Chapter 5
Extended Rail and Vessel Transport

Under the proposed action, oil would be transported to and from the project site primarily by rail and vessel, respectively. Chapter 3, *Affected Environment, Impacts, and Mitigation*, describes impacts of rail transport along the Puget Sound & Pacific Railroad (PS&P) rail line between Centralia, Washington, and the project site as well as vessel transport from the project site. This chapter examines impacts of rail transport along mainline routes beyond Centralia and vessel transport along commercial vessel routes off the Washington Coast, including Puget Sound.

This chapter describes rail and vessel transportation in the extended study area, impacts under the no-action alternative and proposed action, and any applicable mitigation measures.

Detailed information about the transport of crude oil by rail and vessel in Washington State can be found in the *Washington State 2014 Marine and Rail Oil Transportation Study* (Washington State Department of Ecology 2014, 2015).

5.1 What is the extended study area for rail and vessel transport?

The rail traffic extended study area encompasses the BNSF Railway Company (BNSF) main line from Centralia (the eastern endpoint of the PS&P rail line) to the Bakken formation in North Dakota. This route is considered because Bakken crude oil is expected to be the most likely source of crude oil handled by the applicant. Crude oil from other locations, including Canada, could be brought to the facility by rail as part of the proposed action; however, the same rail routes in Washington State would likely be used.

The vessel traffic extended study area includes likely commercial vessel routes for crude oil transport between Grays Harbor and the final point of delivery. Because U.S. crude oil is not currently exported, transportation routes for U.S. crude oil are limited to routes that access other U.S. ports along the West Coast, including Puget Sound. Therefore, the extended study area for vessel traffic includes the West Coast of the United States. Crude oil other than U.S. crude oil may be exported to domestic and foreign ports as part of the proposed action, however, the same vessel routes off the coast of Washington State would likely be used.

5.2 What laws and regulations apply to rail and vessel transport?

Applicable regulations for rail and vessel traffic are described in Sections 3.15, *Rail Traffic*, and Section 3.17, *Vessel Traffic*, respectively. Additional regulations relevant to rail and vehicle safety and oil spill contingency planning are presented in Chapter 4, *Environmental Health and Safety*.

5.3 How were the impacts on rail and vessel transport in the extended study area evaluated?

5.3.1 Information Sources

The following recently prepared agency studies provided a foundation for the extended study area analysis.

- *Washington State 2014 Marine & Rail Oil Transportation Study* (Washington State Department of Ecology 2014, 2015)
- *Washington State Freight Mobility Plan* (Washington State Department of Transportation 2014a)
- *Washington State Rail Plan, Integrated Freight and Passenger Rail Plan, 2013-2015* (Washington State Department of Transportation 2014b)
- *West Coast Offshore Vessel Traffic Risk Management Project Final Project Report and Recommendations* (Pacific States/British Columbia Oil Spill Task Force 2002)

5.3.2 Impact Analysis

This impact analysis addresses the potential for increased rail and vessel traffic related to the proposed action to result in environmental impacts in the extended study area. In general, this analysis considers that potential impacts along the BNSF main line are likely similar to those that would occur along the PS&P rail line and that the magnitude of impacts would be roughly proportional to the incremental increase in traffic under the proposed action. Potential impacts from ocean vessel traffic on water and air are also likely to be similar to those that would occur in the Grays Harbor area.

Therefore, impacts that were determined to be low as addressed in Chapter 3, *Affected Environment, Impacts, and Mitigation*, and Chapter 4, *Environmental Health and Safety*, were also anticipated to be low in the extended study area. Impacts that would occur only in the study area, such as related to navigation in the Grays Harbor Navigation Channel, were not included in this analysis. The following resource areas are not considered further in this analysis.

- Earth
- Water
- Plants
- Energy and Natural Resources
- Land and Shoreline Use
- Aesthetics, Light, and Glare
- Recreation
- Cultural and Historic Preservation
- Public Health and Safety
- Rail Traffic

- Vessel Traffic

The analysis of impacts in the extended study area focuses on the following resource areas.

- Air (rail)
- Animals (vessel)
- Noise and Vibration (rail)
- Tribal Resources (vessel)
- Vehicle Traffic and Safety (rail)
- Environmental Health and Safety (rail and vessel)

Sections 5.5.2.1, *Rail Transportation*, and 5.5.2.2, *Vessel Transportation*, characterize the relative increases in rail and vessel traffic within the extended study area. Then, the potential indirect impacts of increased rail and vessel traffic related to the proposed action are qualitatively assessed in the context of baseline (i.e., no-action alternative) rail and vessel traffic in the extended study area.

5.4 What rail and vessel transport occurs in the extended study area?

This section describes rail and vessel transportation along routes that would likely be used under the proposed action to transport oil and hazardous materials in the extended study area. This section provides a summary of recent changes in North American crude oil reserves and the modes of transporting crude oil in the United States. It then focuses on rail transport along mainline routes between the Bakken formation and Centralia, Washington, and vessel transport off the coast.

5.4.1 U.S. Crude Oil Production and Modes of Transport

U.S. crude oil reserves are estimated at more than 36 billion barrels (U.S. Energy Administration 2013). Over the last decade, crude oil production in the U.S. has increased by 60% (U.S. Energy Administration 2015). This increase can be attributed primarily to the extraction of shale oil in Texas and crude oil from the Bakken formation in North Dakota.

North Dakota crude oil extraction increased more than 11 times between 2003 and 2013—from 3.4 to 37.8 million gallons per day (Washington State Department of Ecology 2015). During this same period, production of diluted bitumen from oil sands in Alberta and Saskatchewan increased 2.5 times, from 36.2 to 73.5 million gallons per day (Washington State Department of Ecology 2015). This increased production—both crude oil and diluted bitumen—has led to increased shipments of these oils to refineries in Washington State, California, Illinois, Texas, Louisiana, and New Jersey via rail and vessel.

The number of crude oil-containing rail tank cars in the United States has increased nearly 44 times in the last 6 years—from 9,500 carloads in 2008 to 415,000 carloads in 2013 (Washington State Department of Ecology 2015). In 2013, approximately 12.7 billion gallons of oil were transported by rail in the United States. By the end of 2014, an estimated, 19.5 billion gallons of crude oil were transported by rail.

5.4.2 Current Pacific Northwest Oil Movement

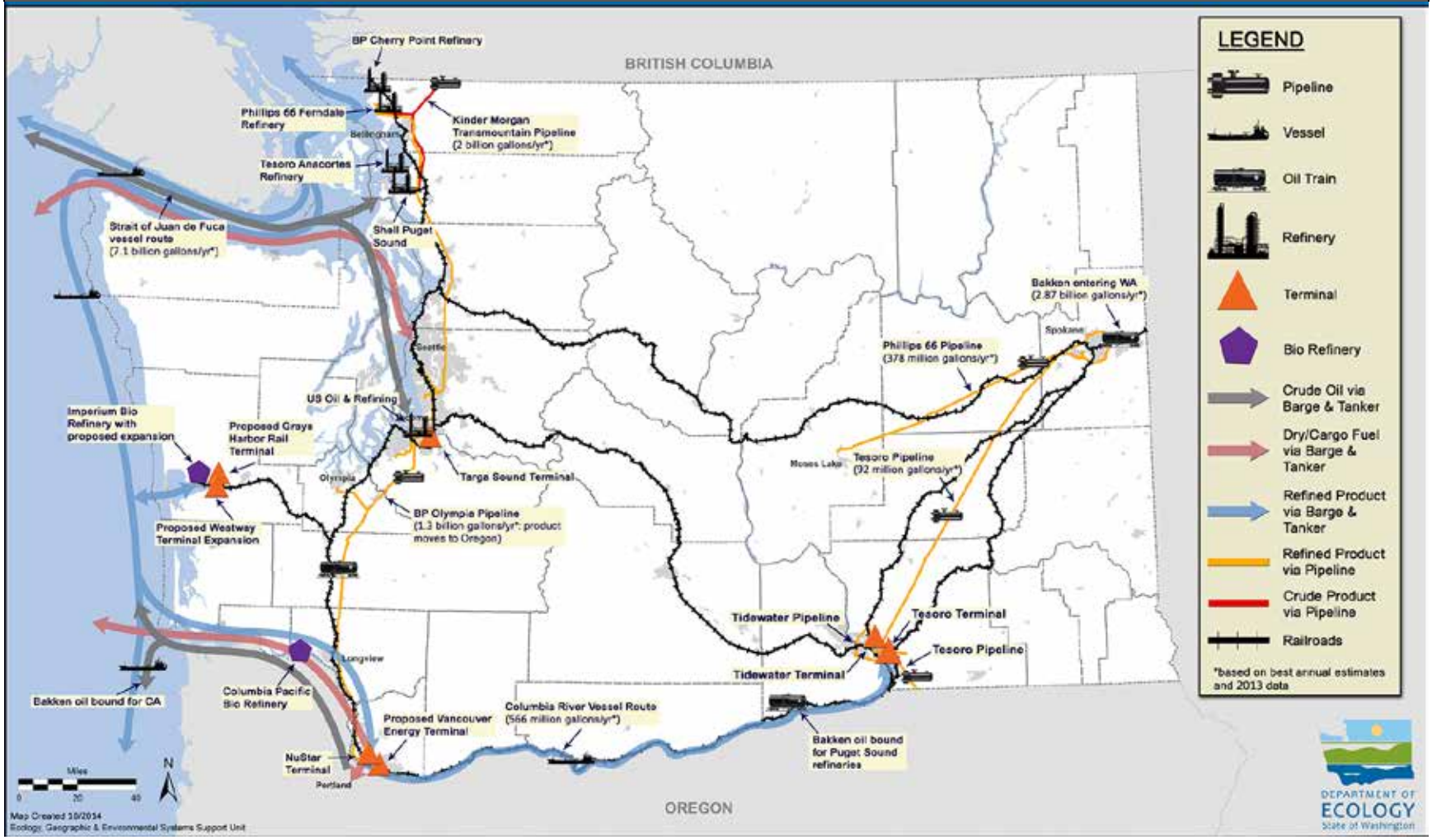
Multiple sources of crude oil have been transported into Washington State over the years. Because the capacity of Washington's refineries has not substantially changed over the last decade, the amount of crude oil transported into the state has been steady at about 8.5 billion gallons annually. However, imports of crude oil have shifted from tanker delivery primarily from Alaska to delivery by pipeline, and more recently by rail tank car (Figure 5-1).

Washington State oil refineries exported about 2.6 billion gallons of refined products in 2011, an increase of 17% from 2008. In addition, in 2011, 487.2 million gallons of bunker (i.e., vessel) fuel were loaded onto tank vessels and exported from Washington State refineries (Washington State Department of Ecology 2015).

Oil, including diluted bitumen, from Canada is transported by pipeline to refineries in northern Puget Sound. Puget Sound refineries transfer refined products to the Olympic Pipeline, to tank vessels and trucks for transport. Diluted bitumen and Bakken crude oil are also currently being transported by rail through Spokane to a facility on the Columbia River and refineries in Puget Sound. Most crude oil shipped by rail in Washington is currently going through the Columbia River Gorge, but could transit over other rail routes.

Nineteen loaded crude oil unit trains pass through Washington State weekly, or approximately 988 per year, destined either for the storage facilities and refineries described above, or for facilities in Oregon and California. Additionally, crude oil tank cars are transported on mixed commodity unit trains carry; data on these tank car movements are unknown. Table 5-1 and Figure 5-2 illustrate how the mode of crude oil transport to Washington State has changed from 2003 to 2013.

Figure 5-1. Movement of Oil In and Out of Washington State



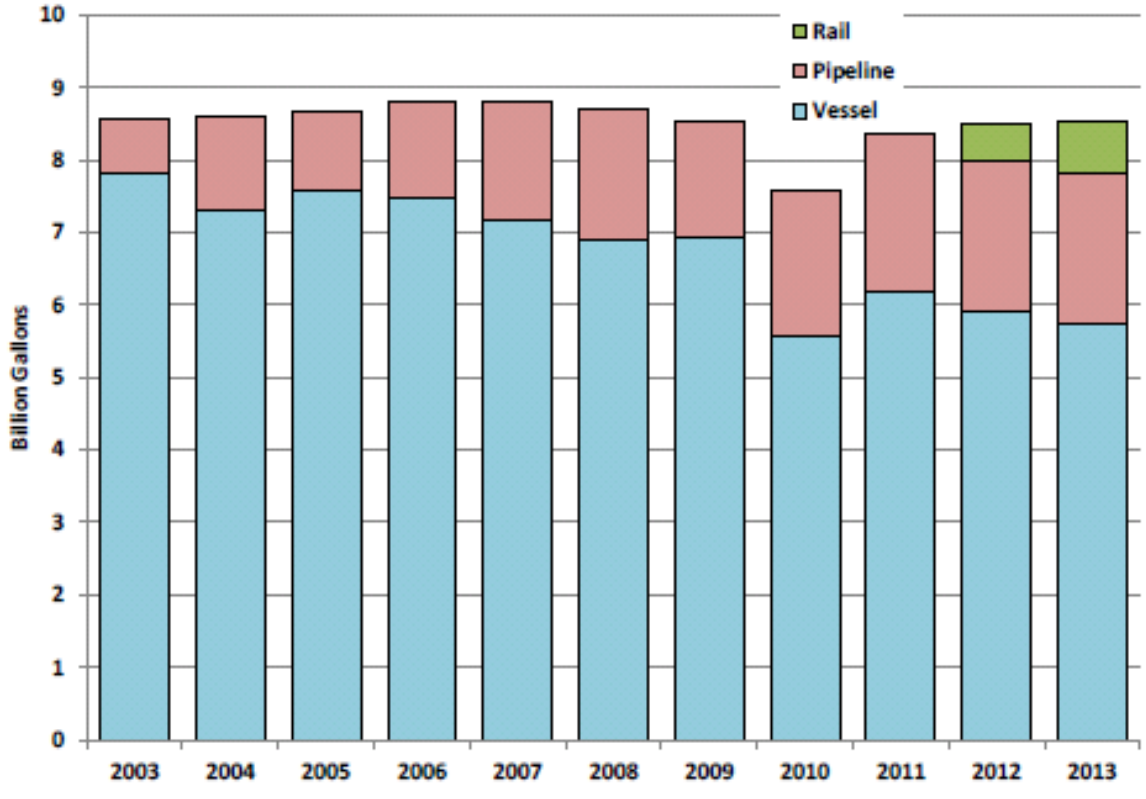
Source: Washington State Department of Ecology 2015

Table 5-1. Estimated Annual Oil Imports by Mode of Transportation into Washington State

	Billion Gallons				Total (%)		
Year	Vessel	Pipeline	Rail	Total	Vessel	Pipeline	Rail
2003	7.8030	0.7753	0.0000	8.5783	91.0	9.0	0.0
2004	7.3171	1.2929	0.0000	8.6100	85.0	15.0	0.0
2005	7.5884	1.0919	0.0000	8.6803	87.4	12.6	0.0
2006	7.4826	1.3079	0.0000	8.7905	85.1	14.9	0.0
2007	7.1744	1.6338	0.0000	8.8083	81.5	18.5	0.0
2008	6.9090	1.7784	0.0000	8.6875	79.5	20.5	0.0
2009	6.9398	1.5992	0.0000	8.5390	81.3	18.7	0.0
2010	5.5713	2.0129	0.0000	7.5842	73.5	26.5	0.0
2011	6.1756	2.1769	0.0000	8.3525	73.9	26.1	0.0
2012	5.9210	2.0756	0.5092	8.5057	69.6	24.4	6.0
2013	5.7480	2.0652	0.7128	8.5260	67.4	24.2	8.4
Total	**74.6302**	**17.8100**	**1.2220**	**93.6621**	**79.7**	**19.0**	**1.3**

Source: Washington State Department of Ecology 2015:32

Figure 5-2. Crude Oil Imports into Washington State by Mode (2003–2013)



Source: Washington State Department of Ecology 2015

5.4.3 Freight Rail Corridors

5.4.3.1 Williston Basin and Bakken Crude Oil Rail Transport

The U.S. crude oil anticipated to be received by the applicant would come from the Bakken region also generally referred to as the Williston Basin. BNSF serves 10 originating terminals in the Williston Basin and connects to 16 of the top 19 oil-producing counties in central and western North Dakota, and five of the six oil-producing counties in eastern Montana. BNSF transports more than half of the oil produced in the North Dakota and Montana regions of the Bakken formation.

In 2008, when the Bakken boom was beginning, BNSF transported just a few thousand barrels a day. Between 2008 and 2012, the volume transported by BNSF increased nearly 7,000% (Bowen 2012). By 2013, BNSF was transporting about 700,000 barrels of crude oil per day, with 550,000 to 600,000 of those barrels originating in the Bakken formation (Stagle 2014). Production in the Bakken formation—where BNSF handles 75% of the output—is expected to grow from 1.2 to 2 million barrels per day (Stagl 2014).

BNSF has stated plans to accommodate growing demands for oil and freight transit with capital investments in infrastructure, equipment, and rolling stock enhancements. In 2012, BNSF invested $197 million on projects in North Dakota and Montana such as 2,188 miles of track surfacing, 121 miles of rail replacements, and about 332,000 rail ties, as well as signal upgrades and equipment acquisitions. In addition, BNSF constructed two 8,000-foot inspection tracks near Minot, North Dakota, which is a switching yard where cars are routed to their end locations, and an inspection station. In 2013, BNSF budgeted $4.3 billion for capital expenditures, including about $250 million on capacity enhancements and infrastructure work in North Dakota and the Bakken region. In 2014, BNSF identified almost $500 million of proposed infrastructure improvements on the northern tier of its network—primarily in North Dakota, Montana and Washington—to address capacity needs for handling more crude oil and agricultural products traffic. Figure 5-3 shows the BNSF networks transporting Bakken crude oil.

Figure 5-3. Originating Crude Oil by Rail Terminals

5.4.3.2 BNSF Main Lines

Between Williston Basin and Washington State

The most northerly BNSF route (linking Chicago and Minneapolis with Spokane, Seattle, and Portland) is used to transport various commodities, including Bakken crude oil from North Dakota to the Pacific Northwest. Continuing from Sandpoint, Idaho, the BNSF main line travels through Montana to Williston, North Dakota. Montana communities along this line include Whitefish, East and West Glacier Park, Havre, and Glasgow.

The BNSF main line from Spokane connects with the Kootenai River Subdivision, which runs to Sandpoint, Idaho. This section of track is commonly known as the Funnel—it is the second-busiest rail corridor in Washington. The 69-mile line hosts an average of 46 freight trains each day, along with daily operation of Amtrak's Empire Builder service connecting Seattle and Portland to Chicago. Sandpoint also is the western end of the Montana Rail Link system, which has operating rights over BNSF into Spokane. As the corridor experienced substantial growth in recent years, BNSF began to increase capacity by adding a second main track. As of April 2005, only 20 miles remained under single-track operation. Annual freight traffic consists of intermodal, forest, and agricultural products, coal, chemicals, and finished automobiles.

Washington State

Washington State is served by two Class 1[1] railroads: BNSF and the Union Pacific Railroad (UP) (Figure 5-1). Except for two small segments of UP-owned track, UP operates in Washington State on BNSF tracks. Crude oil is currently transported along the BNSF main lines. UP does not transport crude oil by rail in Washington State (Washington State Department of Ecology 2015).

BNSF operates more than 1,604 miles of rail line in Washington, which represents almost 10% of their total system. It is the largest rail operator in Washington, handling 1.367 million carloads in 2011 (Washington State Department of Transportation 2014b:37).

Within Washington State, BNSF has four main freight routes (Figure 5-4).

- **Stevens Pass**. Stevens Pass, the most northerly route, runs through or near Spokane, Ephrata, Wenatchee, Leavenworth, and Everett, where it connects to the BNSF north-south main line. Amtrak also uses this route for destinations in the eastern United States and Seattle or Portland.
- **Stampede Pass**. Stampede Pass, the middle route, runs through or near Spokane, Yakima, and Auburn, where it connects with the BNSF north-south main line.
- **Columbia River Gorge**. Columbia River Gorge, the most southerly route, runs through or near Spokane, Pasco, and communities along the north shore of the Columbia River, including Vancouver, Washington, where it connects with the BNSF north-south main line.
- **North-south main line.** The north-south main line roughly parallels the Interstate 5 corridor and extends from Vancouver, Washington, to the Canadian border. The route passes through or near Kelso, Centralia, Olympia, Tacoma, Seattle, Edmonds, Everett, Mount Vernon, and Bellingham. Amtrak uses this route for a number of passenger rail trains. In the Puget Sound area, Sound Transit's Sounder commuter rail also travels along this main line.

Each of these main line routes is part of the BNSF's Northwest Division, which consists of various subdivisions (Table 5-2).

[1] Class I railroads have annual revenue exceeding $453 million and account for 69% of the industry's mileage, 90% of its employees, and 94% of its freight revenue. They operate in 44 states and the District of Columbia and concentrate largely on long-haul, high-density intercity traffic (Association of American Railroads 2014).

Figure 5-4. BNSF Main Line Routes in Washington State

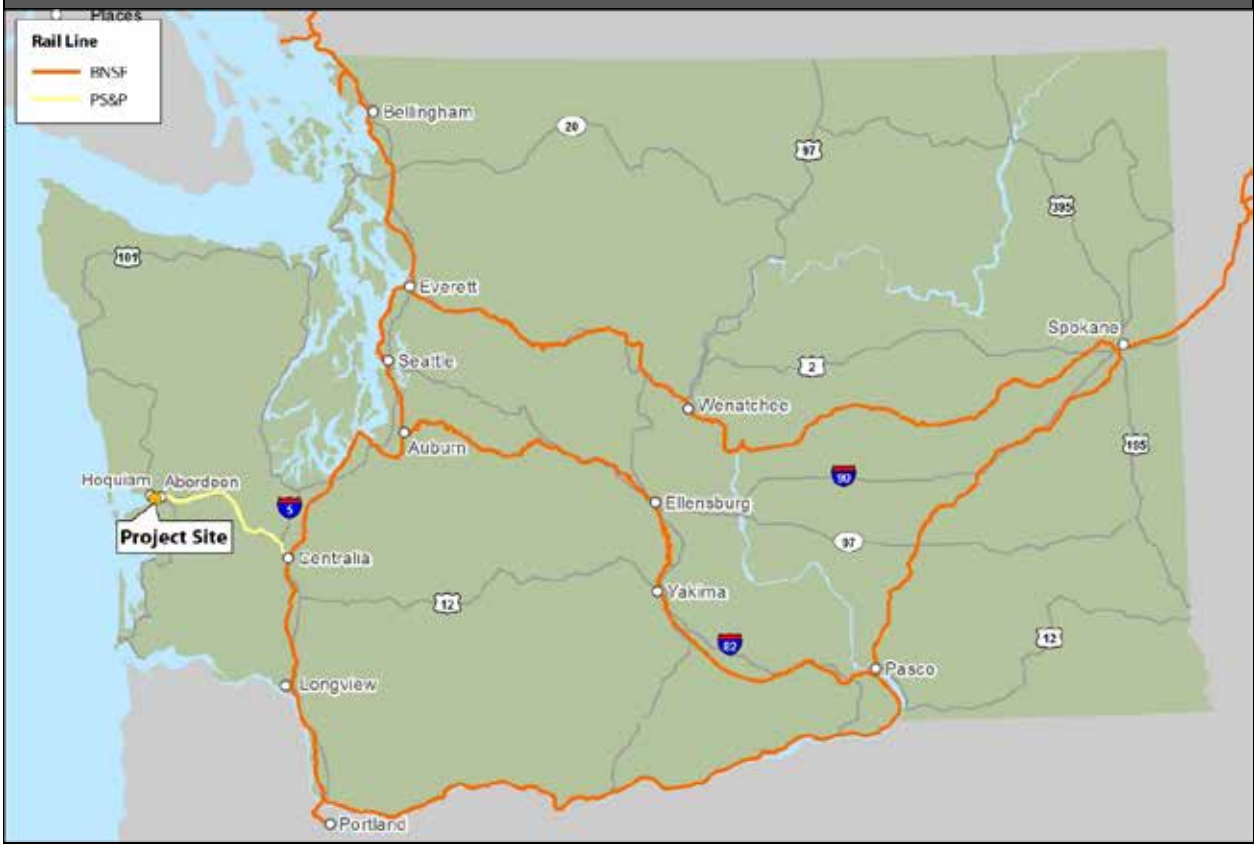


Table 5-2. BNSF Northwest Division—Subdivisions in Washington State

Main Line Route	Subdivision	Begin-End Point	Primary Cities along the Route
Stevens Pass	Scenic	Everett to Wenatchee	Everett, Monroe, Gold Bar, Skykomish, Leavenworth, Wenatchee
	Columbia River	Wenatchee to Spokane	Wenatchee, Quincy, Spokane
Stampede Pass	Stampede	Auburn to Ellensburg	Auburn, Easton, Cle Elum, Ellensburg
	Yakima Valley	Ellensburg to Pasco (connects with Lakeside Subdivision to from Pasco to Spokane)	Ellensburg, Yakima, Kennewick, Pasco
Columbia River Gorge	Fallbridge	Vancouver to Pasco	Vancouver, Camas, Wishram, Pasco
	Lakeside	Pasco to Spokane	Pasco, Ritzville, Cheney, Spokane
North-South	Bellingham	U.S./Canada Border to Everett	Everett, Marysville, Burlington, Bellingham, Blaine
	Scenic	Everett to Seattle	Everett, Mukilteo, Edmonds, Seattle,
	Seattle (connects with Fallbridge Subdivision)	Seattle to Vancouver	Seattle, Tukwila, Auburn, Tacoma, Olympia, Centralia, Winlock, Kelso, Vancouver

Track Conditions, Classes, Control Systems, and Speeds

The BNSF main line routes are located in diverse geographic and topographic corridors that contribute to their physical layout. The routes also vary with respect to operating characteristics, as summarized below.

- **Track class.** The Federal Railway Administration sets track classes from 1 to 9 based on the quality of the track. Track class determines speed limits and maximum train car weight. It also determines whether the rail line can accommodate passenger trains. The BNSF main line routes in Washington State are maintained at Class 4 specifications.
- **Control system.** The train control system ensures safety by managing rail traffic through signaling systems.
- **Speed.** The Federal Railway Administration sets the speed limit based on track class, although some large communities may establish permanent speed restrictions. While unloaded unit bulk trains can operate at maximum track speed, all trains over 100 tons per operative brakes—including unit trains carrying crude oil—are restricted to a maximum speed of 45 miles per hour (mph).[2] Lesser volumes of oil and hazardous materials, however, may be transported in manifest trains,[3] which frequently do not exceed 100 tons per operating brakes and can operate at the maximum speed allowed for class track and freight trains.

The U.S. Department of Transportation Pipeline And Hazardous Materials Safety Administration's final rule on Hazardous Materials: Enhanced Tank Car Standards and Operational Controls for High-Hazard Flammable Trains (May 2015) places several restrictions and requirements on the high-hazard flammable unit trains[4] that would be operating on the main line in Washington State under the proposed action. These controls relate to speed restrictions, braking systems, and routing, as follows.

- **Speed.** All trains that include 20 or more tank cars carrying a Class 3 flammable liquid in a continuous block or 35 such tank cars throughout the entire train are designated as high-hazard flammable trains and are restricted to 50 mph in all areas. If such trains include tank cars that do not meet the new enhanced standards, they are restricted to 40 mph in high-threat urban areas. Portland, Vancouver, and a 10-mile buffer extending from the border of the combined area plus Seattle, Bellevue, and a 10-mile buffer extending from the border of that combined area are the only high-threat urban areas in the extended study area (49 Code of Federal Regulations [CFR] 1580, Appendix A).
- **Braking.** High-hazard flammable trains must have a functioning two-way end-of-train device or a distributed power braking system in place. In addition, high-hazard flammable unit trains must be operated with an electronically controlled pneumatic braking system. This system must be implemented by January 1, 2021, if the train is transporting one or more tank cars loaded

[2] Exceedence is determined by the total weight of the train (cars and commodity without the weight of the locomotives) divided by the number of cars in the train with operable brakes.
[3] BNSF defines a manifest train as a scheduled merchandise freight train. Manifest trains are typically composed of loaded and empty boxcars, gondolas, individual tank cars, auto cars, etc.
[4] A high-hazard flammable unit train is one that travels at speeds greater than 30 mph and includes 70 or more tank cars loaded with Class 3 flammable liquids. Crude oil and ethanol are Class 3 flammable liquids.

with a Packing Group I flammable liquid and by May 1, 2023, if it is transporting one or more tank cars loaded with a Packing Group II or III flammable liquid.[5]

- **Routing.** Railroads must select their route based on a routing analysis that addresses at least 27 specified safety and security factors. They must also provide an appropriate point of contact to state and/or regional fusion centers and other state, local, and tribal officials who contact the railroad to discuss routing decisions. This will be in addition to the requirements to notify State Emergency Response Commissions set forth in a May 2014 Emergency Order, per a recent clarification from the U.S. Department of Transportation.

The topographic and operational characteristics of each route are summarized below; explanations and definitions about rail track elements can be found in Appendix K, *Rail Technical Information*.

Stevens Pass

This 331-mile corridor consists of BNSF's Scenic Subdivision (Seattle-Everett-Wenatchee) and Columbia River Subdivision (Wenatchee-Spokane). The line traverses the longest railroad tunnel in the United States, the 7.8-mile Cascade Tunnel under the summit of Stevens Pass. The portion of the line between Seattle and Everett is mostly double track, and the majority of the Everett-Spokane segment is single track.

With only a few exceptions, rail traffic is controlled entirely by a dispatcher managed Centralized Traffic Control.[6] Maximum passenger train speed is 79 mph, maximum freight train speed is 60 mph between Wenatchee and Spokane and 50 mph between Seattle and Wenatchee.

Stampede Pass

The BNSF's 227-mile main line across central Washington consists of the Stampede Subdivision between Auburn and Ellensburg and the Yakima Valley Subdivision connecting Ellensburg and Pasco. The Stampede Subdivision crosses the Cascade Mountains at Stampede Pass, entering the height-restricted Stampede Tunnel at the summit. The Yakima Valley Subdivision traverses the twisting Yakima River Canyon, which limits train speed and capacity. The corridor is almost all single track, except for a short stretch of two main tracks at Easton.

Rail traffic is controlled with Track Warrant Control,[7] with a dispatcher managed Centralized Traffic Control used only at sidings. Maximum permitted train speed is 49 mph.

Columbia River Gorge

The 233-mile Columbia River Gorge route consists of the BNSF Fallbridge Subdivision, which connects Vancouver, Washington, with Pasco, where main lines continue to Seattle and Spokane. The line closely follows the Columbia River for its entire length, connecting with the Oregon Trunk Subdivision (BNSF's sole connection between the Pacific Northwest and California) at Wishram. The line is essentially level, with a maximum grade of 0.20%. The Fallbridge Subdivision is almost all single track, with short stretches of double track around Portland and Wishram. East of Pasco, the 149-mile BNSF Lakeside Subdivision connects Pasco and Spokane, and its eastern 12-mile track

[5] The packing groups set requirements based on the degree of danger presented by the material (I: high, II; medium, or III: low), which reflects the boiling point and flashpoint for the material carried.
[6] With Centralized Traffic Control, train movement is authorized by signals remotely provided by a train dispatcher.
[7] With Track Warrant Control, dispatchers issue permission for trains to proceed instead of using signals.

hosts UP trains operating between Hinkle, Oregon, and Spokane. The corridor is primarily single track, with short stretches of double track near Spokane, Beatrice, and Pasco.

Between Vancouver and Pasco, rail traffic is controlled over the entire line by a dispatcher managed Centralized Traffic Control. Maximum passenger train speed is 79 mph and freight train speed is 60 mph; the maximum allowable railcar weight is 143 tons. East of Pasco, except for a short segment of Automatic Block Signaling[8] at Pasco, the entire line is controlled by a dispatcher managed Centralized Traffic Control. Maximum passenger train speed is 79 mph and freight train speed is 60 mph.

North-South Main Line

The BNSF's 177-mile Seattle Subdivision, the north-south main line that connects Seattle with Portland, is the most heavily trafficked rail line in Washington State. The entire corridor is double track. The double track continues north between Seattle and Everett on the Scenic Subdivision. From Everett to New Westminster, British Columbia, this 152-mile corridor is single track, and then becomes double track from New Westminster to Vancouver, British Columbia.

Between Vancouver, Washington, and Everett, rail traffic is controlled by a dispatcher managed Centralized Traffic Control, with the exception of short stretches in the Tacoma and Seattle areas. Maximum passenger train speed is 79 mph and freight train speed is 60 mph. From Everett to New Westminster, British Columbia, rail traffic is controlled by a dispatcher managed Centralized Traffic Control, with the exception of Automated Block Signaling/Occupancy Control System[9] in a few short stretches. Maximum train speeds vary between 60 mph to 79 mph for both passenger and freight rail.

Maintenance and Inspections

Ongoing track maintenance is a standard practice for railroads. Crews continually monitor track condition and maintain or upgrade ties, rail, and ballast, as necessary. This maintenance program relies upon continual inspection of the track and grade crossings.

Track Inspection

As required by federal law, key corridors on BNSF are inspected four times a week, and many heavily traveled routes are inspected daily. The BNSF inspectors review the conditions of tracks and right-of-way as well as whistle posts, crossbucks, and active warning devices. In addition, BNSF train crews are instructed to report any signal and crossing warning malfunctions immediately to BNSF's Network Operations Center in Fort Worth (BNSF Railway Company 2013).

Grade Crossings

BNSF is responsible for maintenance of active warning devices. Each active warning device is inspected monthly by BNSF. This inspection includes a review of functionality of gates and lights and of battery back-up power sources (BNSF Railway Company 2013).

[8] With Automatic Block Signaling, signals are activated by trains in a consecutive series of blocks along the track.

[9] The Occupancy Control System is one of three control systems; the other two are Track Warrant Control and Direct Traffic Control.

Wayside Detector System

A nationwide wayside detector system helps prevent damage and accidents by monitoring the condition of passing trains. Located along 140,000 miles of railroad, wayside detectors monitor the wheels of passing trains and alert rail car operators to potential defects, enabling them to schedule appropriate maintenance in a safe, timely, and cost-effective manner.

The BNSF Railway Northwest Division Timetable No. 4 (BNSF Railway Company 2009) identifies wayside detectors at multiple locations on its primary mainline corridors in Washington State. The detectors include dragging equipment detection, rail car journal integrity exception reporting, wheel impact detectors, and slide fence detectors. Table 5-3 lists the locations of these detectors.

Table 5-3. Location of Wayside Detectors by Subdivision

Main Line	Route	Mileposts (MP)	Route Miles	Number of Wayside Detectors	Average Miles between Detectors
Columbia River Gorge	Sandpoint, ID to Spokane, WA	MP3.0–MP71.5	68.5	14	4.89
	Spokane to Pasco	MP1.1–MP147.5	146.4	28	5.23
	Pasco to Vancouver, WA	MP229.7–MP9.9	219.8	28	7.85
North-South	Vancouver, WA to Seattle	MP136.5–MP0.3	136.2	12	11.35
	Seattle to Everett	MP0.0–MP32.2	32.2	4	8.05
	Everett to Blaine	MP0.0–MP119.3	119.3	9	13.26
Stevens Pass	Everett to Wenatchee	MP1784.7–MP1650.2	134.5	22	6.11
	Wenatchee to Spokane	MP1650.2–MP1481.6	168.6	11	15.33
Stampede Pass	Auburn to Ellensburg	MP0.0–MP102.6	102.6	18	5.7
	Ellensburg to Pasco	MP1.9–MP127.0	125.1	12	10.43

Source: Washington State Department of Ecology 2015

5.4.3.3 Main Line Freight Rail Traffic

Washington State

In addition to currently transporting crude oil into Washington State, the BNSF main lines deliver products to locations throughout Washington. Amtrak and Sound Transit (in Puget Sound) also operate passenger rail service along portions of the main lines. Table 5-4 provides a summary of freight and passenger traffic by route.

Table 5-4. Existing Daily Rail Traffic along the BNSF Main Lines in Washington State

Main Line	Route	Average Number of Freight Trains	Number of Passenger Trains	Freight Train Products
North-South	Vancouver, BC to Everett	23 (with only 12 running through to BC)	4 Amtrak Cascades	Intermodal, forest and agricultural products, refuse, chemicals, and finished automobiles.
Stevens Pass	Everett to Spokane	25	1 Amtrak Empire Builder	Intermodal, agricultural and forest products, chemicals, automobiles, and other merchandise between the Northwest and the Midwest.
	Everett to Seattle	50	4 Amtrak Cascades 8 Sounder 1 Amtrak Empire Builder	
North-South	Seattle to Portland	58	8 Cascades 18 Sounder 1 Amtrak Coast Starlight	Intermodal, forest and agricultural products, refuse, chemicals, and finished automobiles.
Columbia River Gorge	Portland to Pasco	31	1 Amtrak Empire Builder	Intermodal, forest, and agricultural products, refuse, coal, chemicals and finished automobiles.
	Pasco to Spokane	33 (BNSF) 11 (UP)		
Stampede Pass	Auburn to Pasco	6		Forest, agricultural, and chemical products.

Source: Washington State Department of Transportation 2014b: Appendix 3-B

Mainline Capacity and Utilization

The Washington State Department of Transportation (WSDOT) State Rail Plan shows the BNSF main line in Washington State has adequate capacity to meet its current demands (Figure 5-5) (Washington State Department of Transportation 2014b). Rail capacity is different from rail traffic. Rail traffic is the number of trains that actually use the rail line (typically presented by segment or subdivision). Rail capacity is the maximum number of trains that can be operated along the rail line while safely operating trains within a realistic schedule.

The corridor with the most rail traffic is BNSF's Spokane to Pasco segment, which operates at 87% of capacity (Washington State Department of Transportation 2014b). BNSF's Portland-Vancouver, Washington to Pasco Subdivision follows at 71% of line capacity. Since 2012, BNSF's directional running[10] of empty bulk trains on the Stampede Pass route (Auburn-Pasco via Yakima) has enhanced rail capacity—by almost 300%—from about 10 trains per day to 39 trains per day on this route. At present, this Stampede Pass route handles approximately four to six trains per day. Figure 5-5 illustrates rail traffic and utilization[11] along each main line (as of 2010). Figure 5-6 projects the same information for year 2035. The projections for 2035 do not include rail growth related to crude oil trains. Future projections and utilization are based on analyses performed as part of

[10] Directional running refers to running trains in opposite directions on a double track.
[11] Utilization is defined as the ratio of demand to available capacity.

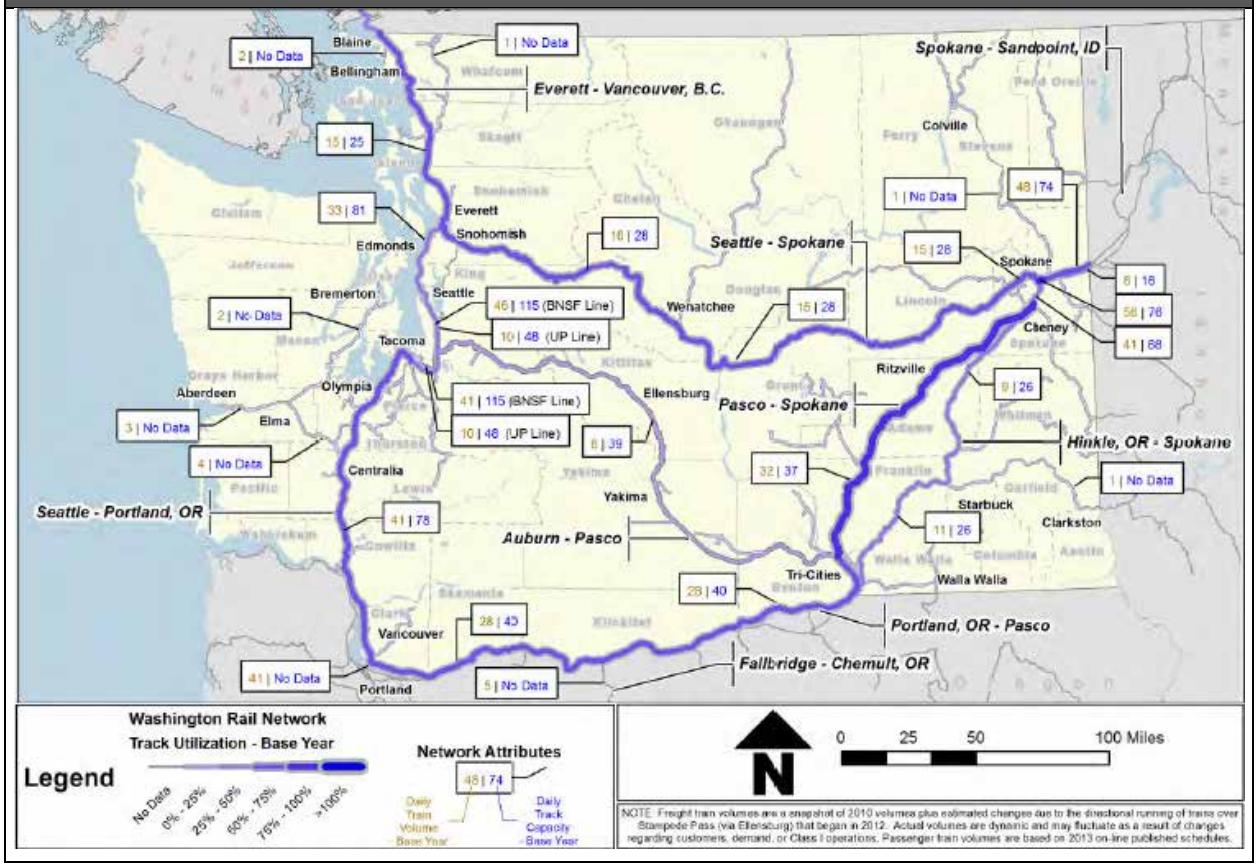
Washington State Rail Plan (Washington State Department of Ecology 2015). That analysis presents an estimate of future rail traffic and utilization.

Washington's rail system is expected to handle more than 260 million tons of cargo by 2035 — more than double the volume carried on the system in 2010. This represents a compound annual growth rate of 3.4% for commodities carried on the rail system but does not include increased rail traffic related to crude oil or coal proposals. Rail traffic in Washington associated with crude oil is discussed further in Section 5.4.1, *No-Action Alternative*. Several rail segments are expected to require operational changes and/or capital improvements to manage anticipated freight rail volumes under the 2035 projection.

This analysis of the BNSF lines suggests the following conditions by 2035.

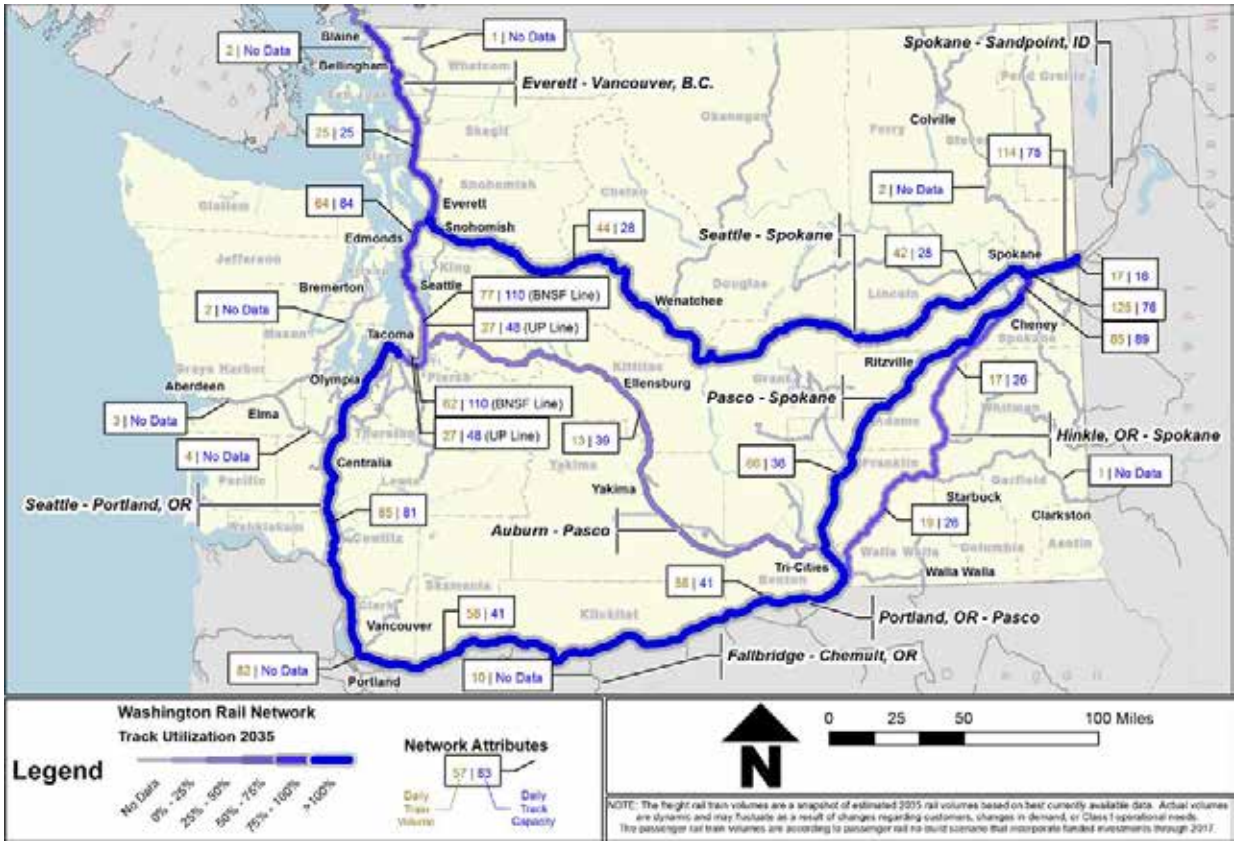
- Pasco-Spokane at 170% utilization.
- Seattle-Spokane via Wenatchee at 150% utilization.
- Spokane-Hauser Junction, Idaho at 150% utilization.
- Vancouver-Pasco at 140% utilization.
- Seattle-Portland and Everett-Burlington are projected to be near the 100% utilization mark.

Figure 5-5. BNSF Main Line Daily Traffic and Utilization —2010



Source: Washington State Department of Transportation 2014b:41

Figure 5-6. BNSF Main Line Daily Traffic and Utilization—2035



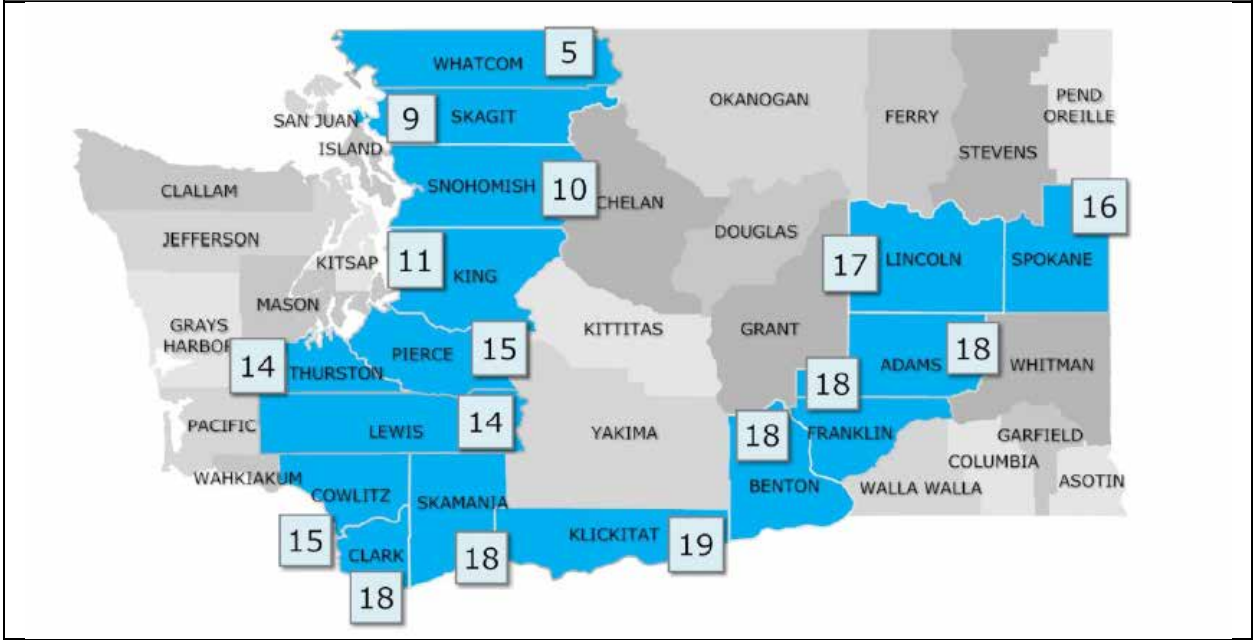
Source: Washington State Department of Transportation 2014b:41

Crude Oil Unit Bulk Train Routes

BNSF has not specified a route for crude oil unit trains in Washington State. BNSF has stated that routes will be determined based on operational needs and may vary. Most trains enter and leave Washington State over the BNSF corridor between Sandpoint and Spokane. In some cases, a few trains arrive and/or leave on UP routes from Oregon and California.

Currently, BNSF directs westbound loaded unit bulk trains, including crude oil, from Spokane to Vancouver, Washington on the Columbia River Gorge route. In Vancouver, the unit trains are switched to the north-south main line and travel north to Puget Sound and beyond. BNSF directs eastbound empty trains on the Stevens Pass and the Columbia River Gorge routes, depending on capacity. A growing number of eastbound empty unit bulk trains operate over Stampede Pass. Figure 5-7 illustrates the location and number of loaded crude oil by rail trains that currently travel through Washington State.

Figure 5-7. Current Weekly Loaded Crude Oil by Rail in Washington Counties (June 2014)



Source: Washington State Department of Ecology 2015

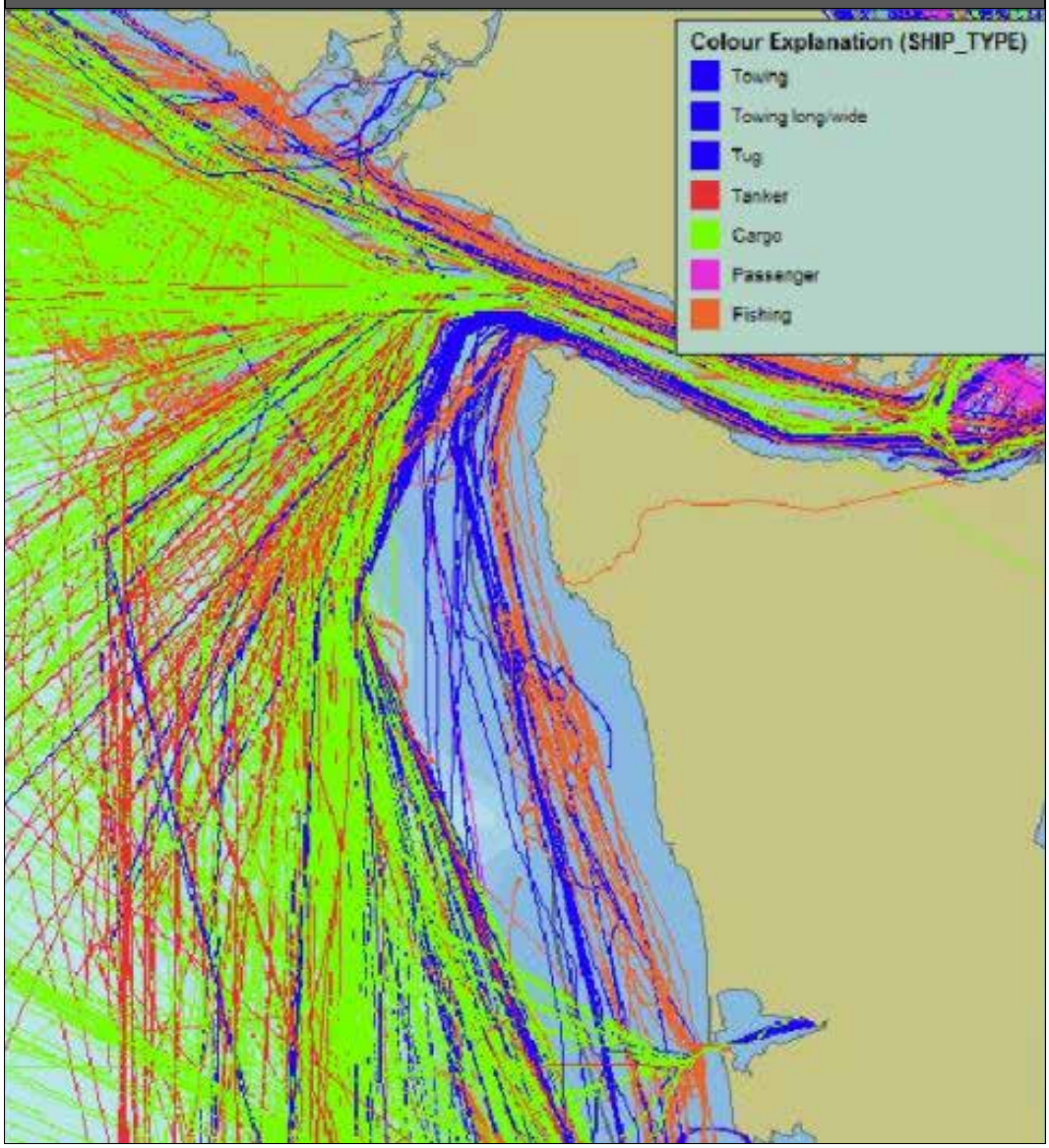
5.4.4 Vessel Routes and Destinations

Vessel routes vary based on destinations but follow typical vessel routes off Washington's coast and in Puget Sound, as discussed in this section. Vessels transporting oil/bulk liquids as part of the proposed action are not expected to transit the Columbia River. Under recommendations from the Pacific States/British Columbia Oil Spill Task Force, loaded tank vessels typically transit along routes 50 nautical miles from the coast and freight vessels transit 25 nautical miles from the coast.

In 2014, 6,815 cargo ships and tankers[12] entered Grays Harbor, the Columbia River and Grays Harbor and there were 4,175 tank barge transits (Washington State Department of Ecology 2015:343). Vessels are tracked using automated identification systems required on all large commercial vessels. The Marine Exchange of Puget Sound tracks vessels in Puget Sound, Grays Harbor, and off the Washington coast for 150 miles. The Merchants Exchange of Portland tracks vessels in the Lower Columbia River and off the Washington and Oregon coasts. An example of the transits of large commercial ships tracked along the Olympic Peninsula coast of Washington are shown on Figure 5-8.

[12] *Vessels* used to transport bulk liquids, such as crude oil, are referred to as tank vessels and include *tankers* (self-propelled ships) and *tank barges* (barges propelled by tugs). Vessel traffic in the navigation channel also includes *cargo vessels* (comprising ships and barges) carrying grain, automobiles, and wood or other products. Tank vessels and cargo vessels are referred to collectively in this document as *large commercial vessels*.

Figure 5-8. Vessel Traffic along the Olympic Peninsula Coastline—December 2012–January 2013



5.4.4.1 Vessel Arrivals and Departures for Grays Harbor

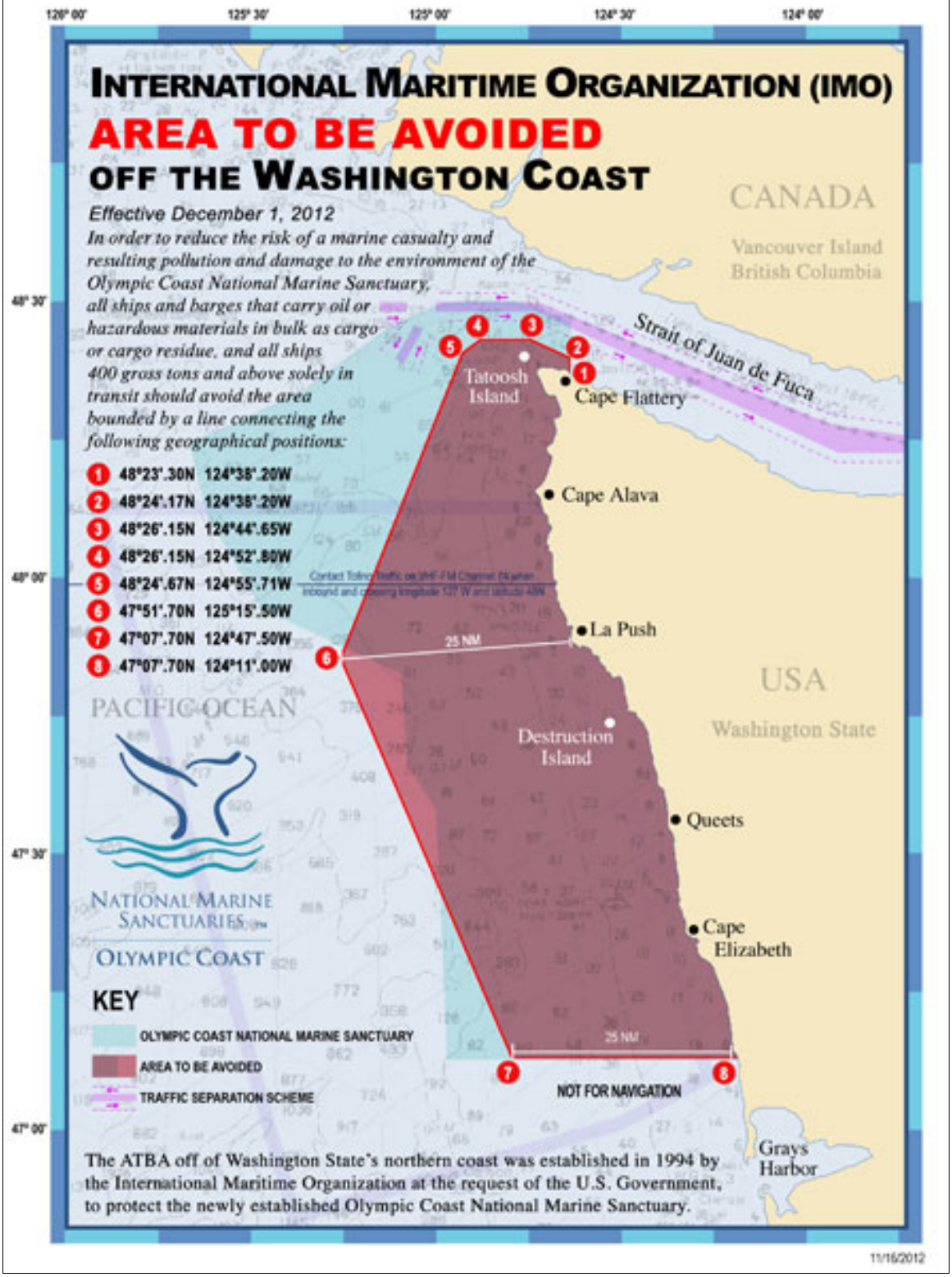
In 2012, 157,663 vessels called at the principal ports along the west coast in Washington, Oregon, and California. In 2012, 140 vessels called at the Port of Grays Harbor (Port), which accounts for less than 0.1% of total vessels transiting off the coast. When entering or departing Grays Harbor, whether heading to another U.S. port (a coastwise voyage) or a foreign port, a freight vessel is likely to travel seaward to 25 to 50 nautical miles from the coast and transit along the coast. Under recommendations from the Pacific States/British Columbia Oil Spill Task Force, loaded tank vessels typically transit along routes 50 nautical miles from the coast and freight vessels transit 25 nautical miles from the coast.

5.4.4.2 Olympic Coast National Marine Sanctuary

The Olympic Coast National Marine Sanctuary comprises approximately 2,408 square nautical miles of coastal and ocean waters and the submerged lands off the central and northern coast of Washington State. The sanctuary, which is connected to both the Big Eddy Ecosystem and the California Current Large Marine Ecosystem, is one of North America's most productive marine regions and undeveloped shorelines. The northern edge of the sanctuary begins just north of Cape Flattery, Washington, and the southern boundary is located approximately 12 nautical miles north of the entrance to Grays Harbor (Figure 5-9).

The sanctuary includes an area designated an *Area to Be Avoided* by the International Maritime Organization in 1994 at the request of the U.S. government. The designation is intended to protect the sanctuary by limiting vessel transits off the coast of Washington to reduce the risk of marine casualties such as oil spills, and the resulting environmental damage to the sanctuary. The designation applies to all ships 400 gross tons and greater and to any ships and barges that carry oil or hazardous materials as cargo or if the tanks contain residual oil. Complying with the Area to Be Avoided is voluntary but in 2012, the compliance rate for all vessels over 400 gross tons was 98% (National Oceanic and Atmospheric Administration 2013).

Figure 5-9. Areas to Be Avoided off the Washington Coast



Source: National Oceanic and Atmospheric Administration 2013

5.4.4.3 Puget Sound

Description

The Strait of Juan de Fuca, accessible from the Pacific Ocean, and its approaches provide access to Port Angeles, Puget Sound, and the San Juan Island Archipelago. To the north and connected by Haro Strait and Boundary Pass is the Strait of Georgia. Deep-draft vessels entering the Strait of Juan de Fuca use the harbors at Port Angeles, Anacortes, Seattle, Tacoma, Olympia, and Bellingham, Washington, and Vancouver, British Columbia. The Strait of Juan de Fuca separates the south shore of Vancouver Island, Canada, from the north coast of Washington State. Commerce in this region is extensive. Vessels entering the Strait of Juan de Fuca for commerce may be foreign-flagged or U.S.-flagged. Typical vessel approaches are along major vessel routes.

The Strait of Juan de Fuca is about 11 miles wide for approximately 50 miles to Race Rocks and then widens to about 16 miles for 30 miles east to Whidbey Island, its eastern boundary (National Oceanic and Atmospheric Administration 2015). The waters are typically deep until near the shore with few outlying dangers, most of which are in the eastern part. The navigation of these waters is relatively simple in clear weather. In thick weather, because of strong and irregular currents, extreme caution and vigilance must be exercised.

Vessel Traffic

Large commercial vessels operating in Puget Sound typically call at ports in Port Angeles, Seattle, Tacoma, Olympia, or Vancouver, British Columbia. The Puget Sound area has a vessel traffic service system under the command of U.S. Coast Guard to facilitate safe and efficient transit of vessel traffic and prevent collisions or groundings. This system conducts real-time reporting, monitoring, and management of vessel traffic and anchorage usage and provides instant information and advice 24 hours a day as needed. It also enforces navigation rules and special safety and security restrictions. It may adjust certain rules or restrictions for safety reasons.

An International Maritime Organization-approved traffic separation scheme governs vessel traffic in Puget Sound and its approaches. This area is actively managed by a joint U.S.–Canadian Cooperative Vessel Traffic Service. The separation scheme consists of five sets of traffic lanes: the western approach and the southwestern approach from the ocean; the western lanes in the Strait; the southern lanes to Port Angeles; the northern lanes to Victoria, British Columbia; and two precautionary areas, one west-northwest of Cape Flattery and the other north of Port Angeles. Each set of lanes consists of inbound and outbound traffic lanes with separation zones (National Oceanic and Atmospheric Administration 2015). Tank vessels are not required to meet the Rosario Strait one-way traffic rules in 33 CFR 161.55. Tug vessels are monitored by the U.S.–Canadian Cooperative Vessel Traffic Service during transit though Rosario Strait and Puget Sound.

Tankers over 125,000 deadweight tons[13] bound for a U.S. port are prohibited from operating in Puget Sound (33 CFR 165.1303). All oil tankers (as defined in 33 CFR 168) and vessels of 40,000 deadweight tons or more must have tug escorts (Revised Code of Washington [RCW] 88.16.190). All escorts must be nearby to ensure timely and effective response, taking into consideration the sea and weather conditions, ship characteristics, and nearby traffic.

[13] *Deadweight ton* refers to the ship's weight-bearing capacity: it is the sum of all cargo, provisions, and crew, but not the weight of the ship itself.

The Puget Sound Harbor Safety Committee has implemented a harbor safety plan with standards of care for bunkering (fueling), anchoring, and actions for incidents, towing vessels, and tanker escorts.

5.4.4.4 Emergency Response Towing Vessel

To help protect Washington's shorelines and waterways, the Washington State maritime industry has permanently stationed an emergency response towing vessel in Neah Bay. The tug is an important safety net to prevent disabled ships and barges from grounding off Washington's outer coast or in the western Strait of Juan de Fuca. Tank vessels transiting to or from a Washington port through the Strait of Juan de Fuca (except for transits extending no further west than Race Rocks Light) must include the emergency response towing vessel stationed at Neah Bay in their oil spill contingency plans (RCW 88.46.130).

5.5 What are the potential impacts on rail and vessel transport in the extended study area?

This section describes the impacts on rail and vessel traffic that could occur in the extended study area. Impacts that could occur under the no-action alternative are described first as a baseline for comparing the potential impacts of the proposed action.

5.5.1 No-Action Alternative

Under the no-action alternative, the applicant would continue to operate its existing facility as described in Chapter 2, Section 2.1.2.2, *Existing Operations.* Although the proposed action would not occur, it is assumed that growth in the extended study area would continue under the no-action alternative within the 20-year analysis period (2017 to 2037). Such development could result in in impacts characterized in subsections 5.5.1.1, *Rail Transportation*, and Section 5.5.1.2, *Vessel Transportation*.

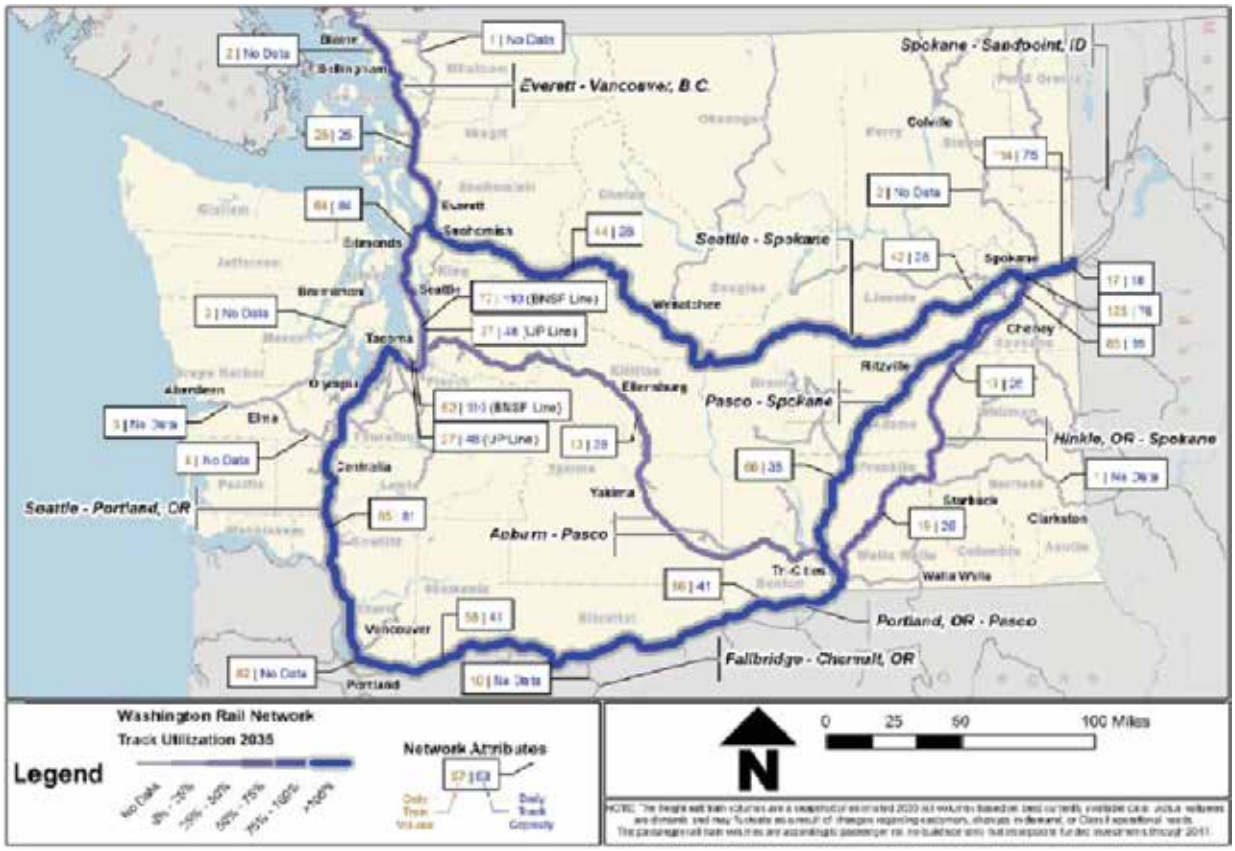
5.5.1.1 Rail Transport

Future demand and growth in Washington and beyond will depend on market forces. Future growth and rail capacity have been analyzed by WSDOT, and the results from some of these analyses are included in this discussion. The existing and proposed facilities identified below could increase rail traffic in the extended study area in the future. These facilities are not part of the detailed study area described in Chapters 3, 4, 6, or 7 of this document.

Impacts on BNSF Main Lines in Washington State

Washington's rail system is expected to handle more than 260 million tons of cargo by 2035—more than double the volume carried on the system in 2010 (Washington State Department of Transportation 2014b). This represents a compounded annual growth rate of 3.4% for commodities carried on the BNSF main lines. Under the no-action alternative, rail traffic on the BNSF main line routes is expected to increase as presented in Figure 5-10.

Figure 5-10. BNSF Main Line Future Growth and Capacity (2035)



Sources: BNSF 2010 Train Counts Data for Washington; UP 2012 Q1 Train Counts Data for Spokane-Eastport, Idaho corridor; Cambridge Systematics' Estimation of growth factors between 2010 and 2035 for Train Volumes using a TransCAD Model of ORNL's Rail Network; and Capacity Analysis using the 2011 BNSF Northwest Division timetable data, 2011 BNSF R 1 report data and Washington Rail Plan GIS data.
Note: Reflects directional running of trains on the Stampede Pass route (Auburn-Pasco via Yakima), which was implemented by BNSF in 2012.

Source: Washington State Department of Transportation 2014b

The WSDOT State Rail Plan states it did not include crude oil movement by rail or coal export terminal proposals in Washington State for the 2035 projection. The Millennium Bulk Terminals – Longview coal export proposal includes an estimate of 16 train trips a day (Millennium Bulk Terminals—Longview 2013). The Gateway Pacific Terminal coal and bulk export proposal includes an estimate of 18 train trips a day (Pacific International Terminals 2012).

Table 5-5 uses information from the Marine & Rail Oil Transportation Study for an overview of proposed and operating facilities moving crude oil by rail, including refineries and terminals outside of the Grays Harbor Study area, which are discussed in Chapter 6, *Cumulative Impacts* (Washington State Department of Ecology 2015).

Table 5-5. Proposed and Operating Facilities Moving Crude Oil by Rail

Owner or Proponent	Location	Daily Trains (Empty and loaded)
BP Refinery	Cherry Point	2
NuStar Terminal	Vancouver	0.6
Phillips66 Refinery	Ferndale	1
Shell Refinery	Anacortes	2
Targa Sound Terminal	Tacoma	2
Tesoro Refinery	Anacortes	2
U.S. Oil Refinery	Tacoma	1
Vancouver Energy Terminal	Vancouver	8

Planned Capacity Enhancements

To address future growth and capacity on the BNSF main lines, four projects are currently in the construction or detailed planning phase, with completion for each ranging from 2012 through the 2018 (Washington State Department of Transportation 2014b). Improvements include the completion of a third main line between Martin's Bluff and Rocky Point and a new siding near Kalama, which will be necessary to accommodate projected passenger train volumes. These improvements are currently in the environmental review process.

The Blakeslee Junction project would improve access/egress efficiency between the Interstate 5 corridor main lines, and both the PS&P rail line and Tacoma rail line at Centralia. Growth in the number of unit trains moving to and from the Port via the PS&P rail line has increased congestion at the interchange. This project includes a number of elements designed to increase the speed of trains through the interchange with the PS&P rail line. This will benefit both freight and passenger trains. The project is divided into five phases. Early planning has been completed on the project, but only partial funding for Phase 1A and 1B are available. Construction will require additional funding.

Recommended port access projects include a unit train staging yard near Woodland, which would increase the efficiency of both the BNSF and UP routes through the Columbia River Gorge and the Interstate 5 corridor. BNSF currently stages unit grain trains in Pasco for movement to export terminals on the lower Columbia River, Puget Sound, and Grays Harbor. The distance between the Pasco staging yard and the export terminals increases the potential for train delays. A staging yard in Woodland would reduce the distance to the export terminals. This project would also benefit passenger trains by reducing conflicts with slower-moving freight trains. This project is currently in the discussion phase.

Impacts on Rail Network Capacity in Washington State from Future Non-Crude Oil by Rail Transport

Under the no-action alternative, the applicant would continue rail operations consistent with current operations as described in Section 2.1.2.2, Existing Operations. Based on rail traffic projections discussed in Section 3.15, *Rail Traffic*, it is anticipated that rail traffic bound for the existing facility at the project site would not substantially increase by 2017 or 2037 compared to overall Washington State rail traffic. WSDOT projections of rail capacity in Washington in 2035 (Figure 5-10) identify areas where existing rail capacity is expected to be exceeded. Additional rail traffic not included in the rail study could also affect rail capacity. The potential impacts will depend

on actions taken by the railroad to address capacity but are not dependent on the proposed action. Under the no-action alternative, potential impacts on the BNSF rail network could occur.

Indirect Impacts on Other Resources from Increased Rail Traffic in Washington State

Under the no-action alternative, the applicant would continue rail operations consistent with current operations as described in Section 2.1.2.2, Existing Operations. Rail traffic growth along the BNSF main lines in Washington State under the no-action alternative could have incremental impacts on the natural and human environment in the extended study area. Impacts associated with routine rail operations are anticipated to be similar to those along the PS&P rail line as described in Chapter 3, *Affected Environment, Impacts, and Mitigation*. For example, rail traffic along the BNSF main lines is anticipated to result in the following impacts.

- Increased emissions from more diesel trains.
- Increased emissions to surface waters as more trains cross waterways along the routes.
- Increased noise at grade crossings and along the route.
- Increased delay at rail-roadway grade crossings, including disruption to emergency vehicle response times.
- Increased safety and hazard risks related to grade-crossing accidents, derailments, and incidents.

These incremental impacts would be dispersed across rail routes in Washington State. Potential impacts from increased risk of derailment, oil spills, and incidents involving rail cars for the proposed action are addressed in Chapter 4, *Environmental Health and Safety*. Due to the overall increase in rail traffic in Washington State, the risk of a derailment, oil spill, or incident involving rail cars is expected to increase. Potential impacts would be similar to the potential impacts described in Chapter 4. Under the no-action alternative, potential impacts from increased rail traffic could occur.

5.5.1.2 Vessel Transport

Under the no-action alternative, the applicant would continue to load and unload bulk liquids at Terminal 1 consistent with current operations as described in Section 2.1.2.2, *Existing Operations*. Methanol entering the facility is currently transported by tank vessels. These tank vessels typically originate from Brunei, Indonesia, Malaysia and Venezuela and berth at Terminal 1. Departing vessels would continue to depart to Southeast Asia or South America. The current volume of tank vessels calling at Terminal 1 to load and unload bulk liquids for Westway Terminal Company LLC is low, and is forecast to increase from 16 vessel calls in 2017 to 27 vessel calls in 2037 under the no-action alternative. The incremental impact of such a small number of vessels on vessel traffic management, environmental and community resources, or environmental health risks within the context of the extended study area is not likely to pose a substantial environmental impact.

5.5.2 Proposed Action

This section describes the impacts that could occur in the extended study area as a result of routine operation of the proposed action in the extended study area. No impacts in the extended study area are expected to result from construction of the proposed action.

5.5.2.1 Rail Transportation

Diluted bitumen and Bakken crude oil are currently being transported by rail coming through Spokane to facilities in the Columbia River and Puget Sound. The bulk of crude oil by rail traffic is currently going through the Columbia River Gorge, but could transit over other rail routes. With the introduction of additional oil trains resulting from the proposed action, the BNSF may consider other potential routes to transport loaded or empty oil trains.

Impacts on BNSF Main Lines

Based on capacity data for the BNSF main lines (Section 5.4.2.1, *Main Lines Routes in Washington State*) the BNSF has capacity to route crude oil (and/or other unit bulk trains) over all three of the east-west corridors from Spokane. However, the routing of crude oil over Stampede Pass or Stevens Pass would likely have negative impacts on BNSF rail operations in Washington State because unit trains would not be able to travel at high speeds on these routes. BNSF will likely continue to use the Columbia River Gorge route for loaded oil trains. Empty cars could be transported east via the Stampede Pass or the Columbia River Gorge routes.

Rail traffic for the proposed action would account for a small percentage of BNSF rail traffic in Washington State. With 1.5 one-way train trips per day, the new traffic would not be likely to affect traffic on the BNSF main line substantially.

Impacts on Rail Network Capacity from Future Crude Oil by Rail Transport to the Project Site

Proposed rail traffic would account for a small percentage of BNSF rail traffic in Washington State. The proposed rail traffic would account for approximately 2% of the expected 2035 capacity estimated by WSDOT for the rail line along the I-5 corridor and approximately 3% along the Columbia River Gorge.

Indirect Impacts on Other Resources

The addition of 1.25 one-way train trips per day on the BNSF main lines due to the proposed transport of crude oil could affect the natural and human environment in the extended study area. The following impacts could result from increased rail traffic.

- Increased emissions from more diesel trains.
- Increased noise at grade crossings and along the route.
- Increased delay at rail-roadway grade crossings, including disruption to emergency vehicle response times.
- Potential impacts from increased risk of derailment, oil spills, and incidents involving rail cars for the proposed action are addressed in Chapter 4, *Environmental Health and Safety*. Due to the increase in rail traffic, the risk of a derailment, oil spill, or incident involving rail cars is expected to increase. Potential impacts would be similar to the potential impacts described in Chapter 4. Unavoidable and significant adverse environmental impacts in the extended study area are described in Section 5.7.

5.5.2.2 Vessel Transportation

The applicant's proposal to expand their bulk liquid storage facility would increase the throughput of crude oil by vessel to the project site. The route taken by vessels upon their departure from Grays Harbor would depend on the vessels' final destinations. Domestically produced crude oil cannot be exported and would be transported from Grays Harbor by tanker or tank barge. The likely routes for these vessels would be along the western coast, either north to refineries in the Puget Sound area or south to refineries in California. Although transport of U.S. crude oil overseas is currently not allowed under U.S. law, it is possible for Canadian oil to be transported abroad, and overseas transport of U.S. oil could occur if current regulations were to change. Shipments of foreign crude oil (such as from Canada) could head to any port in the world from Grays Harbor so the routes would depend on the final destination.

Impacts on Puget Sound and Olympic Coast National Marine Sanctuary Vessel Traffic

The number of vessels from the proposed action (119) compared to the overall tank vessel traffic transiting Puget Sound (3,895) is small (less than 3%). Due to the small increase in vessel traffic in Puget Sound and the high level of safety requirements in place, the potential impact on vessel traffic in Puget Sound would not be significant. Due to the small increase in vessel traffic off the coast of Washington and a high rate of vessel compliance with the Area to Be Avoided (approximately 98%), the potential impact of the proposed action on the Olympic Coast National Marine Sanctuary vessel traffic would not be substantial.

Impacts on Shipping Routes and Vessel Traffic Management

Up to 119 tankers and tank barges are expected to call at the proposed facility. To put the increase in vessel traffic related to the proposed action in perspective, it is useful to compare the number of proposed action vessels to vessels recorded at other principal west coast ports. In 2012, 157,663 vessels were recorded at the principal ports in Washington, Oregon, and California. The addition of up to 119 vessel calls related to the proposed action would account for approximately 0.1% of all vessels calling at West Coast ports. This small increase in overall vessel traffic is not expected to result in substantial impacts to vessel traffic management in the extended study area.

Indirect Impacts on Other Resources

The addition of up to 238 tanker or tank barge transits for the proposed action would affect the natural environment in the extended study area. The increase in vessel traffic in the extended study area from the proposed action is small compared to overall vessel traffic. The following impacts could result from the small increase in vessel traffic due to the proposed action.

- Increased impacts on air quality from increased vessel traffic.
- Increased impacts on noise resulting from increased vessel traffic.
- Increased impacts on marine mammals from increased vessel traffic.
- Potential impacts on tribal resources (access to usual and accustomed fishing areas) from increased vessel traffic.
- Potential impacts from increased vessel traffic are addressed in Chapter 4, *Environmental Health and Safety*. Due to the small increase in vessel traffic, the risk of an oil spill or incident involving

vessels may increase slightly. Potential associated impacts would be similar to the potential impacts described in Chapter 4. Unavoidable and significant adverse environmental impacts in the extended study area are described in Section 5.7.

5.6 What mitigation measures would reduce impacts on rail and vessel transport in the extended study area?

The increase in rail and vessel traffic in the extended study area from the proposed action is small relative to the existing and anticipated future traffic that will occur without the projects. A risk of an incident involving a major spill, fire, explosion, or derailment in the extended study area exists but has a low likelihood based on the small increase in overall rail and vessel traffic due to the proposed action. Therefore, no mitigation is proposed in the extended study area.

5.7 Would the proposed action have unavoidable and significant adverse impacts on rail and vessel transport in the extended study area?

As discussed in Chapter 4, *Environmental Health and Safety*, large oil spills, fires, or explosions would likely include unavoidable and significant adverse environmental impacts. Although the likelihood of a large spill, fire, or explosion is low, the potential for significant adverse impacts on the environment and human health in the case of such an incident is high. The specific impacts would vary based on the location, amount spilled, type of liquid, and weather conditions. Examples of these impacts are described in Section 4.7, *Impacts on Resources*. Existing regulatory requirements for the prevention, preparedness, and response to a large spill, fire, or explosion and mitigation measures to reduce impacts are detailed in Chapter 4. However, no mitigation measures would completely eliminate the possibility of a large spill, fire, or explosion from rail cars carrying crude oil or hazardous materials nor would they completely eliminate the adverse consequences of a large spill, fire, or explosion.