%	Interstate 5 (I-5) is a major north-south corridor that runs along the U.S. West Coast from Canada to Mexico. I-5 passes through Washington, Oregon, and California, connecting the cities of Seattle, Portland, Sacramento, Los Angeles, and San Diego. In Washington, I-5 begins at the state's northern Canada border; passes through Seattle, Tacoma, Olympia, and Vancouver; and exits at the state's southern Oregon border.
	133 mi.	3,080	14.1%	Interstate 82 (I-82) is located in the Pacific Northwest, from Ellensburg, WA (where it connects with I-90) to Hermiston, OR (where it connects with I-84).
	30 mi.	3,881	2.5%	Interstate 204 (I-405) in Washington is a north-south auxiliary interstate corridor. It is a bypass route of I-5, running east of Lake Washington around Seattle, from Lynwood in at the north end to Tukwila at the south end. I-405 intersects I-90 in Bellevue.
	297 mi.	3,852	15.3%	Interstate 90 (I-90) is a major east-west corridor that runs along the northern U.S., from Washington on the Pacific Coast to Massachusetts on the Atlantic Coast. I-90 passes through 13 states, connecting the cities of Seattle, Billings, Sioux Falls, Madison, Chicago, Cleveland, Buffalo, Albany, and Boston. In Washington, I-90 begins in Seattle and travels east through Ellensburg and Spokane to the state's eastern Idaho border.
	11 mi.	3,175	3.6%	Interstate 205 (I-205) in Washington is a north-south auxiliary interstate corridor. It is a bypass route of I-5, beginning in Salmon Creek, WA; running east of Vancouver, WA and Portland, OR; and connecting again with I-5 in Tualatin, OR. I-205 intersects I-84 east of Portland.
	15 mi.	2,162	5.6%	Interstate 182 (I-182) is an east-west auxiliary interstate corridor in Washington, crossing the Columbia River to connect I-82 with the Tri-Cities (Kennewick, Pasco, and Richland). All of I-82 travels in concurrency with US 12.
	1.5 mi.	339	0.7%	Interstate 705 (I-705) in Washington is a spur that runs north off I-5 in Tacoma, WA.

Corridor	Miles	Average Truck AADT *	Average Truck Share of Total AADT **	Description
	770 mi. ¹²¹	N/A (not located in Washington)	N/A (not located in Washington)	Interstate 84 (I-84) in the northwestern U.S. is an east-west interstate corridor that passes through Oregon, Idaho, and Utah, connecting the cities of Portland, Boise, and Ogden. Although I-84 is not located in Washington, the segment of I-84 that extends east from Portland runs along Oregon's northern border with Washington along the Columbia River, with several bridges connecting I-84 in Oregon to SR 14 in Washington.
U.S. Highways				
	6.4 mi	1,368	42.6%	U.S. Highway 730 (US 730) is an east-west highway that is primarily located in Oregon, with less than ten miles running in Washington. Connecting with US 12 at the Wallula Junction in Washington, US 730 then runs south along the eastern edge of the Columbia River into Oregon, where it connects to US 82 and US 84.
	192 mi.	1,095	10.1%	U.S. Highway 395 (US 395) is a major north-south highway that passes through the eastern portions of Washington, Oregon, and California. US 395 also exits Northern California to run through Reno and Carson City in western Nevada before returning to Southern California. In Washington, US 395 begins at the Canada border in Ferry County and runs south to Spokane. From Spokane to Ritzville, US 395 runs concurrently with I-90. The corridor then continues onto Pasco, where it connects with I-182, and then turns back south to run with I-82 through Plymouth and across the Columbia River into Oregon.
	291 mi.	651	13.0%	U.S. Highway 97 (US 97) is a north-south highway. US 97 begins at the U.S.-Canada border in Oroville, WA; runs south through Oregon; and ends at I-5 in Weed, CA. In Washington, US 97 passes through Omak, Brewster, Wenatchee, Ellensburg, and Yakima.
	325 mi.	618	11.9%	U.S. Highway 12 (US 12) is a major east-west highway that runs along most of the northern U.S. US 12 passes through ten states, from Washington to Michigan. US 12 connects the cities of Helena, Minneapolis/St. Paul, Madison, greater Chicago, Ann Arbor, and Detroit. In Washington, US 12 begins at I-5 in Chehalis; runs east through Yakima, the Tri-Cities (Kennewick, Pasco, and Richland) and Walla Walla; and exits at Clarkston on the state's eastern Idaho border.
	94 mi.	510	8.5%	U.S. Highway 195 (US 195) is a north-south highway primarily located in Washington, with less than a mile running into Idaho. US 195 begins at I-90 in Spokane, runs south past Colfax and Pullman, and crosses the state's eastern border into Idaho, north of Lewiston.
	2.8 mi.	431	7.8%	U.S. Highway 197 (US 197) is a north-south highway primarily located in Oregon, with less than 5 miles located in Washington. US 197 begins at SR 14 in Smithville, then runs south and crosses the Columbia River into rural Oregon.

¹²¹ Interstate 84 (Western), Interstate-Guide.com, (n.d.). <https://www.interstate-guide.com/i-084-west/>

Corridor	Miles	Average Truck AADT *	Average Truck Share of Total AADT **	Description
	325 mi.	298	4.9%	U.S. Highway 2 (US 2) is a major east-west highway that runs along the northern U.S. US 2 has two segments: the eastern segment runs through four states from New York to Maine, and the western segment runs through seven states from Washington to Michigan. In Washington, US 2 begins at I-5 in Everett, runs east to Spokane, and then turns northeast to Newport at the state's eastern Idaho border.
	366 mi.	289	5.7%	U.S. Highway 101 (US 101) is a major north-south highway. US 101 runs from Washington, through Oregon, to California, where it connects San Francisco and Los Angeles. In Washington, US 101 begins in Olympia, runs northwest around the Olympic Peninsula coast, and then turns back south through Forks and Aberdeen to the state's Oregon border.
State Routes				
	28 mi.	3,865	4.3%	State Route 167 (SR 167) in Washington, also known as the Valley Freeway, is a four-lane highway that runs from I-5 in Tacoma, and curves southeast to turn north toward Renton, where it interchanges with I-405 and ends at I-900. SR 167 connects the cities of Tacoma, Puyallup, Sumner, Auburn, Kent, and Renton.
	12 mi.	3,744	4.3%	State Route 512 (SR 512) in Washington is located in Pierce County, connecting I-5 in Lakewood to SR 167 in Puyallup.
	28 mi.	3,517	8.6%	State Route 18 (SR 18) in Washington begins at SR 99 and intersects I-5 in Federal Way, and runs northeast through Covington and Maple Valley, ending at I-90 near Snoqualmie.
	1.8 mi.	2,730	6.0%	State Route 599 (SR 599) in Washington is located in Tukwila, extending north from I-5 to SR 99.
	1.1 mi.	2,724	22.1%	State Route 543 (SR 543) connects British Columbia Highway 15 in Canada to I-5 in northwestern Washington in Blaine, WA at the U.S.-Canada border.
	0.9 mi.	1,369	5.9%	State Route 433 (SR 433) runs south from SR 432 in Longview and crosses the Columbia River into Oregon, where it connects with US 30.
	28 mi.	1,360	2.1%	State Route 16 (SR 16) in Washington begins at I-5 and passes through the city of Tacoma, and then extends northwest to SR 3 in Gorst.
	12 mi.	1,073	16.6%	State Route 281 (SR 281) in Washington runs north from I-90 in George to connect to SR 28 in Quincy.

Corridor	Miles	Average Truck AADT *	Average Truck Share of Total AADT **	Description
	6.1 mi.	1,016	3.4%	State Route 181 (SR 181) in Washington is located in King County, extending north from SR 516 near SR 167 in Kent to I-405 in Tukwila.
	21 mi.	903	4.8%	State Route 8 (SR 8) in Washington connects US 12 in Elma to US 101 just west of Olympia in Thurston County.
	13 mi.	744	0.9%	State Route 520 (SR 520) in Washington begins at I-5 in north Seattle, intersects with I-405 in Bellevue, and connects to SR 202 in Redmond. Along its route, SR 520 crosses Lake Washington on the Evergreen Point Floating Bridge.
	26 mi.	739	30.5%	State Route 221 (SR 221) in Washington is located in Benton County, extending north from SR 14 in Paterson to I-82 and SR 22 in Prosser.
	10 mi.	703	4.5%	State Route 432 (SR 432) in Washington connects with I-5 in Keslo and extends northwest along the eastern side of the Columbia River to connect with SR 4/Ocean Beach Highway in West Longview.
	45 mi.	668	20.1%	State Route 24 (SR 24) is located in south-central Washington, connecting I-82 in Yakima to SR 26 in Othello. Along its route, SR 24 crosses the Columbia River on the Vernita Bridge.
	28 mi.	664	17.0%	State Route 243 (SR 243) in Washington connects with SR 24 north of Vernita Bridge on the Columbia River. SR 243 then runs northwest along the eastern side of the Columbia River to connect with SR 26 just south of the I-90/SR 26 intersection.
	2.2 mi.	604	12.0%	State Route 128 (SR 128) in Washington is located at the state's eastern Idaho border, connecting with US 12 south of the Snake River in Clarkston, running north across the Snake River, and then turning east to the state border.
	135 mi.	556	14.2%	State Route (SR 17) runs north-south through central Washington, beginning at US 395 in Mesa, extending north to intersect with I-90 at Moses Lake, and ending at US 97 in Southern Okanogan County.
	181 mi.	529	19.1%	State Route 14 (SR 14) in Washington runs east-west, north of the Columbia River along the state's southern Oregon border, beginning at I-5 and intersecting I-205 in Vancouver and ending at I-82 in Plymouth.
	134 mi.	502	17.8%	State Route 26 (SR 26) runs east-west through Central Washington, beginning at I-90 in Vantage and ending at US 195 in Colfax.
	1.4 mi.	416	9.4%	State Route 117 (SR 117) in Washington serves Port Angeles, extending north from US 101 to the port.

Corridor	Miles	Average Truck AADT *	Average Truck Share of Total AADT **	Description
	15 mi.	327	12.6%	State Route 283 (SR 283) in Washington connects with I-90 and SR 281 in George and extends northeast to connect with SR 28 in Ephrata.
	45 mi.	276	11.1%	State Route 124 (SR 124) in Washington connects US 12 in Burbank (near the Tri-Cities (Kennewick, Pasco, and Richland) to US 12 in Waitsburg.
	27 mi.	175	21.2%	State Route 127 (SR 127) in Washington connects with US 12 in Dodge and runs north to cross the Snake River in Peyton and end at SR 26 in Dusty.
	121 mi.	84	11.7%	State Route 25 (SR 25) in Washington, also known as the Coulee Reservoir Highway, runs north-south between US 2 in Davenport to Frontier at the state's northern border with Canada. For much of its route, SR 25 runs east along the Columbia River.
	22 mi.	80	12.2%	State Route 174 (SR 174) in Washington connects with SR 17 in Leahy, runs east and turns south through Grand Coulee, and extends south to meet SR 21 near US 2 in Wilbur.

Source: CPCS analysis of HPMS data, 2019.

Note: Mileage for concurrent segments is assigned to the primary route. Note: Corridors sorted by average truck AADT.

*Average Annual Average Daily Traffic (AADT) for Combination Trucks, calculated by taking the average value of AADT for Combination Trucks for all segments (weighted by segment length) on a given route.

**Average Annual Average Daily Traffic (AADT) for Combination Trucks Share of Total Annual Average Daily Traffic (AADT), calculated by dividing AADT for Combination Trucks by AADT for each segment, then taking the average value for all segments on a given route.

Reference Chapter B: Rail-served facilities

Figure B-1: Rail-served facilities in Washington

Facility Name	Type	Railroad	City
Seattle, WA	TOFC/COFC Intermodal	UP	Seattle
Seattle, WA - Seattle International Gateway (Sig)	TOFC/COFC Intermodal	BNSF	Seattle
Seattle, WA - South Seattle	TOFC/COFC Intermodal	BNSF	Seattle
Spokane, WA	TOFC/COFC Intermodal	BNSF	Spokane
Tacoma, WA - North Yard	TOFC/COFC Intermodal	BNSF	Tacoma
Tacoma, WA - South Yard	TOFC/COFC Intermodal	BNSF	Tacoma
Terminal 5 (T-5)	Marine roll-on-roll off intermodal	BNSF,UP	Seattle
Blair Terminal	Marine roll-on-roll off intermodal	BNSF,UP	Tacoma
East Blair One (Eb1) Terminal	Marine roll-on-roll off intermodal	TMBL	Tacoma
Terminal 7 (T7)	Marine roll-on-roll off intermodal	BNSF, UP via TMBL	Tacoma
Marshall Avenue Auto Facility	Marine roll-on-roll off intermodal	BNSF, UP via TMBL	Tacoma
Tote Maritime Alaska Terminal	Marine roll-on-roll off intermodal	BNSF, UP	Tacoma
Terminal 4	Marine roll-on-roll off intermodal	BNSF	Vancouver
Seattle Intl Gateway (Sig)	Intermodal	BNSF	Seattle
South Seattle	Intermodal	BNSF	Seattle
Spokane (Inland Empire)	Intermodal	BNSF	Spokane
Tacoma (North Yard)	Intermodal	BNSF	Tacoma
Tacoma (South Yard)	Intermodal	BNSF	Tacoma
Quincy Intermodal Terminal	Intermodal	BNSF	Quincy
Denver Avenue	Intermodal Terminal	UP	Seattle
Seattle International Gateway (SIG) Intermodal Facility	Intermodal	BNSF	Seattle
South Seattle Intermodal Facility	Intermodal	BNSF	Seattle
Spokane Intermodal Facility	Intermodal	BNSF	Spokane
Seattle Intermodal Terminal	Intermodal Terminal	UP	Seattle
Kent Automotive	Automotive Loading Facility	UP	Kent
Renton Automotive	Automotive Loading Facility	BNSF	Renton
Vancouver Port Automotive	Automotive Loading Facility	BNSF	Vancouver (port)
Spokane Automotive Wisconsin Ave	Automotive Loading Facility	BNSF	Spokane
Spokane Automotive Alki Ave	Automotive Loading Facility	UP	Spokane
Tacoma Automotive	Automotive Loading Facility	TMBL,BNSF,UP	Tacoma
Grays Harbor Automotive	Automotive Loading Facility	PSAP,UP	Grays Harbor
Simplot Land and Livestock	Grain Elevator	BNSF	Attalia

Facility Name	Type	Railroad	City
Kalama Export Co.	Grain Elevator	BNSF	Kalama
Grain Handling Inc.	Grain Elevator	BNSF	Plymouth
Ritzville Warehouse Co.	Grain Elevator	BNSF	Ritzville
Louis Dreyfus Corp	Grain Elevator	BNSF	Seattle
Tacoma Export Marketing Co.	Grain Elevator	BNSF	Tacoma
Templin Terminal, LLC	Grain Elevator	BNSF	Templin
United Harvest, LLC	Grain Elevator	BNSF	Vancouver
Ritzville Warehouse	Grain Train Shuttle Facility	BNSF	Ritzville
Mccoy Grain Terminal, LLC	Grain Train Shuttle Facility	NA*	Rosalia
Highline Grain, LLC	Grain Train Shuttle Facility	NA	NA
Agreserves, Inc	Grain Train Shuttle Facility	NA	NA
Horn Rapids Industrial Park Central Washington Corn Processors	Grain Train Shuttle Facility	BNSF, UP	Richland
Port Of Seattle Intermodal Terminals	Intermodal terminal	BNSF,UP	Seattle
Port Of Tacoma Intermodal Terminals	Intermodal terminal	BNSF,UP	Tacoma
Tacoma South Intermodal Facility	Intermodal terminal	UP	Tacoma
Seattle International Gateway	Intermodal terminal	BNSF	Seattle
Argo Intermodal Facility	Intermodal terminal	UP	Argo
South Seattle Intermodal Facility	Intermodal terminal	BNSF	Seattle
Port Of Quincy Intermodal Terminal	Intermodal terminal	BNSF	Quincy
Spokane Intermodal Terminal	Intermodal terminal	BNSF	Spokane
Port Of Pasco Intermodal Terminal	Intermodal terminal	BNSF	Pasco
CHS Inc.	Grain Elevator	BNSF	Bruce
Union Elevator & Warehouse Co.	Grain Elevator	BNSF	Bruce
Almira Farmers Warehouse Co.	Grain Elevator	BNSF	Almira
Davenport Union Whse. Co.	Grain Elevator	BNSF	Bluestem
Odessa Union Whse. Co-Op	Grain Elevator	BNSF	Davenport
Ritzville Warehouse Co.	Grain Elevator	BNSF	Edwall
Sheffels Co.	Grain Elevator	BNSF	Govan
Reardan Grain Growers, Inc.	Grain Elevator	BNSF	Reardan
Cooperative Agriculture Producers, Inc.	Grain Elevator	BNSF	Cheney
Reardan Grain Growers, Inc.	Grain Elevator	BNSF	Espanola
Spokane Seed Company	Grain Elevator	BNSF	Spangle
Flour Mill Farm & Hardware Co.	Grain Elevator	BNSF	Kettle Falls
Whitman County Growers, Inc.	Grain Elevator	BNSF	Fallon
Cooperative Agriculture Producers, Inc.	Grain Elevator	BNSF	McCoy
RMK Farms Inc.	Grain Elevator	BNSF	Oakesdale
Palouse Grain Growers, Inc.	Grain Elevator	BNSF	Palouse
Wilbur-Ellis Company	Grain Warehouse	NA	Mt. Vernon
Chris Knutzen Grain Inc.	Grain Warehouse	NA	Bow
United Grain Corporation of Oregon	Grain Warehouse	NA	Vancouver
Highline Grain, LLC	Grain Warehouse	NA	Ephrata

Facility Name	Type	Railroad	City
Mckay Seed Company, Inc.	Grain Warehouse	NA	Moses Lake
Highline Grain, LLC	Grain Warehouse	NA	Mansfield
Farmer Bean & Seed, LLC	Grain Warehouse	NA	Quincy
Columbia Bean & Produce Company, Inc	Grain Warehouse	NA	Moses Lake
Highline Grain, LLC	Grain Warehouse	NA	Withrow
Central Bean Company, Inc.	Grain Warehouse	NA	Quincy
Wilson Creek Union Grain & Trading	Grain Warehouse	NA	Wilson Creek
Highline Grain, LLC	Grain Warehouse	NA	Farmer
Crites Seed, Inc.	Grain Warehouse	NA	Quincy
Cooperative Agricultural Producers, Inc.	Grain Warehouse	NA	Cheney
Lamont Grain Growers, Inc.	Grain Warehouse	NA	Lamont
Highline Grain, LLC	Grain Warehouse	NA	Reardan
Cooperative Agricultural Producers, Inc.	Grain Warehouse	NA	Latah
Cooperative Agricultural Producers, Inc.	Grain Warehouse	NA	Spangle
Hangman Creek Products Dba	Grain Warehouse	NA	Latah
Stateline Processors, Inc.	Grain Warehouse	NA	Tekoa
Highline Grain, LLC	Grain Warehouse	NA	Almira
Highline Grain, LLC	Grain Warehouse	NA	Almira
Mccoy Grain Terminal, LLC	Grain Warehouse	NA	Colfax
Almota Elevator Company, Inc.	Grain Warehouse	NA	Colfax
Whitgro, Inc.	Grain Warehouse	NA	Endicott
Cooperative Agricultural Producers, Inc.	Grain Warehouse	NA	Fairfield
Highline Grain, LLC	Grain Warehouse	NA	Davenport
Highline Grain, LLC	Grain Warehouse	NA	Davenport
BNP Lentil Company	Grain Warehouse	NA	Farmington
Highline Grain, LLC	Grain Warehouse	NA	Harrington
Highline Grain, LLC	Grain Warehouse	NA	Hartline
Palouse Grain Growers, Inc.	Grain Warehouse	NA	Palouse
R M K Farms, Inc.	Grain Warehouse	NA	Oakesdale
Highline Grain, LLC	Grain Warehouse	NA	Harrington
Hinrichs Trading, LLC	Grain Warehouse	NA	Pullman
Gavilon Grain, LLC	Grain Warehouse	NA	Ritzville
Cooperative Agricultural Producers, Inc.	Grain Warehouse	NA	Rosalia
Ritzville Warehouse Co.	Grain Warehouse	NA	Ritzville
Inland Empire Milling Co.	Grain Warehouse	NA	Rosalia
Cooperative Agricultural Producers, Inc.	Grain Warehouse	NA	Spokane
Whitgro, Inc.	Grain Warehouse	NA	St John
Inland Empire Milling Co.	Grain Warehouse	NA	St John
Uniontown Cooperative Assoc.	Grain Warehouse	NA	Uniontown
Highline Grain, LLC	Grain Warehouse	NA	Wilbur
Cooperative Agricultural Producers, Inc.	Grain Warehouse	NA	Spokane Valley
Spokane Seed Company	Grain Warehouse	NA	Spokane Valley

Facility Name	Type	Railroad	City
Columbia County Grain Growers, Inc.	Grain Warehouse	NA	Dayton
Steve And Edie Mader, LLC Dba	Grain Warehouse	NA	Pullman
Columbia County Grain Growers, Inc.	Grain Warehouse	NA	Dayton
Cooperative Agricultural Producers, Inc.	Grain Warehouse	NA	Oakesdale
Gavilon Grain, LLC	Grain Warehouse	NA	Lind
Gavilon Grain, LLC	Grain Warehouse	NA	Lind
Eppich Grain, Inc.	Grain Warehouse	NA	Mesa
Pomeroy Grain Growers, Inc.	Grain Warehouse	NA	Pomeroy
Mccoy Grain Terminal, LLC	Grain Warehouse	NA	Pomeroy
Golden West Bean & Seed, Inc.	Grain Warehouse	NA	Royal City
Cooperative Agricultural Producers, Inc.	Grain Warehouse	NA	Pomeroy
Blue Mountain Seed, Inc.	Grain Warehouse	NA	Walla Walla
Pomeroy Grain Growers, Inc.	Grain Warehouse	NA	Pomeroy
Horse Heaven Grain, LLC	Grain Warehouse	NA	Roosevelt
Highline Grain Growers Inc	Grain Elevator	BNSF	Almira
Highline Grain Growers Inc	Grain Elevator	BNSF	Brewster
Pacific Northwest Farmers Coop Inc.	Grain Elevator	BNSF	NA
Highline Grain Growers Inc	Grain Elevator	BNSF	Coucity
Central Washington Grain Growers In	Grain Elevator	BNSF	NA
Highline Grain Growers	Grain Elevator	BNSF	Davenport
Highline Grain Growers Inc	Grain Elevator	BNSF	Ephrata
Central Washington Grain Growers In	Grain Elevator	BNSF	NA
Central Washington Grain Growers In	Grain Elevator	BNSF	NA
Highline Grain Growers (West)	Grain Elevator	BNSF	Harrington
Highline Grain Growers (East)	Grain Elevator	BNSF	Harrington
Central Washington Grain Growers In	Grain Elevator	BNSF	Hartline
Kalama Export Company LLC	Grain Elevator	BNSF	NA
Highline Grain Growers Inc	Grain Elevator	BNSF	Lamona
Columbia Grain International LLC	Grain Elevator	BNSF	Lind
M&E Seed Grain Company Inc	Grain Elevator	BNSF	NA
Highline Grain Growers	Grain Elevator	BNSF	Marlin
Highline Grain Growers	Grain Elevator	BNSF	Marlin
Davenport Union Warehouse	Grain Elevator	BNSF	Mondovi
Pacific Northwest Farmers Cooper	Grain Elevator	BNSF	NA
RMK Farms Inc	Grain Elevator	BNSF	NA
Highline Grain Growers Inc	Grain Elevator	BNSF	NA
Palouse Grain Growers Inc	Grain Elevator	BNSF	NA
Cooperative Ag Producers	Grain Elevator	BNSF	Plaza
Agri Northwest	Grain Elevator	BNSF	Plymouth
Farmer Bean & Seed LLC	Grain Elevator	BNSF	NA
Highline Grain Growers Inc	Grain Elevator	BNSF	Reardan
Pacific Northwest Farmers Coop	Grain Elevator	BNSF	Rosalia
Columbia Grain International LLC	Grain Elevator	BNSF	Schrag

Facility Name	Type	Railroad	City
Louis Dreyfus Company Seattle Export	Grain Elevator	BNSF	Seattle
Columbia Grain Intl LLC	Grain Elevator	BNSF	NA
Temco LLC	Grain Elevator	BNSF	NA
Great Western Malting Co	Grain Elevator	BNSF	NA
United Grain Corporation of Oregon	Grain Elevator	BNSF	NA
Reardan Grain Growers	Grain Elevator	BNSF	Waukon
Highligragro	Grain Elevator	BNSF	Wenatchee
Highline Grain Growers Inc	Grain Elevator	BNSF	Wilbur
Highline Grain Gowers Inc	Grain Elevator	BNSF	NA
Temco LLC	Grain Elevator	BNSF	NA
Tri-Pak Four	Grain Elevator	BNSF	NA
Central Washington Grain Growers In	Grain Elevator	BNSF	NA
Highline Grain Growers Inc	Grain Elevator	BNSF	Sprague
Connell Grain Growers Inc	Grain Elevator	BNSF	NA
Ritzville Warehouse Co	Grain Elevator	BNSF	NA
Wilbur Ellis Company LLC	Grain Elevator	BNSF	NA
Kittitas Farm Storage	Grain Elevator	BNSF	NA
Wilbur-Ellis Company LLC	Grain Elevator	BNSF	NA
Mckay Seed Co	Grain Elevator	BNSF	NA
Pacific Northwest Farmers	Grain Elevator	BNSF	NA
Reardan Grain Growers	Grain Elevator	BNSF	NA
Blue Mountain Seed	Grain Elevator	BNSF	NA
Pacific Northwest Farmers Cooperative	Grain Elevator	BNSF	NA
Valley Agronomics LLC	Grain Elevator	BNSF	NA
Pacific Northwest Farmers Cooperative	Grain Elevator	BNSF	NA
Hinrich Trading LLC	Grain Elevator	BNSF	Othello
Inland Empire Oilseeds LLC	Grain Elevator	BNSF	NA
Viterra USA LLC	Grain Elevator	BNSF	NA
Whites Trucking LLC	Grain Elevator	BNSF	NA
South Sound Transload	Grain Warehouse	BNSF	NA
Central Washington Corn Processors	Grain Elevator	BNSF	Richland
Pacific Coast Duwamish	Grain Elevator	BNSF	NA
Pacific Coast Container	Grain Elevator	BNSF	NA
Martins Feed	Grain Elevator	BNSF	NA
Sunrise Food Int	Grain Elevator	BNSF	NA
Purina Animal Nut	Grain Elevator	BNSF	NA
Highline Grain Growers Inc	Grain Elevator	BNSF	NA
Calaway Trading Inc	Grain Elevator	BNSF	NA
EPL Feed LLC	Grain Elevator	BNSF	NA
Ag Enterprise Supply LLC	Grain Elevator	BNSF	NA
Palouse Trading	Grain Elevator	BNSF	NA
Martins Feed Inc.	Grain Elevator	BNSF	NA
Columbia Bean & Produce Inc	Grain Elevator	BNSF	NA

Facility Name	Type	Railroad	City
Nuseed Americas Inc	Grain Elevator	BNSF	NA
Spokane Seed Co	Grain Elevator	BNSF	NA
Mcgregor Co	Grain Elevator	BNSF	NA
Mckay Seed Company Inc	Grain Elevator	BNSF	NA
Macmillan-Piper Inc	Grain Elevator	BNSF	NA
Port Of Chehalis	Grain Elevator	BNSF	NA
Ray-Mont Logistics Seattle Inc	Grain Elevator	BNSF	NA
Simplifeeder	Grain Elevator	BNSF	NA
Agp International Terminal 2	Grain Elevator	BNSF	NA
Port Of Longview	Grain Elevator	BNSF	NA
EGT LLC	Grain Elevator	BNSF	NA
Red Bridge Farms	Grain Elevator	BNSF	NA
Orillia Vehicle Facility	Automotive Facility	BNSF	Renton
Cold Connect Facility	Intermodal Facility	UP	Wallula
Ritzville Shuttle Train Loading Facility	Intermodal Facility	BNSF	Ritzville
Port Of Tacoma Vehicle Facility	Automotive Facility	BNSF	Tacoma
Spokane Vehicle Facility	Intermodal Facility	BNSF	Spokane
Port Of Anacortes	Intermodal Facility	NA	Anacortes
Port Of Bellingham	Intermodal Facility	NA	Bellingham
Port Of Clarkston	Intermodal Facility	NA	Clarkston
Port Of Everett	Intermodal Facility	NA	Everett
Port Of Grays Harbor	Intermodal Facility	NA	Aberdeen
Port Of Kalama	Intermodal Facility	NA	Kalama
Port Of Port Angeles	Intermodal Facility	NA	Port Angeles
Port Of Vancouver	Intermodal Facility	NA	Vancouver
Boeing Field/King County International Airport	Intermodal Facility	NA	Seattle
Seattle-Tacoma International Airport	Intermodal Facility	NA	Seattle-Tacoma
Paine Field/Snohomish County Airport	Intermodal Facility	NA	Everett
Spokane International Airport	Intermodal Facility	NA	Spokane
Port Of Kennewick	Intermodal Facility	NA	Kennewick
Port Of Olympia	Intermodal Facility	NA	Olympia
Port Of Pasco	Intermodal Facility	NA	Pasco
Port Of Longview	Intermodal Facility	NA	Longview

Source: CPCS analysis of data provided by WSDOT, USDOT BTS, BNSF Website, UP Website, Association of American Railroads, Loadmatch, and HighLine Grain Growers websites, 2021.

*NA: Data not available.

Reference Chapter C: Shipping lines carrying containerized cargo by port

Figure C-1: Shipping lines carrying containerized cargo in Washington

Port	Containerized Shipping Lines	Type
Northwest Seaport Alliance/ Port of Tacoma/ Port of Seattle	ANL CMA CGM COSCO Shipping Lines Evergreen Line Hamburg Süd Hapag-Lloyd HMM Maersk Mediterranean Shipping Co. (MSC) Ocean Network Express (ONE) OOCL SM Line UWL/Swire Shipping Wan Hai Westwood Shipping Lines Yang Ming Line ZIM	International
	Alaska Marine Lines Aloha Marine Lines Matson TOTE Maritime Alaska	Domestic
Port of Everett	Westwood Shipping BBC Chartering & Logistic GMBH Eastern Car Liner Ltd American Shipping & Chartering Corp	Import

Source: PIERs data analysis, 2019.

Reference Chapter D. Vessel type by port

Figure D-1: Washington port trips by vessel type, 2019: inbound receiving

Port	Carrier Cargo		Towboats	Total
	Barge (non-self-propelled) ¹²²	Vessel (self-propelled) ¹²³		
Salish Sea				
Port of Seattle	1,662	9,375	2,907	13,944
Port of Tacoma	993	886	3,425	5,304
Port of Everett	373	393	607	1,373
Port of Port Angeles	-	-	-	-
Port of Bellingham	5	735	195	935
Port of Anacortes*	147	588	1,012	1,748
Port of Olympia	4	17	27	48
Coastal				
Port of Grays Harbor	20	82	18	120
Columbia-Snake River				
Port of Vancouver	995	237	999	2,231
Port of Kalama	458	101	492	1,051
Port of Longview	414	179	673	1,266

Source: CPCS analysis of USACE data, 2021.

*One vessel at the Port of Anacortes classified as Other (Cranes, etc.) is not shown.

¹²² Includes dry cargo barge and liquid barge vessels.

¹²³ Includes self-propelled dry and tanker vessels.

Figure D-2: Washington port trips by vessel type, 2019: outbound shipping

Port	Carrier Cargo		Towboats	Total
	Barge (non-self-propelled) ¹²⁴	Vessel (self-propelled) ¹²⁵		
Salish Sea				
Port of Seattle*	1,713	9,386	2,961	14,061
Port of Tacoma	984	935	3,376	5,295
Port of Everett	388	359	630	1,377
Port of Port Angeles	-	-	-	-
Port of Bellingham	5	759	191	955
Port of Anacortes*	176	602	1,008	1,788
Port of Olympia	1	20	27	48
Coastal				
Port of Grays Harbor	30	84	29	143
Columbia-Snake River				
Port of Vancouver	868	263	1,002	2,133
Port of Kalama	421	289	492	1,202
Port of Longview	384	231	652	1,267

Source: CPCS analysis of USACE data, 2021.

*Two vessels at the Port of Anacortes and one vessel at the port of Seattle classified as Other (Cranes, etc.) is not shown.

¹²⁴ Includes dry cargo barge and liquid barge vessels.

¹²⁵ Includes self-propelled dry and tanker vessels.

Reference Chapter E. Public port authorities

WPPA Port Name / Community	City	County	MPO/RTPO	Body of Water	Maritime Assets			Airport Assets	Railroad Connection	NHS Road Connection
					Cargo	Recreational	Shipbuilding			
Chelan-Douglas Regional Port Authority	Orondo	Chelan, Douglas	CDTC	Columbia River	-	X	-	X	BNSF, Genesee and Wyoming (Cascade and Columbia River RR)	US 2, US 97
Port Grand Coulee Dam	Electric City	Grant	QUADCO	Near Columbia River	-	X	-	X	N/A	US 2
Port of Allyn	Allyn	Mason	PRTPO	North Bay, Salish Sea	-	X	-	-	Genesee and Wyoming (Puget Sound & Pacific RR)	SR 3
Port of Anacortes	Anacortes	Skagit	SCOG	Guemes Channel, Salish Sea	X	X	-	X	BNSF	SR 20
Port of Bellingham	Bellingham	Whatcom	WCOG	Bellingham Bay, Salish Sea	X	X	-	X	BNSF, Bellingham International Railroad	I-5, SR 11, SR 539
Port of Benton	Richland	Benton	BFCOG	Columbia River	X	X	-	X	Operator TBD as of 2022	I-182, I-82, SR 240
Port of Bremerton	Bremerton	Kitsap	PSRC and PRTPO	Puget Sound, Salish Sea	-	X	-	X	Genesee and Wyoming (Puget Sound & Pacific RR)	SR 3, SR 16, SR 166, SR 304, SR 303, SR 310
Port of Brownsville	Bremerton	Kitsap	PSRC and PRTPO	Port Orchard, Salish Sea	-	X	-	-	N/A	SR 303
Port of Camas-Washougal	Washougal	Clark	SWRTC	Columbia River	-	X	-	X	BNSF	SR 14

WPPA Port Name / Community	City	County	MPO/RTPO	Body of Water	Maritime Assets			Airport Assets	Railroad Connection	NHS Road Connection
					Cargo	Recreational	Shipbuilding			
Port of Centralia	Centralia	Lewis	SWRTPO	N/A	-	-	-	-	BNSF, Rainier Rail (Tacoma Rail Mountain Division), UP, Genessee and Wyoming	I-5
Port of Chehalis	Chehalis	Lewis	SWRTPO	N/A	-	-	-	-	BNSF, Rainier Rail (Tacoma Rail Mountain Division), Genessee and Wyoming	I-5
Port of Chinook	Chinook	Pacific	SWRTPO	Columbia River	-	X	-	-	N/A	SR 401
Port of Clarkston	Clarkston	Asotin	LCVMPO and PRTPO	Snake River	-	X	-	-	Watco Companies (Great Northwest Railroad)	US 12, SR 128
Port of Columbia	Dayton	Columbia	PRTPO	Snake River	-	X	-	-	Port of Columbia CWW Railroad, UP, Watco Companies (Palouse River and Coulee River)	US 12
Port of Coupeville	Greenbank	Island	IRTPO	Salish Sea	-	X	-	-	N/A	SR 525, SR 20
Port of Dewatto	Tahuya	Mason	PRTPO	N/A	-	-	-	-	N/A	N/A
Port of Edmonds	Edmonds	Snohomish	PSRC	Puget Sound, Salish Sea	-	X	-	-	BNSF	SR 104, SR 524
Port of Eglon	Hansville	Kitsap	PSRC and PRTPO	N/A	-	X	-	-	N/A	N/A
Port of Ephrata	Ephrata	Grant	QUADCO	N/A	-	-	-	X	BNSF	SR 282

WPPA Port Name / Community	City	County	MPO/RTPO	Body of Water	Maritime Assets			Airport Assets	Railroad Connection	NHS Road Connection
					Cargo	Recreational	Shipbuilding			
Port of Everett	Everett	Snohomish	PSRC	Possession Sound, Salish Sea	X	X	-	-	BNSF	I-5, SR 529
Port of Friday Harbor	Friday Harbor	San Juan	-	Salish Sea	-	X	-	X	N/A	N/A
Port of Garfield County	Pomeroy	Garfield	PRTPO	N/A	X	X	-	-	Watco Companies (Great Northwest Railroad), UP	SR 127, US 12
Port of Grandview	Grandview	Yakima	YVCOG	N/A	-	X	-	-	N/A	I-82
Port of Grapeview	-	Mason	PRTPO	Salish Sea	-	X	-	-	Genesee and Wyoming (Puget Sound & Pacific RR)	SR 3
Port of Grays Harbor	-	Grays Harbor	SWRTPO	Pacific Ocean and Chehalis River	X	X	-	X	Genesee and Wyoming (Puget Sound & Pacific RR), BNSF, UP	US 101, US 12
Port of Hartline	Hartline	Grant	QUADCO	N/A	-	-	-	-	WSDOT (Eastern Washington Gateway)	US 2
Port of Hoodspport	Hoodspport	Mason	PRTPO	Salish Sea	-	X	-	-	N/A	US 101
Port of Illahee		Kitsap	PSRC and PRTPO	Salish Sea	-	X	-	-	N/A	SR 303
Port of Ilwaco	Ilwaco	Pacific	SWRTPO	Baker Bay, Columbia River, Pacific Ocean	X	X	-	X	N/A	N/A
Port of Indianola	Indianola	Kitsap	PSRC and PRTPO	Puget Sound, Salish Sea	-	X	-	-	N/A	N/A

Appendix D | Washington's Freight Transportation System

WPPA Port Name / Community	City	County	MPO/RTPO	Body of Water	Maritime Assets			Airport Assets	Railroad Connection	NHS Road Connection
					Cargo	Recreational	Shipbuilding			
Port of Kahlotus	Kahlotus	Franklin	BFCOG	Snake River	-	-	-	-	UP, BNSF	N/A
Port of Kalama	Kalama	Cowlitz	SWRTPO	Columbia River	X	X	-	-	BNSF	I-5
Port of Kennewick	Kennewick	Benton	BFCOG	Columbia River	-	X	-	-	BNSF, UP, Tri-City & Olympia RR	SR 397, US 395, SR 240
Port of Keyport	Keyport	Kitsap	PSRC and PRTPO	Salish Sea	-	X	-	-	N/A	N/A
Port of Kingston	Kingston	Kitsap	PSRC and PRTPO	Puget Sound, Salish Sea	-	X	-	-	N/A	SR 104
Port of Klickitat	Bingen	Klickitat	SWRTC	Columbia River	-	X	-	-	BNSF	SR 14
Port of Longview	Longview	Cowlitz	CWCOG	Columbia River	X	X	-	-	Port of Longview, BNSF, Patriot Rail (Columbia and Cowlitz RR)	SR 433, SR 432, I-5
Port of Lopez	Lopez Island	San Juan	-	Salish Sea	-	X	-	X	N/A	N/A
Port of Mabana	Camano	Island	IRTPO	N/A	-	-	-	-	N/A	N/A
Port of Manchester	Manchester	Kitsap	PSRC and PRTPO	Salish Sea	-	X	-	-	N/A	N/A
Port of Mattawa	Mattawa	Grant	QUADCO	N/A	-	-	-	-	N/A	N/A
Port of Moses Lake	Moses Lake	Grant	QUADCO	N/A	-	X	-	X	Columbia Basin Railroad	SR 17, I-90
Port of Olympia	Olympia	Thurston	TRPC	Budd Inlet, Salish Sea	X	X	-	X	UP (Tacoma Rail Capital/Tidelands Division and BNSF nearby)	I-5, US 101
Port of Orcas	Eastsound	San Juan	-	N/A	-	-	-	X	N/A	N/A
Port of Othello	Othello	Adams	QUADCO	N/A	-	-	-	X	Columbia Basin Railroad	SR 17, SR 26

WPPA Port Name / Community	City	County	MPO/RTPO	Body of Water	Maritime Assets			Airport Assets	Railroad Connection	NHS Road Connection
					Cargo	Recreational	Shipbuilding			
Port of Pasco	Pasco	Franklin	BFCOG	Columbia River	X	X	-	X	BNSF	US 395, I-182, US 12, SR 397
Port of Pend Oreille	Usk	Pend Oreille	New RTPO	N/A	-	-	-	-	Port of Pend Oreille	US 2
Port of Peninsula	Nahcotta	Pacific	SWRTPO	Willapa Bay, Pacific Ocean	-	X	-	-	N/A	N/A
Port of Port Angeles	Port Angeles	Clallam	PRTPO	Salish Sea	X	X	X	X	N/A	US 101, SR 117
Port of Port Townsend	Port Townsend	Jefferson	PRTPO	Salish Sea	-	X	X	X	N/A	US 20
Port of Poulsbo	Poulsbo	Kitsap	PSRC and PRTPO	Liberty Bay, Salish Sea	-	X	-	-	N/A	SR 305
Port of Quincy	Quincy	Grant	QUADCO	N/A	-	-	-	X	BNSF	SR 28, SR 281
Port of Ridgefield	Ridgefield	Clark	SWRTC	Lake River, Columbia River	-	X	-	-	BNSF	I-5
Port of Royal Slope	Royal City	Grant	QUADCO	N/A	-	-	-	-	Port of Royal Slope	SR 26
Port of Seattle	Seattle	King	PSRC	Puget Sound, Salish Sea	X	X	-	X	BNSF, City of Seattle, UP	I-5, SR 99, SR 509, SR 518, I-405, I-90
Port of Shelton	Shelton	Mason	PRTPO	Salish Sea	-	-	-	X	Genesee and Wyoming (Puget Sound & Pacific RR)	US 101, SR 3
Port of Silverdale	Silverdale	Kitsap	PSRC and PRTPO	Dyes Inlet, Salish Sea	-	X	-	-	Genesee and Wyoming (Puget Sound & Pacific RR)	SR 3, SR 303

Appendix D | Washington's Freight Transportation System

WPPA Port Name / Community	City	County	MPO/RTPO	Body of Water	Maritime Assets			Airport Assets	Railroad Connection	NHS Road Connection
					Cargo	Recreational	Shipbuilding			
Port of Skagit	-	Skagit	SCOG	Swinomish Channel, Salish Sea	-	X	-	X	BNSF	I-5, SR 20
Port of Skamania	Stevenson	Skamania	SWRTC	Columbia River	-	X	-	-	BNSF	SR 14
Port of South Whidbey	Langley	Island	IRTPO	Salish Sea	-	X	-	-	N/A	SR 525
Port of Sunnyside	Sunnyside	Yakima	YVCOG	N/A	-	-	-	X	UP, Central Washington Railroad	I-82
Port of Tacoma	Tacoma	Pierce	PSRC	Puget Sound, Salish Sea	X	-	-	-	BNSF, UP, City of Tacoma (Tacoma Rail Mountain Division), Sound Transit	I-5, SR 16, SR 509, SR 7, SR 99, SR 167, I-705
Port of Tracyton	Tracyton	Kitsap	PSRC and PRTPO	Salish Sea	-	X	-	-	N/A	SR 303
Port of Vancouver	Vancouver	Clark	SWRTC	Columbia River	X	-	-	-	BNSF, Clark County (PVJR)	SR 501, I-5, SR 14,
Port of Walla Walla	Walla Walla	Walla Walla	WWV	Columbia River	X	-	-	X	UP, BNSF, Port of Columbia (CWW), Watco Companies (Palouse River and Coulee River)	US 12, SR 125
Port of Warden	Warden	Grant	QUADCO	N/A	-	-	-	X	Columbia Basin Railroad	SR 17, I-90
Port of Waterman	Port Orchard	Kitsap	PSRC and PRTPO	Salish Sea	-	X	-	-	N/A	SR 166
Port of Whakiakum County #1: Elochoman Marina	Cathlamet	Whakiakum	SWRTPO	Columbia River	-	X	-	-	N/A	SR 4

WPPA Port Name / Community	City	County	MPO/RTPO	Body of Water	Maritime Assets			Airport Assets	Railroad Connection	NHS Road Connection
					Cargo	Recreational	Shipbuilding			
Port of Whakiakum County #2: Skamokawa Vista Park	Skamokawa	Whakiakum	SWRTPO	Columbia River	-	X	-	-	N/A	SR 4
Port of Whitman County	-	Whitman	PRTPO	Snake River	X	X	-	X	Watco Companies (Palouse River and Coulee River and Great Northwest Railroad), WSDOT, BNSF, UP	SR 26, SR 127, US 195, SR 270, SR 27
Port of Willapa Harbor	-	Pacific	SWRTPO	Willapa Harbor, Willapa River	-	X	-	X	N/A	US 101
Port of Wilson Creek	Wilson Creek	Grant	QUADCO	N/A	-	-	-	X	BNSF	N/A
Port of Woodland	Woodland	Cowlitz	SWRTPO	Columbia River	-	X	-	-	BNSF	I-5

Source: CPCS analysis of Washington Public Ports Association, Port websites, Railroad websites, Washington NHS routes, Washington State Rail Map, 2017 Washington Marine Ports and Navigation Plan, Washington Transportation Plan 2040 and Beyond website, and Coast Pilot 10, 2022.

Reference Chapter F. Maritime terminal inventory

Port Name or Community Name	Terminal Name	Cargo Types Handled	Road Connection	Rail Connection
Columbia River				
Port of Benton	North Richland High Dock	Decommissioned nuclear materials for long-term disposal at Hanford Site	SR 240	Operator TBD as of 2022
Port of Benton	North Richland Barge Slip	Decommissioned nuclear materials for long-term disposal at Hanford Site	SR 240	Operator TBD as of 2022
Port of Pasco	Marine Terminal Wharf	Agricultural products, petroleum products, paper products, iron and steel products, manufactured goods	SR 397, US 12, I-182, SR 397	BNSF
Kennewick	CHS SunBasin Growers Terminal	Grain/Wheat	SR 397, US 395, SR 240	BNSF
Port of Pasco	Barge Slip No. 1 Container Terminal Wharf	Agricultural products, petroleum products, paper products, iron and steel products, manufactured goods	SR 397, US 12, I-182	BNSF
Kennewick, Finley	Nutrien Hedges Area Dock	Fertilizer and other chemicals	SR 397	UP
Kennewick, Finley	Nutrien Plant/Dock	Fertilizer	SR 397	UP
Kennewick, Finley	Nutrien Finley Area Plant/Dock	Fertilizer	SR 397	UP
Wallula	Packaging Corporation of America Plant Barge Slip Dock	Paper products, agricultural products, packaging	US 12	BNSF, UP
Wallula	Northwest Grain Growers Terminal	Grain	US 12	UP
Port Kelley	Port Kelley Dock	Grain	US 730	UP
Roosevelt	Horse Heaven Grain Terminal	Wheat/Grain	SR 14	BNSF
Wishram	Pacific Northwest Aggregates Dock	Aggregates	SR 14	
Port of Klickitat	Barge Dock	Forest products, stone/gravel/rock, iron and steel, manufactured goods, fruit?	SR 14	BNSF
Bingen	SDS Lumber Co Dock	Forestry Products	SR 14	BNSF
Port of Camas Washougal	Camas-Washougal Port Dock	Lumber products	SR 14	
Camas	Georgia-Pacific Paper Mill	Paper products	SR 14	BNSF

Port Name or Community Name	Terminal Name	Cargo Types Handled	Road Connection	Rail Connection
Vancouver	Western Forest Products Columbia Vista Division Sawmill	Lumber products	SR 14	BNSF
Vancouver	JT Marine Inc Crane Dock	Iron and steel, manufactured products	SR 14, I-5	BNSF
Vancouver	Columbia Business Center West and East Barge Slips	Metal products	SR 14, I-5	BNSF
Vancouver	Lafarge Cement Pier	Cement, concrete, and other chemicals	SR 501, I-5	BNSF
Port of Vancouver; operated by United Grain Harvest	Vancouver Terminal 2 Grain Elevator Wharf	Grain	SR 501, I-5	BNSF
Port of Vancouver	Vancouver Terminal 2 Berth 7 Dry Bulk Export Dock	Mineral bulk commodities	SR 501, I-5	BNSF
Port of Vancouver	Vancouver Terminal 2 Berth 2 Heavy Lift & Bulk Export Dock	Scrap commodities	SR 501, I-5	BNSF
Port of Vancouver, operated by NuStar Energy and Tesoro Logistics	Vancouver Terminal 2 Berth 5 Liquid Bulk Dock	Petroleum products	SR 501, I-5	BNSF
Port of Vancouver	Vancouver Terminal 2 Berth 1	Steel, pulp, aluminum, forest products, containers, yachts, other break bulk	SR 501, I-5	BNSF
Port of Vancouver	Vancouver Terminal 2 Berth 3 Heavy Lift	Steel, pulp, aluminum, forest products, containers, yachts, other break bulk	SR 501, I-5	BNSF
Port of Vancouver	Vancouver Terminal 2 Berth 4 RoRo	Steel, pulp, aluminum, forest products, containers, yachts, other break bulk	SR 501, I-5	BNSF
Port of Vancouver	Vancouver Terminal 3 Berths 8 & 9 Multiuse	Steel, pulp, aluminum, forest products, containers, yachts, other break bulk	SR 501, I-5	BNSF
Port of Vancouver, Subaru	Vancouver Terminal 4 Berth 10 Auto Dock	Vehicles	SR 501, I-5	BNSF
Port of Vancouver	Vancouver Terminal 4 Berths 13/14	-	SR 501, I-5	BNSF
Port of Vancouver	Vancouver Terminal 5	None currently	SR 501, I-5	BNSF
Vancouver	Tidewater Terminal Company Vancouver Terminal	Petroleum products, fertilizer, waste, containerized goods	SR 501, I-5	-
Vancouver	HME Construction Inc Matthews Point Dock	-	SR 501, I-5	-
Port of Kalama, operated by TEMCO LLC	TEMCO Kalama Terminal	Corn, Soybeans, Wheat	I-5	BNSF

Port Name or Community Name	Terminal Name	Cargo Types Handled	Road Connection	Rail Connection
Port of Kalama	North Port Marine Terminal	-	I-5	BNSF
Port of Kalama, operated by Emerald Chemical LLC	Emerald Kalama Chemical Terminal	Chemicals, petroleum products	I-5	BNSF
Port of Kalama, operated by Kalama Export Company	Kalama Export Company Terminal	Agricultural products, chemicals, lumber products, petroleum products, metals, manufactured goods	I-5	BNSF
Port of Kalama, operated by RSG Forest Products	Kalama Forest Products Terminal	Lumber products	I-5	BNSF
Kalama	Steelscape Dock	Metal products	I-5	BNSF
Port of Longview, operated by International Raw Materials (IRM)	Longview Bridgeview Terminal Berths 1 and 2	Forest products, stone/gravel/rock	SR 432, I-5	BNSF
Port of Longview	Longview Berth 4	-	SR 432, I-5	BNSF
Port of Longview, operated by BP West Coast Products	Longview Berth 5 Bulk Handling Terminal	Bulk	SR 432, I-5	BNSF
Port of Longview	Longview Berth 6 Breakbulk Cargo Terminal	Breakbulk	SR 432, I-5	BNSF
Port of Longview	Longview Berth 7 Bulk, Breakbulk, Container Handling Terminal	Bulk, breakbulk, other	SR 432, I-5	BNSF
Port of Longview	Longview Berth 8 Breakbulk and General Cargo Terminal	Breakbulk, other	SR 432, I-5	-
Port of Longview, operated by Export Grain Terminal (EGT)	Longview Berth 9 Export Grain Terminal	Grain, bulk	SR 432, I-5	BNSF
Port of Longview	Longview RoRo Breakbulk Barge Terminal	Breakbulk	SR 432, I-5	-
Longview	WestRock Containerboard Mill	Paper products	SR 432, I-5	BNSF
Longview	Weyerhaeuser Lumber Mill	Lumber products	SR 432	BNSF
Longview	Westlake Chemical Terminal	Chemicals, liquid bulk	SR 432	BNSF
Longview	Longview Nippon Dynawave Packing Company Paper Mill	Chemicals, paper products	SR 432	BNSF
Longview	Millennium Bulk Terminals	-	SR 432	-
Snake River				
Clarkston	Lewis-Clark Grain Terminal	Grain	US 12, SR 128, US 95	-

Port Name or Community Name	Terminal Name	Cargo Types Handled	Road Connection	Rail Connection
Clarkston	Columbia Grain Terminal	Grain	SR 128, US 12	Great Northwest RR
Port of Whitman County-Wilma	Guy Bennet Lumber Products, LLC Lumber Dock	Lumber products	SR 128, US 12	Great Northwest RR
Port of Whitman County-Wilma	Clearwater Paper Terminal	Lumber products, sawdust	SR 128, US 12	-
Port of Whitman County-Wilma	CHS Terminal	Grain	SR 128, US 12	-
Port of Whitman County-Almota	Pacific Northwest Farmers Coop Snake River Terminal	Grain	SR 194	Great Northwest RR
Port of Whitman-Central Ferry	Central Ferry Terminal	Grain	SR 127	Great Northwest RR
Central Ferry	Columbia Grain Terminal	Grain	SR 127	Great Northwest RR
Pomeroy	Pomeroy Grain Growers Terminal	Grain	SR 127	-
Lyons Ferry	Northwest Grain Growers Terminal	Grain	SR 261	UP
Port of Kahlotus	Prescott Grain Terminal	Grain	SR 263, SR 26	-
Pasco	Louis Dreyfus Company Grain Terminal	Grain	SR 263	-
Prescott	Northwest Grain Growers Sheffler Terminal	Grain	SR 124	UP
Pasco	Tidewater Terminal Company Snake River Terminal	Petroleum products, chemicals, fertilizer, agricultural products, lumber products	US 12	BNSF
Pasco	Tri-Cities Grain Terminal	Grain	US 12	BNSF
Pasco	Tesoro Logistics/Marathon Petroleum Corporation Terminal	Petroleum products	US 12	BNSF
Port of Walla Walla, operated by Northwest Grain Growers	Burbank Grain Terminal	Grain, agricultural products	US 12	BNSF
Port of Walla Walla, operated by The Scouler Company	Scouler Grain Terminal	Grain, agricultural products	US 12	BNSF
Port of Walla Walla, operated by Shnitzer Steel	Schnitzer Steel Terminal	Steel, metals	US 12	BNSF

Port Name or Community Name	Terminal Name	Cargo Types Handled	Road Connection	Rail Connection
Aberdeen	Sierra Pacific Industries Chehalis River Sawmill	Liquid bulk	US 12, SR 128, US 95	Puget Sound and Pacific RR
Pacific Ocean				
Port of Grays Harbor, operated by Renewable Energy Group and BWC Terminals	Port of Grays Harbor Terminal 1	Bulk	US 12	Puget Sound and Pacific RR
Port of Grays Harbor, partner with Ag Processing Inc.	Port of Grays Harbor Terminal 2	Lumber products	US 101	Puget Sound and Pacific RR
Port of Grays Harbor	Port of Grays Harbor Terminal 3	-	US 101	Puget Sound and Pacific RR
Port of Grays Harbor	Port of Grays Harbor Terminal 4	Breakbulk, RoRo, project cargo, OHOW, other	US 101	Puget Sound and Pacific RR
Salish Sea				
Port of Port Angeles	Port of Port Angeles Terminal 1	General cargo	US 101, SR 117	-
Port of Port Angeles	Port of Port Angeles Terminal 3	Lumber products, general cargo	US 101, SR 117	-
Port of Port Angeles	Port of Port Angeles Terminal 4	General cargo	US 101, SR 117	-
Port Angeles	McKinley Packaging Paper Mill	Lumber products, paper products	US 101, SR 117	-
Port of Port Angeles	Port of Port Angeles Log Yard	Lumber products	US 101, SR 117	-
Port of Port Angeles	Port Angeles Boat Yard	Ship building and repair	US 101, SR 117	-
Blaine	BP Cherry Point Terminal	Petroleum products	I-5, SR 548	BNSF
Ferndale	Alcoa Intalco Works Terminal	Aluminum	I-5	BNSF
Ferndale	Phillips 66 Ferndale Terminal	Petroleum products	I-5	BNSF
Port of Bellingham	Bellingham Shipping Terminal	Break bulk, clean bulk	I-5	BNSF
Port of Anacortes	Anacortes Pier 1	Ship building and repair	SR 20	-
Port of Anacortes	Anacortes Pier 2	Dry bulk cargo	SR 20	-
Port of Anacortes	Anacortes Curtis Wharf	Working wharf and dock for commercial boats and ships	SR 20	-
Anacortes	Marathon Petroleum Terminal	Petroleum products	SR 20	BNSF

Port Name or Community Name	Terminal Name	Cargo Types Handled	Road Connection	Rail Connection
Anacortes	Shell Terminal	Petroleum products	SR 20	BNSF
Port of Port Townsend	Port Townsend Boatyard	Ship building	SR 20	-
Port Townsend	Port Townsend Paper Company Mill	Paper products	SR 20, SR 19	-
Port of Everett	Port of Everett Pacific Terminal	Container and breakbulk	SR 529, I-5, US 2	-
Port of Everett	Port of Everett South Terminal	Container, RoRo, breakbulk, project cargo	SR 529, I-5, US 2	-
Port of Everett	Port of Everett Pier 1 North and South	Container, breakbulk, RoRo, forest products	SR 529, I-5, US 2	-
Port of Everett	Port of Everett Pier 3 North and South	General, breakbulk and project cargoes, forest products, bulk cement	SR 529, I-5, US 2	-
Port of Everett	Port of Everett Mount Baker Terminal	Aerospace cargo: accommodates all oversized, ocean-going components for the 747, 767, 777, and 777X airplane programs	SR 525	-
Port of Everett	Port of Everett Hewitt Terminal	Shipyards work	SR 529, I-5, US 2	-
Port of Everett	Port of Everett Norton Terminal	-	SR 529, I-5, US 2	-
North Everett	Lehigh Hanson, Cadman Terminal	Asphalt	SR 529, I-5	BNSF
Edmonds	Point Wells Petroleum Terminal	Petroleum products	SR 104, SR 99, I-5	BNSF
Port of Olympia	Port of Olympia Terminal	Bulk and breakbulk	I-5	UP, BNSF
DuPont	CalPortland Dock	Aggregates, concrete	I-5	BNSF
Port of Tacoma	West Sitcum Terminal	Containers	SR 509, I-5, SR 99, I-705, SR 7, SR 16	UP, BNSF
Port of Tacoma	Husky Terminal	Containers	SR 509, I-5, SR 99, I-705, SR 7, SR 16	UP, BNSF
Port of Tacoma	East Sitcum Terminal	Containers	SR 509, I-5, SR 99, I-705, SR 7, SR 16	UP, BNSF
Port of Tacoma	PCT Terminal	Containers	SR 509, I-5, SR 99, I-705, SR 7, SR 16	UP, BNSF

Port Name or Community Name	Terminal Name	Cargo Types Handled	Road Connection	Rail Connection
Port of Tacoma	WUT Terminal	Containers	SR 509, I-5, SR 99, I-705, SR 7, SR 16	UP, BNSF
Port of Tacoma	TOTE Terminal	Containers	SR 509, I-5, SR 99, I-705, SR 7, SR 16	UP, BNSF
Port of Tacoma	T-7 Terminal	Breakbulk, autos	SR 509, I-5, SR 99, I-705, SR 7, SR 16	UP, BNSF
Port of Tacoma	East Blair One Terminal	Breakbulk, autos	SR 509, I-5, SR 99, I-705, SR 7, SR 16	UP, BNSF
Port of Tacoma	Blair Terminal	Autos	SR 509, I-5, SR 99, I-705, SR 7, SR 16	UP, BNSF
Port of Tacoma	West Hylebos Terminal	Bulk	SR 509, I-5, SR 99, I-705, SR 7, SR 16	UP, BNSF
Tacoma	Westrock Paper Mill	Paper products	SR 509, I-5, SR 99, I-705, SR 7, SR 16	UP, BNSF
Tacoma	NuStar Terminal	Petroleum products	SR 509, I-5, SR 99, I-705, SR 7, SR 16	-
Tacoma	Par Pacific U.S. Oil Terminal	Petroleum products	SR 509, I-5, SR 99, I-705, SR 7, SR 16	UP, BNSF
Tacoma	Seaport Sound Terminal	Petroleum products	SR 509, I-5, SR 99, I-705, SR 7, SR 16	-
Tacoma	Walrath Marine Terminal	Lumber products	SR 509, I-5, SR 99, I-705, SR 7, SR 16	-
Tacoma	American Construction Terminal	-	SR 509, I-5, SR 99, I-705, SR 7, SR 16	UP, BNSF
Tacoma	Orion Marine Group Terminal	-	SR 509, I-5, SR 99, I-705, SR 7, SR 16	UP, BNSF
Tacoma	Graymont Inc Terminal	Limestone, stone	SR 509, I-5, SR 99, I-705, SR 7, SR 16	UP, BNSF
Tacoma	Georgia-Pacific Gypsum Terminal	-	SR 509, I-5, SR 99, I-705, SR 7, SR 16	UP, BNSF
Tacoma	Schnitzer Steel Terminal	Steel, metal	SR 509, I-5, SR 99, I-705, SR 7, SR 16	-
Tacoma	CalPortland Terminal	Concrete	SR 509, I-5, SR 99, I-705, SR 7, SR 16	UP, BNSF
Port of Seattle	T-5 Terminal	Containers	I-5, SR 99, I-90	UP, BNSF

Port Name or Community Name	Terminal Name	Cargo Types Handled	Road Connection	Rail Connection
Port of Seattle	T-18 Terminal	Containers	I-5, SR 99, I-90	UP, BNSF
Port of Seattle	T-30 Terminal	Containers	I-5, SR 99, I-90	UP, BNSF
Port of Seattle	T-115 Terminal	Containers	I-5, SR 99, I-90	UP, BNSF
Port of Seattle	T-46 Terminal	Alternative maritime use	I-5, SR 99, I-90	UP, BNSF
BP	BP Seattle Terminal	Petroleum products	I-5, SR 99, I-90	UP, BNSF
Maxum Petroleum	Maxum Seattle Terminal	Petroleum products	I-5, SR 99, I-90	UP, BNSF
Vigor	Vigor Seattle Terminal	Ship building and repair	I-5, SR 99, I-90	-
Island Tug and Barge	Island Tug and Barge Seattle Terminal	-	I-5, SR 99, I-90	UP, BNSF
Seattle	Pacific Terminals	Containers	I-5, SR 99, I-90	UP, BNSF
Port of Seattle, operate by CalPortland	T-103	Sand, aggregates, gravel, rock	I-5, SR 99, I-90	UP, BNSF
Seattle	Lafarge North America Terminal	Cement	I-5, SR 99, SR 509	UP, BNSF
Seattle	Alaska Marine Lines Terminal	Container, auto	I-5, SR 99, SR 509	UP, BNSF
Seattle	CalPortland Cement Terminal	Cement	I-5, SR 99, SR 509	UP, BNSF
Seattle	Ash Grove Cement Terminal	Cement	I-5, SR 99, I-90	UP, BNSF
Seattle	Manson Construction Terminal	-	I-5, SR 99, I-90, SR 509	UP, BNSF
Seattle	Lehigh Hanson Cadman Terminal	Concrete	I-5, SR 99, I-90, SR 509	UP, BNSF
Seattle	ACG Materials J.A. Jack and Sons Inc Terminal	Limestone	I-5, SR 99, I-90, SR 509	UP, BNSF
Seattle	CertainTeed Terminal	-	I-5, SR 99, I-90, SR 509	UP, BNSF
Seattle	SeaTac Marine Fox Avenue Terminal	Bulk and breakbulk cargo	I-5, SR 99, SR 509	UP, BNSF
Seattle	Boyer Logistics Terminal	-	I-5, SR 99, SR 509	-
Seattle	Pacific Pile and Marine Terminal	-	I-5, SR 99, SR 509	-
Seattle	Waste Management Solutions Terminal	Waste	I-5, SR 99, SR 509	UP, BNSF
Seattle	Gypsum to Gypsum Terminal	Gypsum drywall	I-5, SR 99, SR 509	-

Port Name or Community Name	Terminal Name	Cargo Types Handled	Road Connection	Rail Connection
Seattle	Seattle Iron and Metals Corporation Terminal	Iron, metal	I-5, SR 99, SR 509	UP, BNSF
Seattle	Samson Tug & Barge	Autos, Ro-Ro, Containers to/from SE Alaska	SR 509	-
Port of Seattle, operated by Louis Dreyfus Corporation	Pier 86 Grain Terminal	Grain	SR 99, I-5	UP, BNSF
Port of Seattle	Pier 91 Terminal	-	SR 99, I-5	UP, BNSF
Lakeside Industries	Lakeside Fremont Terminal	Asphalt	SR 99, I-5	-
Northlake Shipyard	Northlake Shipyard	Ship building	SR 99, I-5	-
Waterfront Construction	Waterfront Construction Terminal	-	I-5, SR 99, SR 520	-
Lake Union Drydock Company	Lake Union Drydock	Shipbuilding and repair	I-5, SR 520, SR 99	-
Cadman Materials, Lehigh Hanson	Kenmore Asphalt Terminal	Asphalt	SR 522, SR 104	BNSF

Source: CPCS analysis of USACE Master Dock data, Google Earth, Google Maps, and terminal websites, 2022.