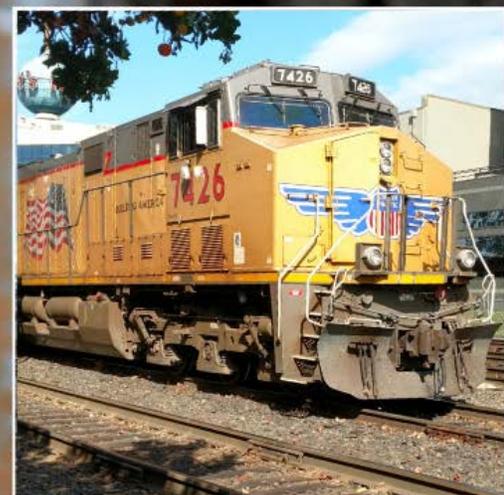
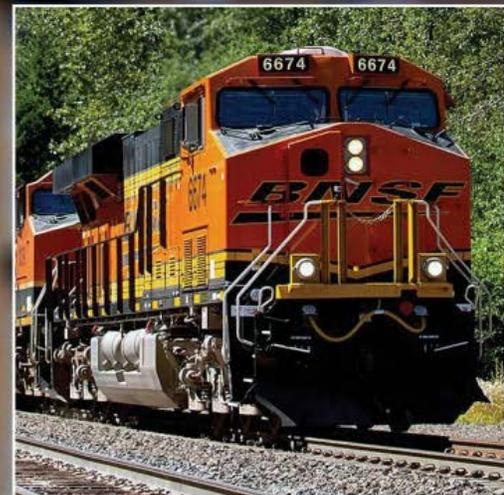




WASHINGTON STATE RAIL PLAN

2019-2040



WASHINGTON STATE RAIL PLAN 2019- 2040

August 2020

Prepared by:



Washington State Department of Transportation

Rail, Freight, and Ports Division

PARSONS



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CONTENTS

CHAPTER 1

INTRODUCTION	1
1.1 Background and context	1
1.2 Vision and goals for Washington’s rail system	2
1.3 Transportation planning in Washington	4
1.4 Alignment with planning activities	5
1.5 Plan development	6

CHAPTER 2

RAIL SYSTEM OVERVIEW	8
2.1 Rail system elements	8
2.2 Freight services	11
2.3 Passenger services	15
2.4 Strategic Rail Corridor Network	17
2.5 Roles and responsibilities	18

CHAPTER 3

FREIGHT RAIL SYSTEM STRENGTHS AND CHALLENGES	21
3.1 Trends that may affect the freight rail system	21
3.2 Existing and future demand for freight rail transportation	25
3.3 Class I railroads	33
3.4 Short line railroads	35

CHAPTER 4

PASSENGER RAIL SYSTEM STRENGTHS AND CHALLENGES	38
4.1 Trends that may affect passenger rail demand	38
4.2 Long distance	39
4.3 Intercity	43
4.4 Commuter	54

CHAPTER 5

INTEGRATED RAIL SYSTEM	57
5.1 Rail system capacity	57
5.2 Multimodal connectivity for freight rail	65
5.3 Multimodal connectivity for passenger rail	69
5.4 The rail system in communities	72

CHAPTER 6

RAIL SYSTEM STRATEGIES.80
6.1 Freight rail strategies80
6.2 Passenger rail strategies.83
6.3 Integrated rail system strategies86

CHAPTER 7

RAIL INVESTMENTS AND INITIATIVES.92
7.1 Freight rail	92
7.2 Passenger rail.96
7.3 Integrated rail system	100

CHAPTER 8

RAIL FUNDING SOURCES	106
8.1 Federal	106
8.2 State.	109

CHAPTER 9

CONCLUSION	112
-----------------------------	-----

APPENDIX A:

ILLUSTRATIVE LIST OF INVESTMENTS.	113
--	-----

APPENDIX B:

EXISTING AND FUTURE DEMAND FORECASTING RESULTS OF INTERCITY PASSENGER RAIL AND FREIGHT RAIL TRANSPORTATION	126
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APPENDIX C:

PASSENGER RAIL MULTIMODAL CONNECTIVITY ANALYSIS AND CANDIDATE IMPROVEMENTS . .	151
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APPENDIX D:

CROSSWALK BETWEEN THE FRA STATE RAIL PLAN GUIDANCE AND THE STATE RAIL PLAN FORMAT . .	278
--	-----

EXHIBITS

Exhibit 2-1: Washington state rail system by owner	9
Exhibit 2-2: Primary rail corridors used for passenger rail services in Washington state.	10
Exhibit 2-3: Short line railroad operators in Washington state	12
Exhibit 2-4: Palouse River and Coulee City (PCC) rail system.	14
Exhibit 2-5: Strategic Rail Corridor Network designation in Washington state	17
Exhibit 3-1: How Positive Train Control works	23
Exhibit 3-2: Freight rail shipment by tonnage in Washington state.	26
Exhibit 3-3: Annual rail freight volume in Washington state by trade type, 2016 (in millions of tons)	26
Exhibit 3-4: Freight Rail Demand Forecast Scenarios	27
Exhibit 3-5: Statewide rail tonnage by movement type, 2016 and 2040 forecasted scenarios (table)	28
Exhibit 3-6: Statewide rail tonnage by movement type, 2016 and 2040 forecasted scenarios	28
Exhibit 3-7: Statewide rail tonnage by trade type, 2016 and 2040 forecasted scenarios	29
Exhibit 3-8: Statewide rail tonnage by service type, 2016 and 2040 forecasted scenarios	30
Exhibit 3-9: Top rail commodities by tonnage, 2016 and forecasted 2040 scenarios.	32
Exhibit 4-1: Empire Builder and Coast Starlight ridership, fiscal year 2000 – 2019.	40
Exhibit 4-2: Empire Builder and Coast Starlight on-time performance, fiscal year 2010 – 2019	41
Exhibit 4-3: Empire Builder and Coast Starlight ridership projection, fiscal year 2018 – 2040	41
Exhibit 4-4: Amtrak Cascades ridership between 2000 and 2019	44
Exhibit 4-5: Amtrak Cascades passenger miles between 2010 and 2019	44
Exhibit 4-6: Amtrak Cascades on-time performance between 2010 and 2019	45
Exhibit 4-7: Amtrak Cascades operating cost, revenue and farebox recovery rate for Washington-funded trains	46
Exhibit 4-8: Amtrak Cascades scenarios for demand forecasting	47
Exhibit 4-9: Amtrak Cascades ridership, 2018 and 2040 scenarios	48
Exhibit 4-10: Amtrak Cascades ridership forecast by year, 2018-2040	49
Exhibit 4-11: 2019 Amtrak Cascades delays by category (minutes) between Vancouver, BC and Portland, OR	51
Exhibit 4-12: Sounder train annual ridership by lines, 2010 – 2019	55
Exhibit 5-1: Volume-to-capacity ratios and level of service grades.	58
Exhibit 5-2: Level of service estimation for base and forecast year scenarios.	60
Exhibit 5-3: Mainline level of service analysis for base year 2016	61
Exhibit 5-4: Mainline level of service analysis for 2040 Low Growth Scenario	62
Exhibit 5-5: Mainline level of service analysis for 2040 Moderate Growth Scenario.	63
Exhibit 5-6: Mainline level of service analysis for 2040 High Growth Scenario.	64
Exhibit 5-7: Truck Freight Economic Corridors in Washington state	68
Exhibit 5-8: Modal connections and supporting infrastructure at Washington state passenger rail stations	70

Exhibit 5-9: Washington rail incidents, 2009 – 201873

Exhibit 5-10: Washington rail crossing/trespassing incidents, 2010 – 2018.73

Exhibit 5-11: Crude oil transportation volume in Washington state by mode, January 1 – December 31, 2018 76

Exhibit 7-1: Freight Rail Investment Bank 2019-2021 projects93

Exhibit 7-2: Freight Rail Assistance Program 2019-2021 projects94

Exhibit 7-3: PCC system prioritized investment needs by branch line95

Exhibit 7-4: Sound Transit System Access Fund projects for Sounder stations 101

Exhibit 7-5: Washington Rail Crossing Projects Funded by FHWA Section 130 Program (2017 Funding). . 102

Exhibit 7-6: Funded grade separation projects 103

Exhibit 7-7: Unfunded grade separation projects in design phase 103

Exhibit 7-8: Proposed planning requirements for railroads moving oil in Washington state 104

Exhibit 8-1: FASTLANE/INFRA awards for rail projects in Washington state. 108

Exhibit 8-2: TIGER and BUILD awards for rail projects in Washington state 108

Exhibit 8-3: FRIB/FRAP 2019-2021 project locations 110

CHAPTER 1

INTRODUCTION

1.1 Background and context

Rail is an integral part of the statewide multimodal transportation system that keeps people and businesses moving. Serving freight and passengers, the rail system provides efficient transportation critical to maintaining our economy, environment and quality of life. The Washington State Rail Plan comes during a time of change for rail transportation in the state, with the rail transportation system facing important near and long-term challenges that include:

- Addressing issues related to the December 2017 Amtrak Cascades derailment at DuPont, WA
- Meeting the increasing demand for passenger and freight rail services in Washington in partnership with private rail carriers that own much of the network over which passenger and freight trains operate
- Developing more efficient and effective connections between rail and other modes of transportation
- Ensuring the sustainability of Washington's public and private short line railroads that face infrastructure investment needs in order to preserve these important services to communities

The Washington State Rail Plan is a single, integrated plan for both passenger and freight rail and is the planning foundation for future actions. To address rail system challenges and identify opportunities for improvement, the Washington State Department of Transportation's (WSDOT) plan describes the rail system and the state's interest in it, identifies potential actions to improve the rail system, and recommends strategies consistent with Washington's' transportation policy goals of economic vitality, preservation, safety, mobility, environment, and stewardship.

It's important to note that planning documents such as this represent a snapshot in the continuous improvement of the rail system in Washington. For example, deliberations, obligations and the needs of the state's rail program in response to the December 2017 Amtrak Cascades derailment, passage of I-976, and transportation impacts resulting from potential dam breaching on the Columbia Snake River Navigation System are still being assessed as this plan is being written. Also, the COVID-19 pandemic may have effects on the rail system that are not fully understood yet.

The Washington State Rail Plan is a single, integrated plan for both passenger and freight rail

NOTE: These issues could have significant implications to the state's rail system and WSDOT may need to perform a technical update as appropriate prior to the next five-year plan update cycle.

1.2 Vision and goals for Washington's rail system

The vision and goals set the direction for the plan. They helped identify and prioritize needs. The objectives and implementation strategies describe how the plan will achieve the vision and goals by identifying and recommending future state investment in Washington's passenger and freight rail system.

Vision

WSDOT collaborated with freight and passenger rail stakeholders while developing the 2014 State Rail Plan to create a vision statement for the rail system that is still in place today.

This vision provides a blueprint for future rail planning and investment activities. A comprehensive, multimodal planning approach, which considers rail along with highways and public transportation and incorporates land use considerations, is essential to achieving this vision.

Transportation policy goals

Washington has six transportation system policy goals defined by statute¹. These goals are used to guide the planning, operation, performance of, and investment in the state's transportation system. WSDOT's activities to implement the rail vision are guided by these policy goals.

Economic Vitality: To promote and develop transportation systems that stimulate, support, and enhance the movement of people and goods to ensure a prosperous economy.

Preservation: To maintain, preserve and extend the life and utility of prior investments in transportation systems and services.

Safety: To provide for and improve the safety and security of transportation customers and the transportation system.

Mobility To improve the predictable movement of goods and people throughout Washington, including congestion relief and improved freight mobility.

Environment: To enhance Washington's quality of life through transportation investments that promote energy conservation, enhance healthy communities and protect the environment.

Stewardship: To continuously improve the quality, effectiveness and efficiency of the transportation system.

Vision for Washington's Rail System

As an integral part of Washington's multimodal transportation network, the rail system provides for the safe, reliable and environmentally responsible movement of freight and passengers to ensure the state's economic vitality and quality of life

¹ RCW 47.04.280

Performance measures

The rail performance measures described and evaluated in Chapters 3 through 5 are aligned with WSDOT's Practical Solutions Performance Framework.² The Performance Framework supports performance-based decision making and identifies measures for the six transportation policy goals. Sub-policies and measures have been identified for the Mobility policy goal and are still under development for the other five policy goal areas. The rail performance measures incorporated in this plan are aligned with the three sub-policies and measures for Mobility Performance Framework:

- **Accessibility:** passenger rail multimodal connectivity analysis presented in Appendix B measures multimodal accessibility for Cascades stations and supports the accessibility sub-policy goal;
- **Predictability:** on-time performance metrics for passenger rail services presented in Chapter 4 measure travel reliability and supports the predictability sub-policy goal;
- **Efficiency:** rail system capacity analysis discussed under Chapter 5 assesses system utilization and supports the efficiency sub-policy goal.

Other rail performance measures discussed in Chapters 3 through 5 such as safety performance and system conditions directly support the Safety and Preservation transportation policy goals.

The rail performance measures described in this plan are aligned with WSDOT's Practical Solutions Performance Framework

State policy goals

Results Washington, the state's performance management system, focuses on five areas that reflect the Governor's and statewide priorities:

- World-class education
- Prosperous economy
- Sustainable energy and clean environment
- Healthy and safe communities
- Efficient, effective, and accountable government

The State Rail Plan aligns with these priorities in a number of ways. Topics related to a prosperous economy; sustainable energy and clean environment; and healthy and safe communities can be found throughout this document.

² Practical Solutions Performance Framework: <https://www.wsdot.wa.gov/about/practical-solutions/performance-framework>

Statutory requirements

There are several state and federal requirements that pertain to rail planning in Washington. This State Rail Plan is a single plan that meets all these requirements, is integral to the Washington State Department of Transportation’s rail program, and is consistent with other state and regional transportation planning documents.

The federal requirements for a state rail plan are outlined in 49 USC 22705 and 49 CFR 266.15 which implement the Passenger Rail Investment and Improvement Act of 2008 and the FAST Act of 2015. These federal acts require states to take a more active role in setting statewide rail policy and complete a state rail plan that includes inventories and proposed improvements for freight and passenger rail systems, an examination of how freight and passenger systems function together, and a rail investment plan.³

There are four separate state requirements for WSDOT to develop rail plans:

- Freight Rail Plan required in RCW 47.06.080
- State Rail Plan required in RCW 47.76.220
- Intercity Passenger Rail Plan required in RCW 47.06.090
- Rail Passenger Plan required in RCW 47.79.040

1.3 Transportation planning in Washington

The transportation planning process is not a straight line with one plan directing another plan to take action. Instead, it can be thought of as a puzzle, with multiple partners each providing a piece that together forms the overall planning process, as illustrated in Exhibit 1-1. WSDOT and its partners agree on the need for an integrated process based on collaboration with each other and the public to arrive at planning and investment decisions. Federal law requires statewide planning to be integrated, but does not define integration. Jurisdictions in Washington achieve integration in their planning processes through sharing the same:

- Goal to move people and goods on the multimodal transportation system.
- Purpose to demonstrate to the public how they will implement policy direction.
- Commitment to coordinate plans with each other.

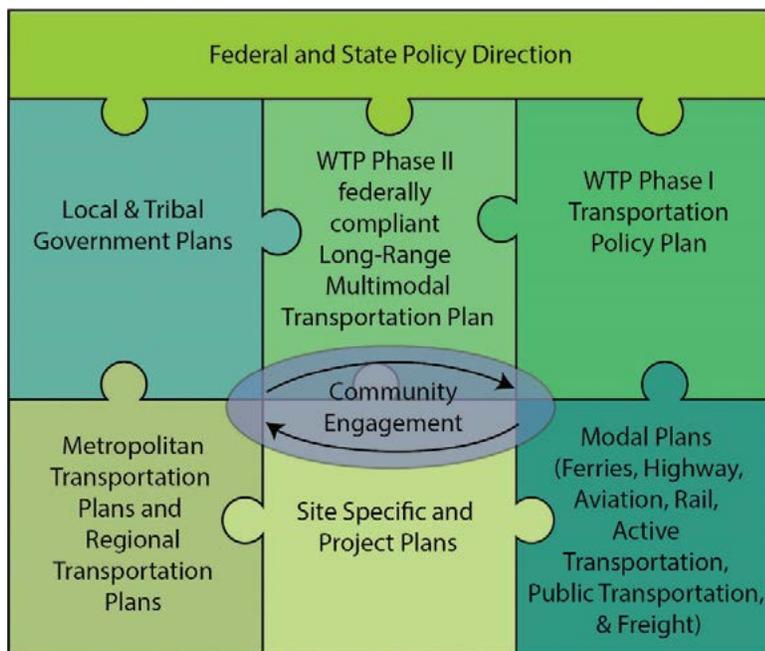


Exhibit 11 Transportation planning integration

³ FRA, Overview, Highlights and Summary of the Passenger Rail Investment and Improvement Act of 2008 <http://www.fra.dot.gov/eLib/details/L02692>

1.4 Alignment with planning activities

WSDOT's 2014 state rail plan, Washington State Rail Plan 2013-2035, provided a strategic direction for public investment in the state's rail transportation system. It included 5- and 20-year funding strategies that met federal and state requirements. The plan established priorities for determining which freight rail investments should receive public support. It also guided coordination with Oregon and British Columbia to continue to grow intercity passenger rail service. Since that plan's completion, much progress has been made to address the issues and take action on recommendations. Below are examples of completed activities:

- **State-owned short line railroad:** In 2015, WSDOT completed the [Palouse River and Coulee City Rail System Strategic Plan](#) to outline the vision and goals for the system and to communicate what policies and funding are needed to achieve the goals.
- **Railroad condition:** In 2015, WSDOT completed the [Short Line Rail Inventory and Needs Assessment](#). Needs identified in that study are reported in Chapter 4.
- **Performance management:** In 2016, WSDOT developed the Amtrak Cascades Performance Database to monitor and track service outcomes contractually negotiated with Amtrak, BNSF Railway and Sound Transit related to on-time performance and travel times. Amtrak Cascades service delays and issues are discussed in Chapter 4, and Cascades on-time performance is reported in Chapter 5.
- **Station stop policy:** With advisory committee and stakeholder participation, WSDOT and the Oregon Department of Transportation developed a corridor-wide policy on station stops for Amtrak Cascades service. The [Station Stop Policy](#) was formally adopted on June 1, 2016. The policy and associated guidance document establishes a process and approach for outlining the data and facts needed to determine the value and benefit of proposed station stop changes to the Amtrak Cascades corridor.
- **Fleet Management Plan:** In 2017, WSDOT completed the [Amtrak Cascades Fleet Management Plan](#) which evaluates passenger rail service goals of increasing service, improving reliability, and reducing journey times from an equipment perspective. The plan addresses the equipment needed to deliver passenger service over the next 20 years, the resources required to sustain the equipment, and the capacity of equipment maintenance facilities.
- **Program analysis:** In 2017, WSDOT completed the [2017-2027 Grain Train Strategic Plan](#) that outlines the vision and goals for the program as well as identifying operational improvements and policy changes.
- **Asset Management Plan:** WSDOT completed an [asset management plan](#) for WSDOT passenger and freight rail assets in 2019 as part of an agency-wide asset management initiative. The plan addresses the current status, condition and performance of rail assets, risk management, investment options for managing the assets, and long-term funding strategies. Findings from the asset management plan fed into the development of Chapters 4 and 7.

The State Rail Plan is also aligned with other state and regional transportation planning activities.

- **Long-range statewide transportation planning:** In 2018, WSDOT completed the [Washington Transportation Plan, Phase 2-Implementation 2017-2040](#), which is the long-range statewide transportation plan required under Section 135 of Title 23. Chapter 6 includes recommendations to address these Action Items related to rail activities:
 - Support ways to help jurisdictions, transportation asset owners, and transportation service providers prepare for, respond to, and become resilient to emergencies and disasters.
 - Research, evaluate, adapt to, and deploy technologies and innovations in all modes; share best practices.

- Work to achieve better travel time reliability and door to door multimodal connections for people of all backgrounds and abilities through continued application of practical solutions.
- **Freight planning:** In 2017, WSDOT completed the [Freight System Plan](#), which includes trends, issues, needs, and strategies for the rail system. Key findings and recommendations from Freight System Plan informed the identification of trends, issues, and needs in Chapter 4 and fed into the development of rail investment plan in Chapter 7.
- **Intercity bus planning:** WSDOT is updating the study for the Travel Washington Intercity Bus Program, which provides bus service to rural residents so they can connect to major transportation hubs and urban centers. This work informed the identification of trends, issues, and needs in Chapter 5- Multimodal Connectivity to Passenger Rail.
- **Active transportation planning:** WSDOT is currently developing an Active Transportation Plan that provides a statewide strategy for bicycle and pedestrian facilities. This work helped identify trends, issues, and needs in Chapter 5 - Multimodal Connectivity to Passenger Rail.
- **Metropolitan and regional planning:** WSDOT reviewed existing metropolitan and region transportation plans and identified key rail-related issues that were discussed during community outreach. In addition, WSDOT reached out to each MPO and RTPPO and offered to provide presentations at regularly scheduled meetings. Key issues from these meetings and from the metropolitan and regional plans informed the identification of trends, issues, and needs in Chapters 3, 4, and 5.

WSDOT reached out to each MPO and RTPPO to discuss key issues in this plan during their regularly scheduled meetings

1.5 Plan development

Planning and investment in the state's rail system is guided by the vision of the Washington State Department of Transportation for a safe, sustainable and integrated multimodal transportation system. The State Rail Plan is consistent with the Transportation System Policy Goals adopted by the state legislature and with statewide and metropolitan planning. Combined, these policy frameworks provide the context for how the state approaches its involvement in the rail system. They were also instrumental in forming the vision statement that drove the technical work completed as part of this rail plan. This plan incorporates vision, policy guidance, and recommendations from previous planning efforts including the Cascades Rail Corridor Management Workplan (2013), Washington Transportation Plan 2040 and Beyond, Washington Transportation Plan Phase 2 – Implementation 2017-2040, 2017 [Washington State Freight Plan](#), and the Sound Transit 2014 [Regional Transit Long-Range Plan](#).

WSDOT developed this plan consistent with the agency's Community Engagement Plan. The term community includes partners (stakeholders/agencies/governments) and the public, who are invited to share their perspectives after reviewing this draft plan. The rail community includes those that own portions of the rail system (railroads), those that provide service (such as Amtrak and Sound Transit), those that use the rail system (passengers and freight shippers), those that manage transportation systems that connect to the rail (federal, tribal, state, and local governments), and those affected by rail. WSDOT reached out to this community by attending meetings and events of organizations and groups and conducting interviews. Partners include groups that will help implement the plan and include: freight rail industry representatives, passenger rail representatives, metropolitan planning organizations, regional transportation planning organizations, cities, counties, ports, tribal governments, federal agencies, and state agencies. WSDOT will work with this community to implement strategies and take actions identified in this plan.

Major themes from stakeholder engagement during development of the plan include:

- Rail safety is a high priority for many, including trespassing and grade crossing incidents, passenger train safety, and the movement of hazardous materials.
- Local communities are interested in additional passenger rail service, more trips and new stations for existing services, as well as new routes.
- Trains occupying grade crossings for extended periods, creating a barrier for travel, is a concern in affected communities.
- Short line railroad infrastructure investment to preserve and maintain existing rail lines is also a common concern.



Preservation work on the Palouse River and Coulee City (PCC) rail system

CHAPTER 2

RAIL SYSTEM OVERVIEW

Washington’s rail system is a central part of a multimodal transportation strategy that provides choices, supports broad-based economic growth and offers an environmentally efficient transportation option. The rail network is categorized into freight services and passenger services. This categorical division is reflected throughout the structure of this document. Yet, both freight and passenger services share much of the same infrastructure and operate as an integrated rail system.

This chapter provides an overview of the rail system in Washington. It describes rail infrastructure and services, the institutional structure that governs rail, and funding programs administered by the state in the last ten years. Additional detail on the rail system and the issues associated with each element can be found in Chapters 3, 4, 5 and in the Appendices.

2.1 Rail system elements

The rail system is part of a larger transportation network that includes many other transportation modes (active transportation, aviation, pipelines, public roads, public transportation, and waterways) to move people and goods. Rail can play different roles in these trips by serving as the primary mode of transportation, providing only a single leg of the journey, or acting as a mode that expands transportation choice and provides resilience.

Likewise, the rail system is composed of different parts, or elements, each with a specific role and purpose. This system connects communities within Washington to each other and to other communities throughout North America and the world.

The rail system in Washington consists of both freight and passenger rail elements. The freight rail system consists of an expansive network of main lines, branch lines, yards and terminals. The passenger rail system consists of long distance, intercity and commuter rail services operating mostly on freight rail lines. Exhibit 2-1 shows the rail system by owner in Washington, and Exhibit 2-2 shows the passenger rail services in the state.

Washington also has other rail systems that are either physically or operationally isolated from the national rail network, including some types of rail transit and tourist-oriented rail operations. These rail systems are not addressed in this plan.

The Rail System in Washington state includes two Class I and twenty-seven Class III (short line) railroads that operate on approximately 3,200 route miles composed of:

- Class I = 1,900 miles
- Class III = 1,300 miles

Exhibit 2-1: Washington state rail system by owner

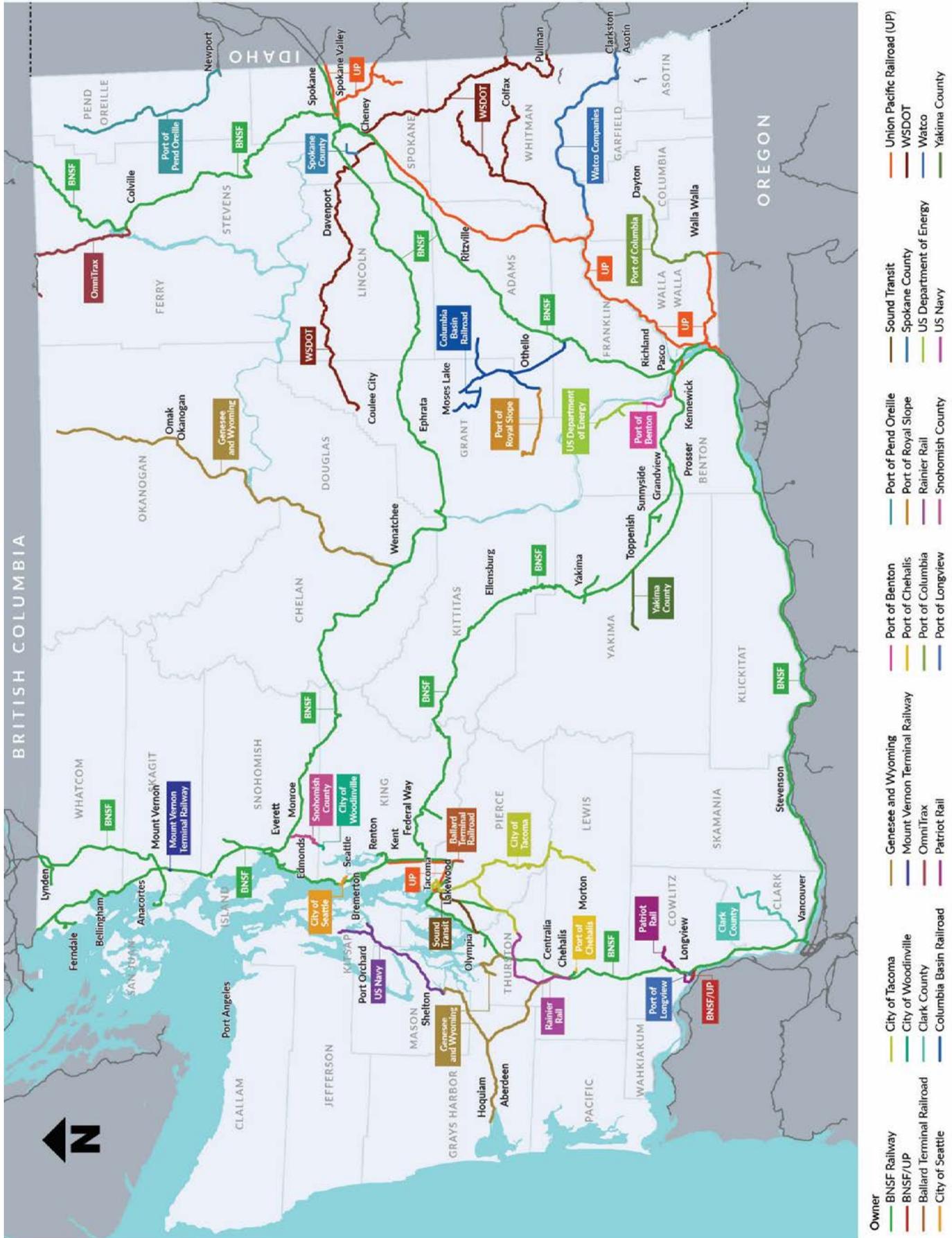
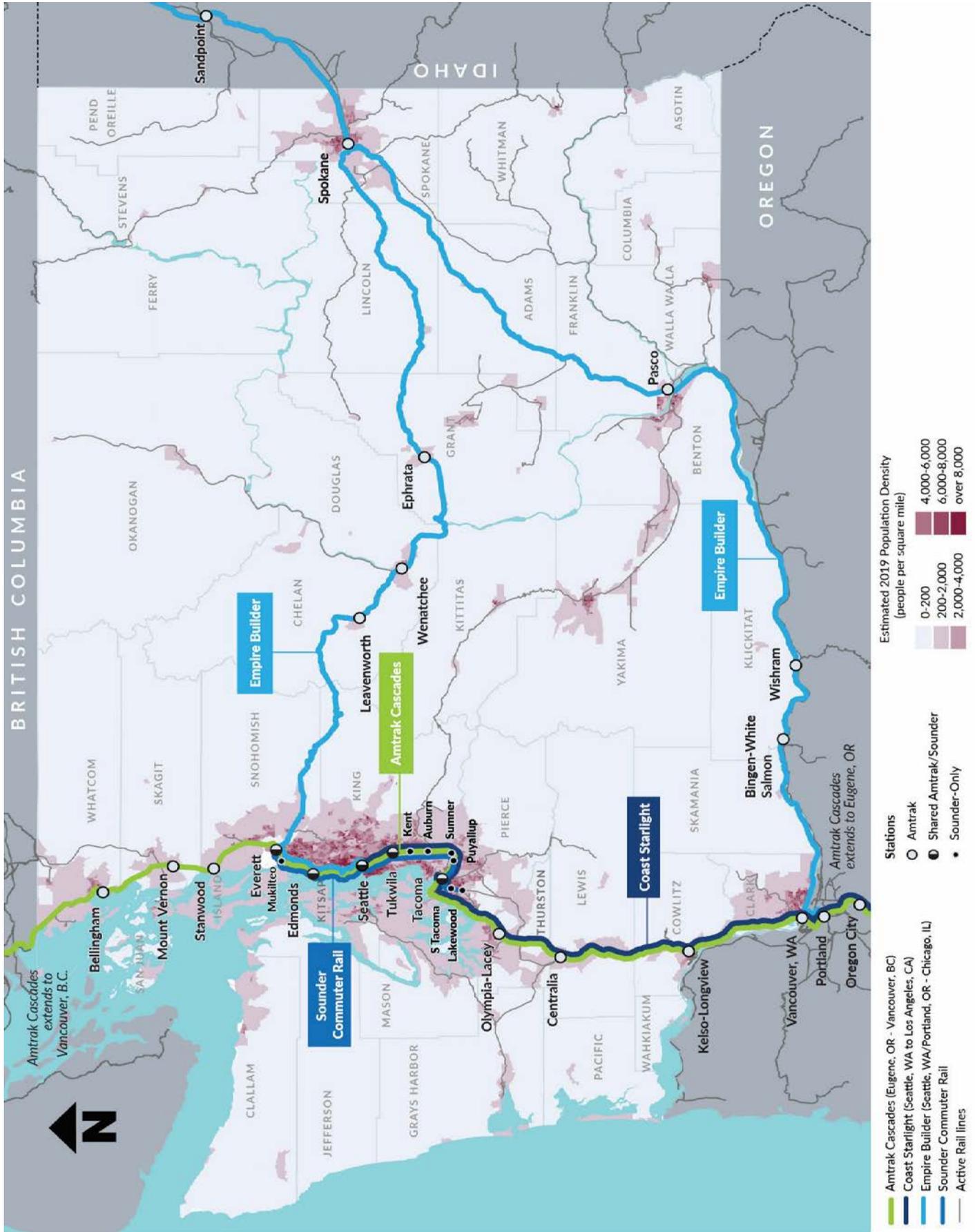


Exhibit 2-2: Primary rail corridors used for passenger rail services in Washington state



2.2 Freight services

Freight railroads are commonly categorized by their operating revenue, a classification system used by the federal Surface Transportation Board (STB). The three classes of railroads are as follows:

Class I: Annual operating revenue in excess of \$489.9 million. BNSF Railway Company and Union Pacific Railroad Company are the only Class I railroads operating within Washington. These two railroads provide the majority of rail service in terms of traffic handles and operate the majority of freight rail lines.

Class II: Annual operating revenue between \$39.2 million and \$489.9 million. Class II railroads are also commonly referred to as regional railroads by the Association of American Railroads (AAR). There are no Class II railroads operating in Washington.

Class III: Annual operating revenue of less than \$39.2 million. Class III railroads are commonly referred to as short line railroads. These rail carriers connect communities to the national rail system. Switching and terminal railroads are a subcategory of Class III railroads that provide pick-up or delivery service within a specific area. Currently there are 27 short lines in Washington – 18 local and seven switching and terminal railroads. Short line railroads provide short distance connectivity to Class I rail lines across Washington.

The two Class I railroads and 27 Class III (short line) railroads operate more than 3,200 miles of track in Washington.

Class I railroads

BNSF Railway operates more than 1,400 route miles in Washington, which represents 44% of the rail system in the state. Service is provided over seven major corridors, including three east-west corridors, a north-south corridor roughly parallel to I-5, and nine low-density corridors. The major corridors provide the primary conduits to the North American rail network.

Union Pacific operates more than 500 route miles in Washington, 16% of the rail system in the state. In addition, the Union Pacific has operating rights on BNSF tracks between Lakeside Junction and Spokane, between Portland and Tacoma, and between Tukwila and Seattle. It operates on its own right of way between Tacoma and Tukwila.

Short line railroads

While the Class I main line railroads provide the primary arteries for the movement of goods throughout Washington, short line (Class III) railroads provide important collector/distributor services for the larger railroads and local rail services for shippers. While some lines carry high volumes of freight, others have struggled as the industries they serve have declined, moved, shifted to other transportation modes, or disappeared completely. Some of the short lines serve Washington's agricultural industries that would otherwise be inaccessible by rail. Even though short lines carry a small share of total rail traffic in Washington, they comprise about 40% of all railroad mileage in the state. The short lines in Washington combined have over 1,300 route miles of track. The mileage of individual short line railroads varies from one route mile to over 150 route miles. Exhibit 2-3 shows the short line railroads in Washington, including the mileage of rail owned.

Exhibit 2-3: Short line railroad operators in Washington state

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

^a Private operator of PCC Rail System line owned by WSDOT

Short line rail ownership also varies. Nationally, approximately half of the short line railroads are owned by holding companies, such as Genesee & Wyoming and Watco. These companies own and manage multiple railroads. The rest are stand-alone railroads. Some short line railroads operate lines leased from Class I railroads. There also are several railroads in Washington that are publicly owned, either by the state, a public port, or a local jurisdiction.

Palouse River and Coulee City (PCC)

The state of Washington owns three rail lines that comprise the Palouse River and Coulee City (PCC) rail system in eastern Washington. It is the longest short line freight rail system in Washington, at 297 miles in length. The PCC rail system consists of three branches: the CW branch, the P&L branch, and the PV Hooper branch, as shown in Exhibit 2-4. WSDOT contracts with private companies to operate each of the branches. The Palouse River and Coulee City Railroad operates the PV Hooper Branch; the Washington Eastern Railroad operates the CW Branch; and the Spokane, Spangle and Palouse Railroad operates the P&L Branch. WSDOT oversees the facilities and regulatory portions of the operating leases. The PCC Rail Authority – an intergovernmental entity formed by Grant, Lincoln, Spokane, and Whitman counties – oversees the business and economic development portions of the operating leases.

The state of Washington owns three rail lines that comprise the Palouse River and Coulee City (PCC) rail system in eastern Washington.

Exhibit 2-4: Palouse River and Coulee City (PCC) rail system



2.3 Passenger services

Passenger rail services link cities and regions throughout the state, supporting commuter, business and leisure travel needs while promoting economic activity and providing an alternative to highway travel. There are three types of passenger rail services: long distance, intercity, and commuter. In addition to the local, regional and statewide importance of these services, the Pacific Northwest Rail Corridor, on which Amtrak Cascades service travels, is one of 11 federally-designated high-speed rail corridors. Passenger service in Washington operates mainly on privately-owned freight rail infrastructure.

Passenger service in Washington operates mainly on privately-owned freight rail infrastructure.

Federal definitions for passenger rail systems are:

- Long distance passenger rail service with routes of more than 750 miles between endpoints
- Intercity passenger rail service with routes of 750 miles or less, but not commuter rail
- Commuter passenger rail transportation in metropolitan and suburban areas usually having reduced fare, multiple-ride, commuter tickets, and morning and evening peak period operations¹

Passenger rail stations connect passengers with the rest of the transportation system. For more information on multimodal connections at passenger stations, see Exhibit 5-8 in Chapter 5.

Long distance

Long distance passenger rail services are routes of more than 750 miles between endpoints and are operated by Amtrak. These routes are funded by ridership revenue and federal subsidies, and are managed by Amtrak with no WSDOT involvement. The two long distance Amtrak services that operate in Washington are the Empire Builder and the Coast Starlight.

- The Empire Builder operates one train each direction daily between Chicago and Seattle/Portland, serving 11 stations in Washington. Half of the train serves the route between Spokane and Seattle that is 326 miles long, with six stations west of Spokane. The other half of the train serves the route between Spokane and Portland and is 376 miles long, with four stations west of Spokane. East of Spokane the two routes continue as one train to Chicago for an additional 1,879 miles, 20 of which are in Washington.
 - The stations in Washington for Empire Builder service between Chicago and Seattle are Spokane, Ephrata, Wenatchee, Leavenworth, Everett, Edmonds, and Seattle.
 - The stations in Washington for Empire Builder service between Chicago and Portland are Spokane, Pasco, Wishram, Bingen-White Salmon, and Vancouver.
- The Coast Starlight service operates between Los Angeles and Seattle. The route is 177 miles long in Washington, with one train each direction daily serving six stations in the state. An additional 1,328 miles are located in Oregon and California.
 - The stations in Washington for Coast Starlight service are Seattle, Tacoma, Olympia-Lacey, Centralia, Kelso-Longview, and Vancouver

¹ United States Code Title 49 Section 24102 (49 USC § 24102).

Intercity

Intercity passenger rail service, except commuter service, are routes of 750 miles or less. Amtrak Cascades, sponsored by Washington and Oregon, is the only intercity passenger rail service operating in the Pacific Northwest. Seattle to Portland is the only major air market outside of the Northeast Corridor (Washington D.C.- Boston) where Amtrak carries more passengers than airlines.²

The Amtrak Cascades service operates between Eugene, Oregon and Vancouver, British Columbia. The route is 467 miles long, with 300 miles in Washington. The service offers four daily roundtrips between Seattle and Portland and two daily roundtrips between Seattle and Vancouver, B.C., as well as two daily roundtrips between Portland and Eugene. Two additional roundtrips between Seattle and Portland will be added once replacement equipment for the trainset damaged in the December 2017 derailment at DuPont arrives, the Point Defiance Bypass is reopened for passenger service, and funding for the expanded service is approved. To reopen the Bypass, Amtrak, Sound Transit and WSDOT are working to address recommendations in the investigation report issued by the National Transportation Safety Board³ in 2019 and an independent safety study undertaken by Sound Transit.

The Amtrak Cascades trains stop at 12 stations in Washington, as well as one station in Vancouver, B.C. and five stations in Oregon.

The Pacific Northwest Rail Corridor is one of eleven federally designated higher-speed rail corridors in the United States. The corridor extends from Eugene, Oregon through Washington to Vancouver, British Columbia. It was designated a high-speed rail corridor in 1992, although it is now called a higher-speed rail since the minimum speed for a high-speed rail is designated as 125 mph.

The stations in Washington with Amtrak Cascades service are: Bellingham, Mount Vernon, Stanwood, Everett, Edmonds, Seattle, Tukwila, Tacoma, Olympia-Lacey, Centralia, Kelso-Longview, and Vancouver.

Commuter

Commuter passenger rail services are located in metropolitan areas and consist of shorter routes that are focused on morning and evening peak period directional operations. Central Puget Sound Regional Transit Authority (Sound Transit) operates Sounder commuter rail service⁴ north and south of Seattle. It is the only commuter rail service in Washington. Sounder includes two routes, described below.

- The North Line between Everett and Seattle operates on 35 route miles, serving 4 stations with 4 daily trains each direction. The stations for the North Line are King Street (Seattle), Edmonds, Mukilteo, and Everett.
- The South Line between Lakewood and Seattle operates on 48 route miles, serving 9 stations with 13 daily trains each direction. The stations for the South Line are King Street (Seattle), Tukwila, Kent, Auburn, Sumner, Puyallup, Tacoma, South Tacoma, and Lakewood.

Other rail systems

Other rail systems are not covered in this plan. There are several active tourist trains in Washington, which provide scenic rides and often showcase historical trains or routes. There are two publicly owned light rail transit systems in Washington, Link Light Rail and Tacoma Link operated by Sound Transit. This system uses a fixed guideway, but it does not share infrastructure with other types of rail. Light rail is considered a rapid transit service. There are two publicly owned streetcar lines in Washington. The City of Seattle has two separate lines, the South Lake Union Line and the First Hill Line. Other rail systems, including the Seattle Monorail, also are not included.

² AMTRAK SERVICE LINE PLANS | FY 2019–2024, page 22

³ National Transportation Safety Board, <https://www.nts.gov/investigations/Pages/RRD18MR001.aspx>

⁴ Sound Transit. Sounder service. <https://www.soundtransit.org/sounder>

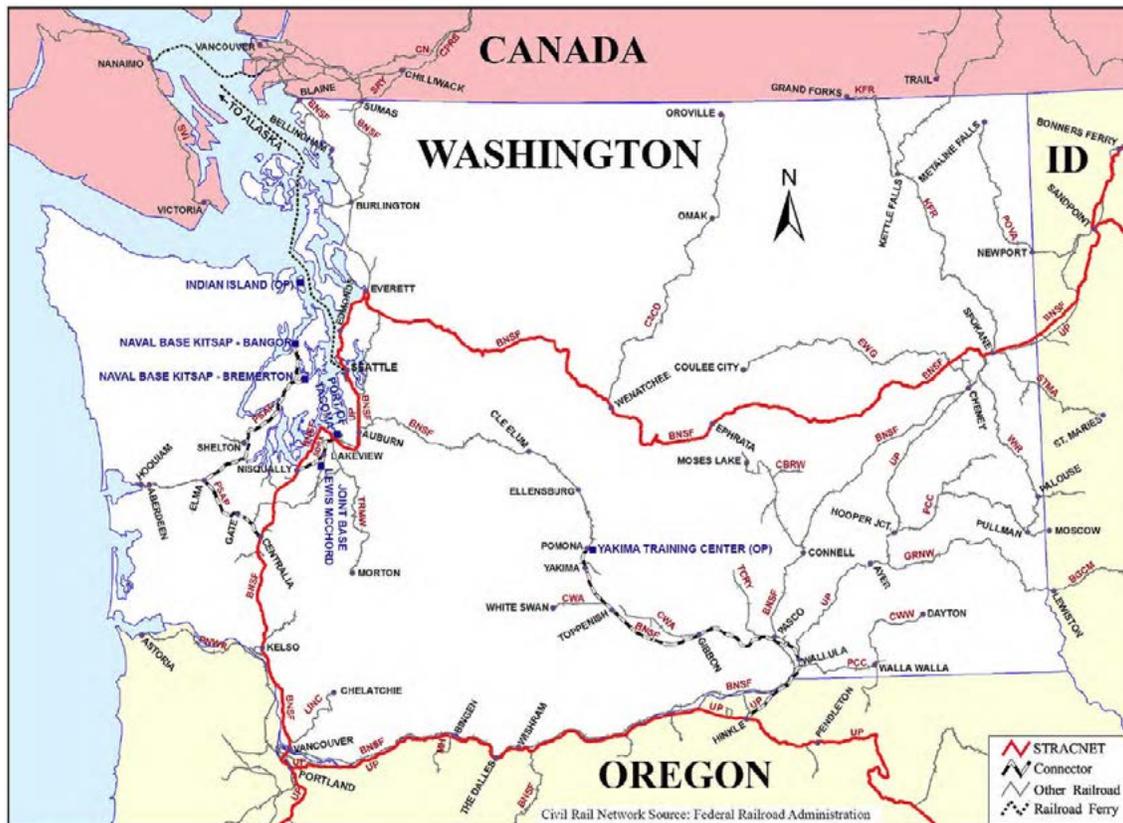
2.4 Strategic Rail Corridor Network

Military equipment, oversized loads, distillates, and other military-related cargo all move on the rail system. The system allows for a large amount of equipment to move efficiently between bases and to ports.

The Department of Defense and the Federal Railroad Administration established the Strategic Rail Corridor Network⁵ (STRACNET) to ensure rail transportation readiness capabilities during a time of need. STRACNET is an interconnected and continuous rail line network consisting of more than 36,000 miles of track serving more than 120 defense installations. Approximately 850 miles of STRACNET rail lines are located within Washington, serving six defense installations, as shown in Exhibit 2-5. One rail line, from Shelton to Bremerton and Bangor, is owned by the U.S. Navy and operated by the Puget Sound & Pacific Railroad. All of the other rail lines that are part of the STRACNET network are privately owned. The purpose of this network is coordination with appropriate transportation authorities, including railroads. Many of the heavy and tracked vehicles shipped by the military will deploy by rail to seaports of embarkation.

Washington is home to the largest Army base on the West Coast, two Air Force bases, six critical Navy facilities, and two military medical centers. Joint Base Lewis-McChord (JBLM) has the only Power Projection Platform on the West Coast, which is an Army installation that strategically deploys high-priority cargo and personnel in the event of a major conflict. If such an event were to occur, military goods from across the nation would surge through I-5 in Central Puget Sound to the Ports of Seattle, Tacoma, Olympia, and Everett. Heavy Army subdivisions, such as the Stryker Brigades stationed at JBLM, are prepared to stage and ship large rolling equipment through the Port of Tacoma. Replenishment goods would ship through the Port of Seattle and other ports in the event of an emergency.

Exhibit 2-5: Strategic Rail Corridor Network designation in Washington state⁶



⁵ US Army Transportation Engineering Agency. <https://www.sddc.army.mil/sites/TEA/Functions/SpecialAssistant/Pages/RailroadsNationalDefense.aspx>

⁶ Strategic Rail Corridor Network (STRACNET) and Defense Connector Lines (2018) www.sddc.army.mil/sites/TEA/Functions/SpecialAssistant/RND%20Publications/STRACNET%202018_Reduced.pdf

2.5 Roles and responsibilities

Privately-owned railroads

The rail system differs from the roadway, transit, aviation and water transportation systems in Washington. Unlike other modes of transportation that are generally owned and maintained at public expense and accessible to any licensed operator, rail carriers not only move the freight, they commonly also own, maintain and control the physical infrastructure. Each railroad functions as an integrated business, including marketing and pricing services, operating and dispatching trains, maintaining assets, and allocating capital for rolling stock and infrastructure.

The public sector's role in the rail system must be balanced with the needs and goals of the private railroad industry. Though the railroads work with the public sector to operate passenger rail service and to help plan necessary freight projects, it is nevertheless the responsibility of each railroad to make decisions about capital investments and maintenance spending. Railroads maintain their infrastructure assets to meet safety standards and to avoid expensive reconstruction. Railroads also must consider which expansions of capacity will provide the most benefit to their business.

The public sector interacts with private freight railroads in multiple ways. In general, overlap between public policy and private railroad decision-making occurs in five areas: publicly-sponsored and publicly-owned assets, taxation, grade crossings, rail safety and economic incentives.

Federal agencies

Federal Railroad Administration

The Federal Railroad Administration (FRA) promotes safe, reliable, and efficient rail transportation to move people and goods. With the responsibility of ensuring railroad safety throughout the nation, the FRA employs safety inspectors to monitor railroad compliance with federally mandated safety standards including track maintenance, inspection standards and operating practices. FRA actively manages rail policy development and investment. This includes providing oversight and guidance in support of rail planning projects, as well as awarding and administering grants that fund safety, state of good repair, and capacity improvement projects. The FRA conducts research and development tests to evaluate projects in support of its safety mission and to enhance the railroad system as a national transportation resource. Public education campaigns on highway-rail grade crossing safety and the danger of trespassing on rail property are also administered by FRA.

Federal Transit Administration

The Federal Transit Administration (FTA) provides financial and technical assistance to state and local public transit service providers, including commuter railroads. FTA awards and oversees formula-based and competitive federal grant programs, distributing funding to state and local transit providers to assist them in developing transit systems, or to improve, maintain, and operate existing systems. FTA also provides federal oversight of transit safety, in coordination with the states. FTA grantees, public transportation providers, are responsible for managing their transit programs in accordance with federal requirements.

Surface Transportation Board

The Surface Transportation Board (STB) is the successor agency to the Interstate Commerce Commission. It is an economic regulatory agency that has jurisdiction over railroad rate and service issues and rail restructuring transactions (mergers, line sales, line construction, and line abandonments). The STB is an independent agency, although it is administratively affiliated with the Department of Transportation.

State agencies

Washington State Department of Transportation

Washington State Department of Transportation (WSDOT) is charged with planning, funding, implementing, constructing and maintaining the multimodal transportation system in the state. WSDOT is responsible for managing and directing the state's freight and passenger rail capital and operating programs. WSDOT sponsors Amtrak Cascades intercity passenger rail service in conjunction with the Oregon Department of Transportation. It also owns and manages the Palouse River and Coulee City Railroad system, three short line railroads in eastern Washington leased to private operators. WSDOT manages the Freight Rail Assistance Program (grants) and Freight Rail Investment Bank (loans) that provide state funding for freight rail capital projects across the state.

Freight Mobility Strategic Investment Board

Freight Mobility Strategic Investment Board (FMSIB) FMSIB was created by the Washington State Legislature in 1998. The Board proposes policies, projects, corridors and funding to the Legislature to promote strategic investments in a statewide freight mobility transportation system. The Board also proposes projects that reduce the effect of freight movement on local communities The Board designates Washington's Strategic Freight Corridors and awards grant funds for freight mobility projects.

Utilities and Transportation Commission

The Washington Utilities and Transportation Commission (UTC) is the state agency responsible for regulating railroad safety in Washington.⁷ It protects consumers by ensuring that utility and transportation services are fairly priced, available, reliable and safe. The UTC is responsible for inspecting railroad crossings in the state every three years, and railroad crossings located on crude oil routes every 18 months, tracking railroad grade crossing inventory information, and documenting trespassing and incident data. The UTC, through Title 49, CFR Part 212, is the designated state agency that partners with the FRA to inspect rail shipments of hazardous materials. There are more than 300 inspection points throughout the state, including shippers' facilities, railroad yards and terminals. In addition to these hazardous materials inspections, the UTC's FRA-certified inspectors perform inspections on signal and train control equipment, track, motive power and equipment, and railroad operating practices. In 2019, the UTC expanded its participation with the FRA by adding several inspectors to the newly-created FRA grade crossing safety inspection discipline.

The UTC has regulatory authority over public safety at highway-rail grade crossings. The UTC monitors all fatalities and injuries involving trains, including those occurring at private crossings, such as crossings at residential driveways or service roads, or on industrial properties and along railroad rights-of-way. The UTC's Rail Safety Program implements engineering, education, and compliance programs that reduce deaths, injuries, and property damage on or around railroads. The program regulates railroad crossings, the safety of rail operations, and railroad employee safety, resolves complaints, and funds safety improvements at or near highway-rail crossings. The UTC also partners with Operation Lifesaver, Inc., and houses and coordinates activities for Washington Operation Lifesaver, a public service education program dedicated to preventing collisions, injuries, and fatalities on and around railroad tracks and highway-rail grade crossings

Department of Ecology

The Department of Ecology (DOE) is responsible for oil transportation spill prevention, preparedness, and response. With the relatively recent emergence of rail as a means to transport large volumes of oil in Washington, DOE has added spill prevention and preparedness requirements for railroads in the state. DOE also tracks the volume of oil moving on Washington rail lines. It issues a quarterly report on crude oil transportation volumes by mode and route.

⁷ Title 81 RCW (transportation)

Local agencies and ports

Local jurisdictions are responsible for the local roads and active transportation networks in their communities. They typically manage railroad grade separation projects that reduce conflicts between railroads and other modes. They also take the lead on 'quiet zone' projects at grade crossings. Some local jurisdictions own railroads, either operating them or leasing them to private operators. Commuter rail is a local agency responsibility. In Washington, Sound Transit operates the only commuter rail system.

Public ports often own rail infrastructure within their facilities. Some also own rail lines that connect communities in their port districts to the rest of the national railroad network.

CHAPTER 3

FREIGHT RAIL SYSTEM STRENGTHS AND CHALLENGES

In order to identify needs and opportunities for the rail system, it is important to understand what is working well and identify the challenges. This chapter discusses the key trends affecting freight rail demand; examines existing freight rail demand; and projects future freight rail flows through 2040. Class I and short line railroads also are analyzed for their conditions, and major challenges and issues. Key findings most relevant to identifying needs and developing plan recommendations are highlighted in this chapter.

3.1 Trends that may affect the freight rail system

This section examines the key drivers affecting rail industry direction in Washington state. The intent is to provide insights on the factors driving rail industry trends beyond the macro-economic environment that influence freight traffic growth. While there is a broad range of external factors influencing future freight rail demand, three key factors with the greatest impact are discussed under this section, including market, regulation, and technology trends.

Market trends

With transportation being a derived demand, the industries and populations that produce and consume goods create the demand for freight movement. Railroads carry a variety of products, including agricultural products, energy products, forest products, chemicals, containerized goods, finished automobiles, and waste products. To better understand how rail traffic in Washington state will be affected by market trends, the trends related to key industries are examined. Agriculture and energy represent the largest sources of rail tonnage in the state and are discussed below. Another critical driver of rail market demand is international trade, with key trends such as Panama Canal expansion and North American Free Trade Agreement also examined.

Agricultural exports

Many field crops, such as wheat produced in the Upper Midwest and northern tier states, are shipped west to Washington state for export to Asia. According to the Federal Highway Administration's Freight Analysis Framework version 4.4 (FAF 4.4) dataset, agricultural exports through Washington seaports, including cereal grains and tree fruits, have increased 30% from 29 million tons in 2007 to 38 million tons in 2016. The key origins for the rail agricultural shipments to the ports are in Washington state and outside the state in the Midwest region. The primary risk to exports is an expanding tariff war with China's tariffs on soybean imports already having dampened soybean volumes through Washington ports. While China receives the vast majority of soybeans exported from the Pacific Coast, wheat and corn are exported in similar volumes and to a variety of countries.

Energy exports

Demand for crude oil by rail is driven largely by relative price differences between the producing and consuming regions, the availability of pipeline capacity, and the ability to export. As a result, in areas where pipeline capacity is scarce, such as the Pacific Northwest, crude will be transported by rail to the extent that there is demand. Currently, crude oil from North Dakota's Bakken region is exported from the Pacific Northwest. Refineries in Washington state also process crude oil from Alaska's North Slope and western Canada in addition to North

Dakota's Bakken region. Several projects have been announced to construct high-capacity facilities for export, but thus far none has been constructed. If those facilities are developed, they will increase freight train volumes in Washington.

As a consumer of utility coal, Washington's sole remaining power plant is TransAlta's Centralia generating station. In addition, Powder River Basin coal is transported through Washington to Oregon's Portland General Electric Boardman generating station. Both of these facilities are expected to cease using coal by the mid-2020s. This will leave coal exports as the only such traffic handled through Washington. Currently, some coal exports have been handled through the Port of Longview, but the majority has been shipped out through Roberts Bank, British Columbia. Currently, some proposals are under consideration to enhance port capacity in Washington for coal exports. If those facilities were built and operated, demand for coal train shipment will increase significantly in Washington.

International trade

Washington state ranked as the 7th most trade-dependent state in 2018. A prosperous Washington economy depends heavily on freight imported and exported through Washington state ports and connected freight rail infrastructure. Competition among the major West Coast ports in Southern California, the Pacific Northwest, and British Columbia has long been fierce, with each region offering a mix of advantages and disadvantages. More recently, with the expansion of the Panama Canal, the West Coast ports also face increased competition from the East and Gulf Coasts. The Panama Canal expansion spurred a shift in traffic from the West Coast to the Gulf and East coasts, including grains near the Mississippi River that now are exported through New Orleans. Washington still has grains arriving from the western parts of the U.S. that are too far from the Mississippi River basin for efficient waterway transport.

Washington state's close proximity to Canada makes the North American Free Trade Agreement (NAFTA) particularly significant to the state's economy and freight flows. NAFTA is a trilateral trade agreement between the U.S., Canada, and Mexico that was signed into law in January 1994. Overall trade between the three NAFTA partners has increased from approximately \$290 billion in 1993 to over \$1.1 trillion in 2016. Canada is a strong trade partner to Washington state. In 2018, about 25% of imports to Washington originated in Canada and 12% of exports from Washington ended up in Canada.¹ On September 30, 2018, the governments of the United States, Canada and Mexico announced they had reached a new trade deal agreement called the United States-Mexico-Canada Agreement (USMCA), which was signed in November 2018 and must be ratified by each country's legislature before taking effect. It was reported that the main structure of the trade deal remains unchanged, and that the most significant changes will affect the automobile sector, dairy sector, and investor-state dispute settlement rules.²

The evolving trends and uncertainties around international trade has the potential to affect international trade volume in either direction, implying high level of uncertainties in future freight rail demand for import and export through Washington state. The impacts of these evolving market trends are considered to establish alternative future scenarios to project freight rail demand, as presented in section 3.2.

Regulatory trends

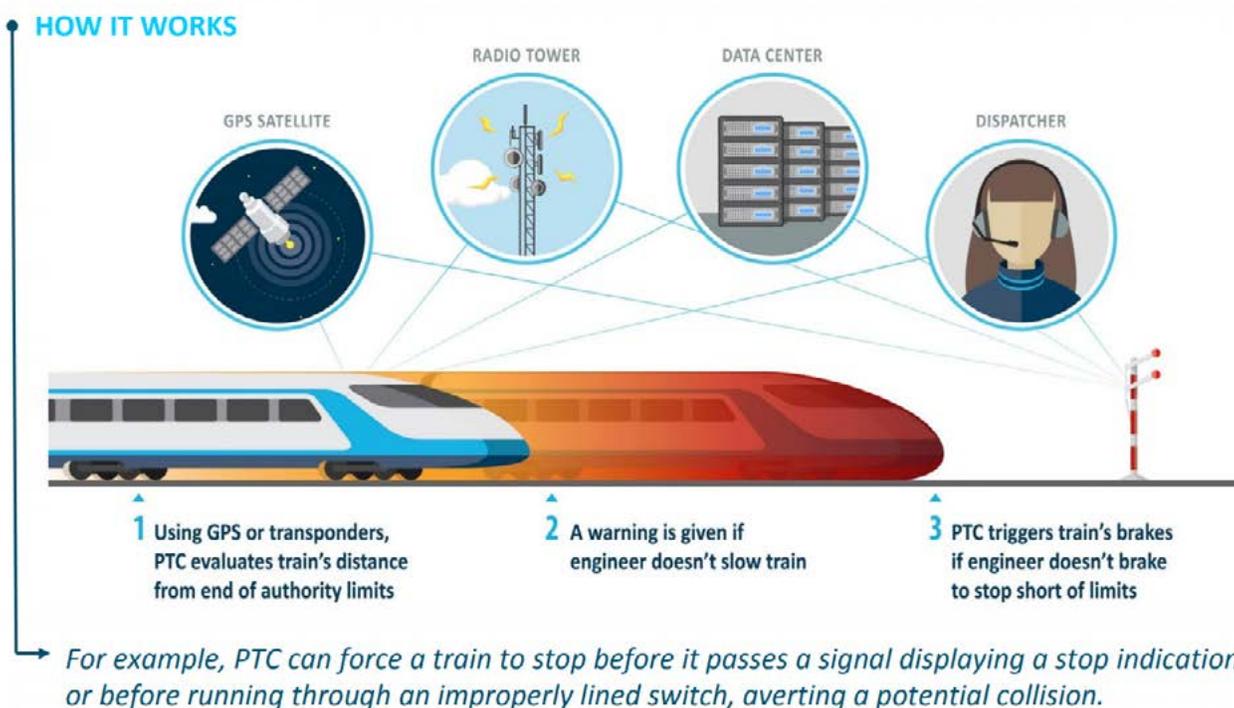
Since the passage of the Staggers Act in 1980, the economic regulatory environment has remained largely benign for railroads. If this continues, the focus will remain on market responses to a changing environment.

Implementation of Positive Train Control (PTC) is a major safety-related mandate from the federal government. PTC systems use communication-based and processor-based train control technology to reliably and functionally prevent train-to-train collisions, overspeed derailments, incursions into established work zone limits, and movements of trains through switches in the wrong position. Exhibit 3-1 explains how PTC works. PTC is required by federal law to be installed and implemented on Class I railroad main lines (i.e., lines with over 5 million gross tons annually) over which any poisonous- or toxic-by-inhalation hazardous materials are transported; and, on any railroad's main lines over which regularly scheduled passenger intercity or commuter operations are conducted. PTC has been implemented on all rail lines (equipment and infrastructure) in Washington where it is required by law. For the short lines, depending on whether they have to use PTC-equipped track or not, effects will either be inconsequential or substantial, given the cost of implementing and maintaining PTC hardware and systems.

PTC has been implemented on all rail lines (equipment and infrastructure) in Washington where it is required by law.

Exhibit 3-1: How Positive Train Control works³

PTC is a technology capable of automatically controlling train speeds and movements, should a train operator fail to take appropriate action in the prevailing conditions.



³ Amtrak, Overview: Positive Train Control (PTC), media.amtrak.com/wp-content/uploads/2018/06/PTC-Media-Brief_June-2018.pdf

While Positive Train Control (PTC) is fully installed and operational where it is required on rail lines in Washington, railroads are continuing to work on interoperability. Interoperability is the ability of one railroad's back office servers and onboard equipment to communicate effectively with the back office operations of another railroad. This is an issue where one railroad operates its trains on a different railroad, either through established operating rights (trackage rights) or a temporary detour. Interoperability is also important for passenger rail services operating on host railroads. Amtrak and Sound Transit have established interoperability with BNSF's PTC system and are using it in Washington. Refinements will continue as issues are identified.

Technology trends

Among the most far-reaching technological advancements will be the increase of automated transportation which is expected to reach across all modes including trucking and railways. The implementation of these technological advancements may have public policy implications that will need to be addressed.

Leveraging PTC to further automate train operations, combined with expanded use of distributed power, provides railroads with a competitive response to autonomous trucks. As Class I railroads develop and execute new technology, smaller railroads will be challenged to keep pace with the technological advances. The Class II and III railroads generally do not have the traffic volume and financial wherewithal to implement these new technologies, but they could benefit from developed technology that becomes less expensive over time.

The development of autonomous trucks has similar implications for Washington state as it does for the nation. Autonomous trucks could bring increased efficiencies to motor carriers and ameliorate the significant shortage of truck drivers. It also will bring about a new set of issues related to infrastructure, safety, and public policy. Since the trucking industry both complements and competes with rail delivery, autonomous trucks will likely bring both competitive reactions and partnerships with the Class I railroads. For short lines, these effects will similarly vary, depending on the nature of the industries that they serve in terms of commodities, volumes and distances. However, although the precise impacts are difficult to project given the potential for far-reaching changes, reduced trucking costs are likely to affect short lines disproportionately, given their tighter profit margins and lower labor productivity.

3.2 Existing and future demand for freight rail transportation

The freight handled on Washington's rail network reflects the industrial base of the state, its demographics, domestic and international trade that flows through the state, and the characteristics of rail and competing modes. Notably, Washington's economy is driven by trade with other states and countries. Freight volumes reflect this and rail plays a central role. This section examines the existing demand for freight rail transportation and provides a summary of projected freight rail flows in Washington state through 2040.

Existing demand for freight rail transportation

Exhibit 3-2 shows the freight volume moved by rail⁴ in Washington during the past ten years. Freight rail volumes declined between 2009 and 2013; rebounded in 2014; and increased gradually over the next three years. Consistent with Washington's trade-oriented economy is the nature of rail freight volumes by trade type, shown in Exhibit 3-3. The annual freight rail tonnage fluctuated in the past ten years, with an average annual growth rate of 1.0%. Looking at the five-year period within 2013-2017, the freight rail tonnage showed a steadier and faster growth, with an average growth rate of 3.6%. In 2016, the freight rail system in Washington moved 122 million tons of freight, with 32% exported through Washington ports and 6% imported from ports. About 14% of freight was U.S. imports from NAFTA countries (Canada and Mexico). Domestic freight accounted for 40% of total rail volume, including domestic inbound (25 million tons), domestic through (12 million tons), domestic outbound (8 million tons), and domestic intrastate (4 million tons)⁵. In 2017, there were 42.8 million tons of cereal grains and other agricultural products shipped by rail, accounting for 35% of total rail shipments. Coal was the second largest commodity moved by rail, accounting for 10% of total rail volume.

Freight rail flows have been relatively stable between 2014 and 2017 with an annual average of 120 million tons

- 40% was exported
- 20% was imported
- 40% was domestic

Top commodities by weight are cereal grains and coal

⁴ Surface Transportation Board Carload Waybill Sample 2008 – 2017. 2016 data was adjusted for freight rail forecast analysis.

⁵ Domestic freight is the freight movement between domestic origins and destinations, and no foreign trade flow is included. Inbound flow indicates freight movements that originate outside Washington and terminate in Washington; outbound flow indicates rail movements that originate in Washington and terminate outside Washington; through flows indicate rail movements that neither originate nor terminate in Washington; and intrastate flows indicate rail movements that both originate and terminate in Washington.

Exhibit 3-2: Freight rail shipment by tonnage in Washington state

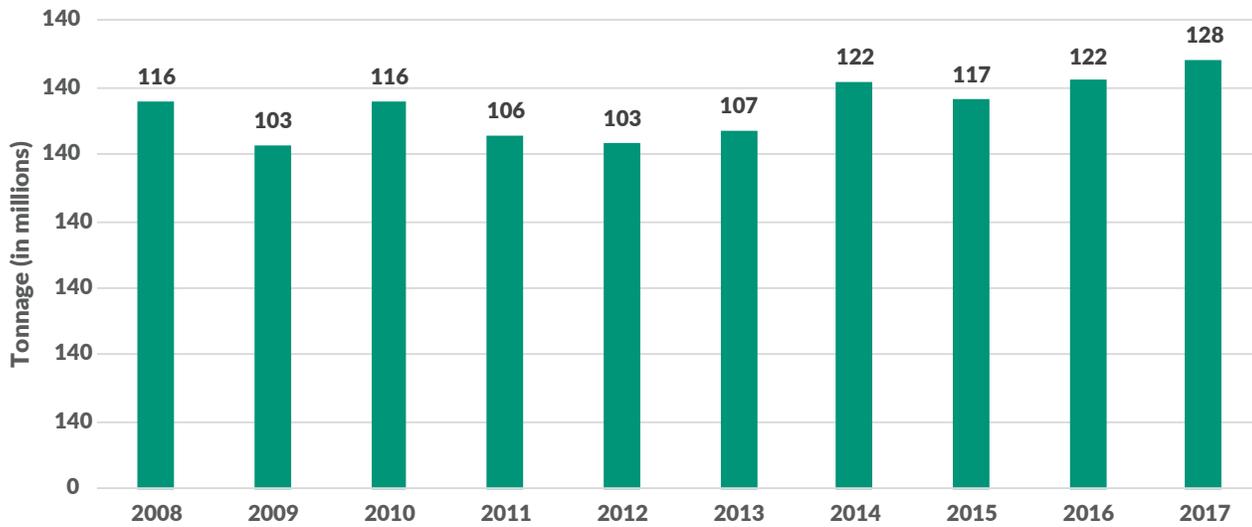
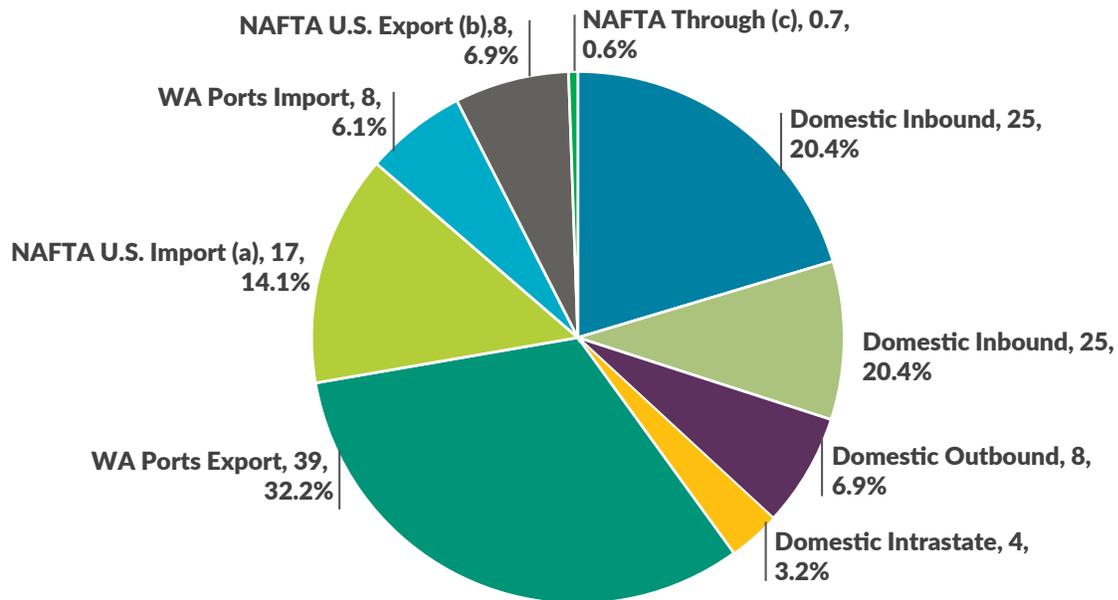


Exhibit 3-3: Annual rail freight volume in Washington state by trade type, 2016 (in millions of tons)



Note: (a) exports from Canada and Mexico to WA Ports (for exporting) are included under WA Ports Export; these are not considered as NAFTA U.S. Import; (b) Imports to Canada and Mexico from WA Ports (after importing) are included under WA Ports Import; these are not considered as NAFTA U.S. Export; (c) a limited amount of Canada-Mexico trade partner flows pass through Washington.

Scenario planning: uncertain future demand for freight rail transportation

Projecting the future demand for freight rail transportation always comes with uncertainty. Current and evolving trends, particularly around international trade, appear far more uncertain than has been the case in past years. In order to effectively plan for the rapidly changing environment and better address uncertainties in the driving factors of freight and economic growth, the 2019 rail plan established three scenarios to forecast a range of different futures: low growth, moderate growth, and high growth. These scenarios are described in Exhibit 3-4.

Exhibit 3-4: Freight Rail Demand Forecast Scenarios

Low growth scenario	Moderate growth scenario	High growth scenario
<ul style="list-style-type: none"> • Driven by a significant decline in export volumes and the resulting cumulative effects • Assumes that tariffs imposed by the U.S. and other nations have a substantial, lasting effect on international trade and suppress export activity • Assumes high potential negative effects on agricultural imports/exports and international containerized trade, and declined energy exports 	<ul style="list-style-type: none"> • Driven by growth in industries requiring long-haul movement of heavy commodities • Assumes no long-term effects from tariff and trade tensions • Based on FHWA's FAF 46 growth rates and long-term macroeconomic forecasts derived from REMI model⁷ 	<ul style="list-style-type: none"> • Driven by robust growth in export volumes • Assumes that tariffs imposed by the U.S. and other nations have little to no effect on international trade volumes and/or are removed with minimal or no lingering effects • Assumes high potential growth in energy exports caused by proposed bulk shipment facilities for coal and oil, • and robust potential growth in international containerized trade and agricultural imports and exports

The primary data sources utilized to develop the freight rail forecast are the Surface Transportation Board's 2016 Carload Waybill data, FHWA Freight Analysis Framework (FAF) version 4 forecast, REMI Economic model for Washington state forecast, and Oak Ridge National Laboratory rail network. Additional key inputs include freight train counts provided by the railroads and rail import and export volume data from the largest Washington ports.

In 2016, Washington's freight rail system moved 122 million tons of goods. The low growth scenario projects a decline in rail tons to 110 million tons (0.4% annual decline). Under the moderate forecast, freight rail traffic is projected to grow annually by 2.4% to 216 million tons by 2040. The high growth scenario projects major growth to 321 million tons by 2040, an annual growth of 4.1%.

Exhibit 3-5 and Exhibit 3-6 show the forecasted tonnage by movement type for the three scenarios. With the exception of the low growth scenario, this represents a significant increase in the amount of rail traffic today, with volumes nearly doubling in the moderate growth scenario and tripling in the high growth scenario.

⁶ FHWA Freight Analysis Framework version 4.4.1 forecast: https://ops.fhwa.dot.gov/freight/freight_analysis/faf/

⁷ Economic forecasts including population and gross domestic product from WSDOT purchased REMI economic model.

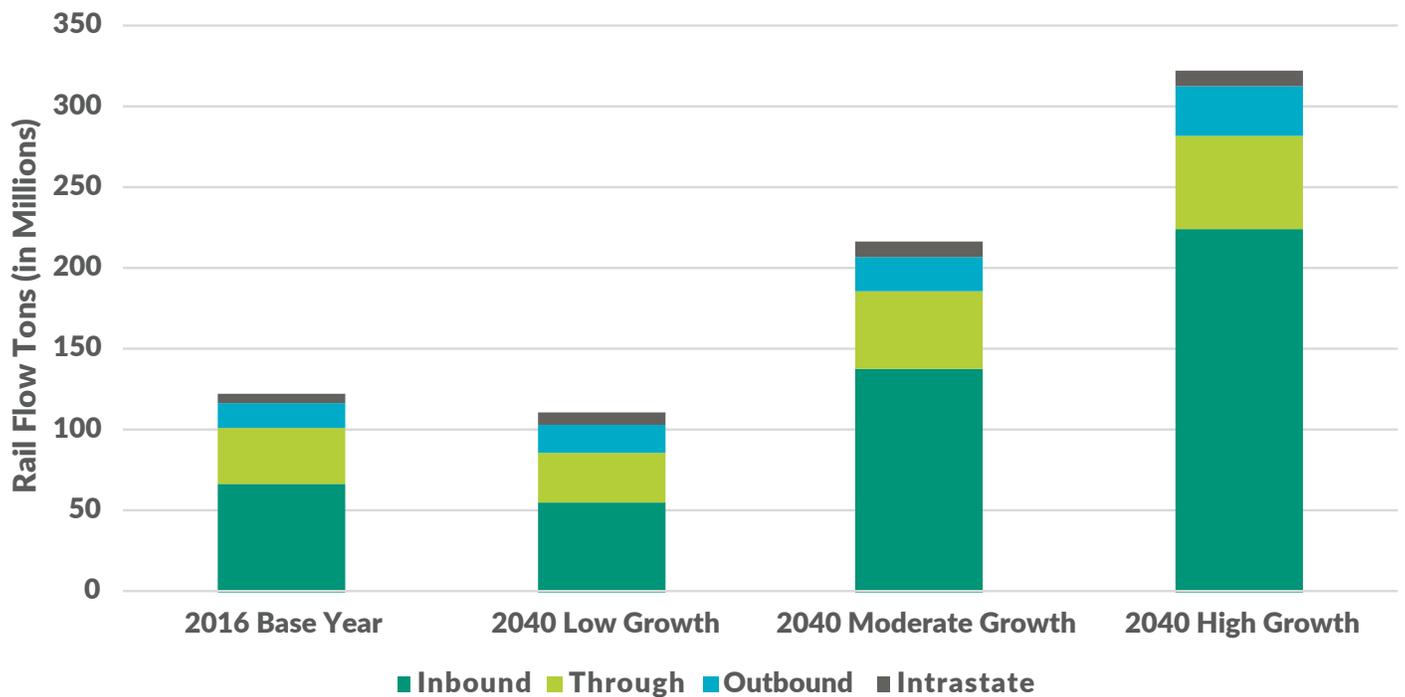
Exhibit 3-5: Statewide rail tonnage by movement type, 2016 and 2040 forecasted scenarios (table)

Movement Type	2016 Rail Tonnage (thousands)	2040 Low Scenario Rail Tonnage (thousands)	2040 Moderate Scenario Rail Tonnage (thousands)	2040 High Scenario Rail Tonnage (thousands)
Inbound	66,677	55,354	137,379	223,894
Through	33,882	31,219	48,071	57,878
Outbound	16,345	17,244	22,143	30,304
Intrastate	5,134	6,604	8,611	9,304
Total	122,038	110,421	216,204	321,381

Source: 2016 Enhanced Carload Waybill Sample, FAF4 Forecast with Adjustments.

Note: Inbound flows indicate rail movements that terminate in Washington; outbound flows indicate rail movements that originate in Washington; through flows indicate rail movements that neither originate nor terminate in Washington; and intrastate flows indicate rail movements that both originate and terminate in Washington.

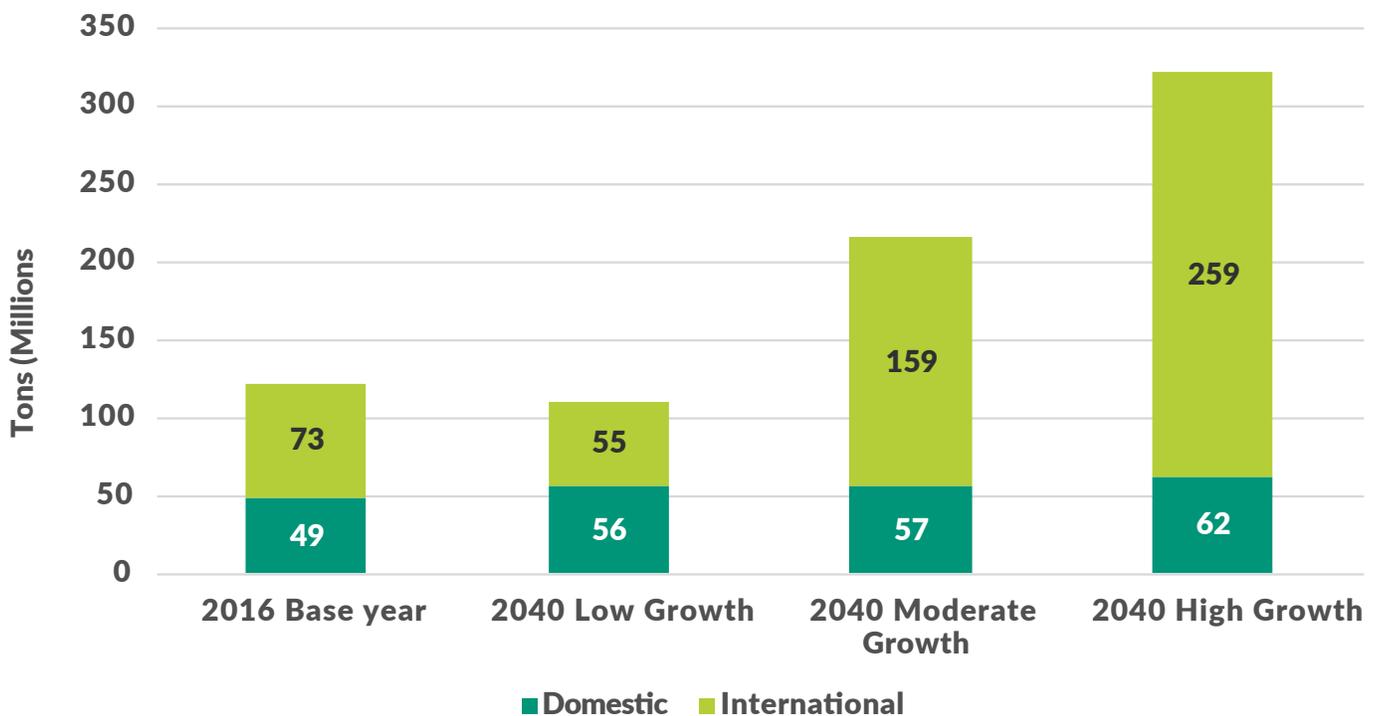
Exhibit 3-6: Statewide rail tonnage by movement type, 2016 and 2040 forecasted scenarios



The reduction in volumes in the low growth scenario is largely driven by projected decreases in inbound rail traffic mostly for exports through state ports. Inbound traffic in this scenario is anticipated to decrease by 17%. In contrast, the moderate and high growth scenarios show 64% and 70% growth in inbound traffic respectively, well above growth in other movement types. The highest growth expected is inbound field crops such as soybeans, corn, and wheat destined for export from Washington state ports.

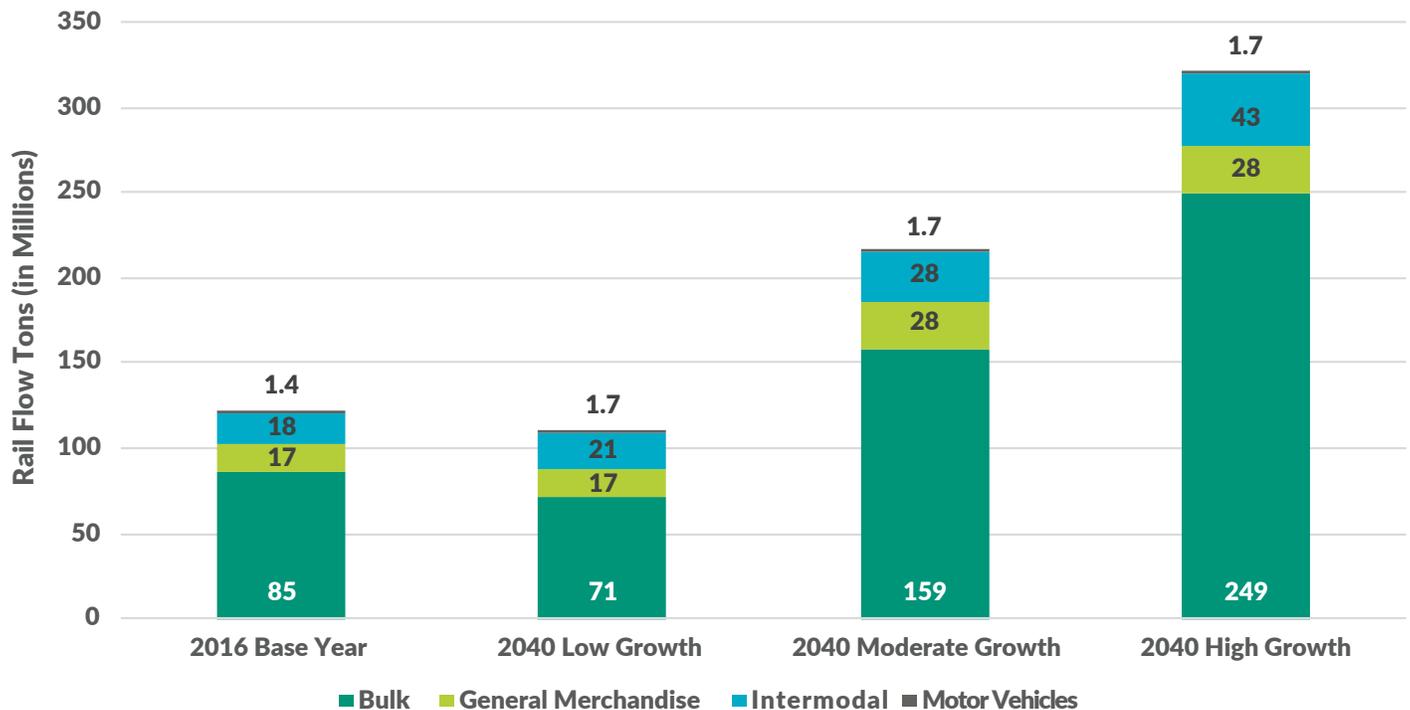
Exhibit 3-7 shows the freight rail forecast by trade type⁸ for the three scenarios. The reduction in volumes to 110 million under the low growth scenario is driven by reductions in international trade. In contrast, the moderate and high growth scenarios project that international traffic is expected to double or triple by 2040. The international traffic in the low growth scenario is anticipated to decrease by 26%, resulting in a relatively even split between domestic and international movement types. In the moderate and high growth scenarios, international movements are projected to increase by 117% and 254% respectively.

Exhibit 3-7: Statewide rail tonnage by trade type, 2016 and 2040 forecasted scenarios



Examining rail traffic trends by type of services⁹, shown in Exhibit 3-8, the reduction in rail tonnage under low growth scenario is due to a 17% decrease in bulk volume. However, in moderate and high growth scenarios, bulk rail services are projected to be the drivers of rail volume growth with an increase of 86% and 191%, respectively. Intermodal service, the second largest category moved by rail, is expected to grow annually by 1.8% and 3.6% under moderate and the high growth scenarios respectively. It will grow much slower under the low growth scenario, at about 0.6% annually. General merchandise is expected to grow at two percent annually, except under the low growth scenario where it is expected to remain stable and exhibit no growth. Assembled motor vehicles are expected to experience modest growth of just under one percent annually.

Exhibit 3-8: Statewide rail tonnage by service type, 2016 and 2040 forecasted scenarios



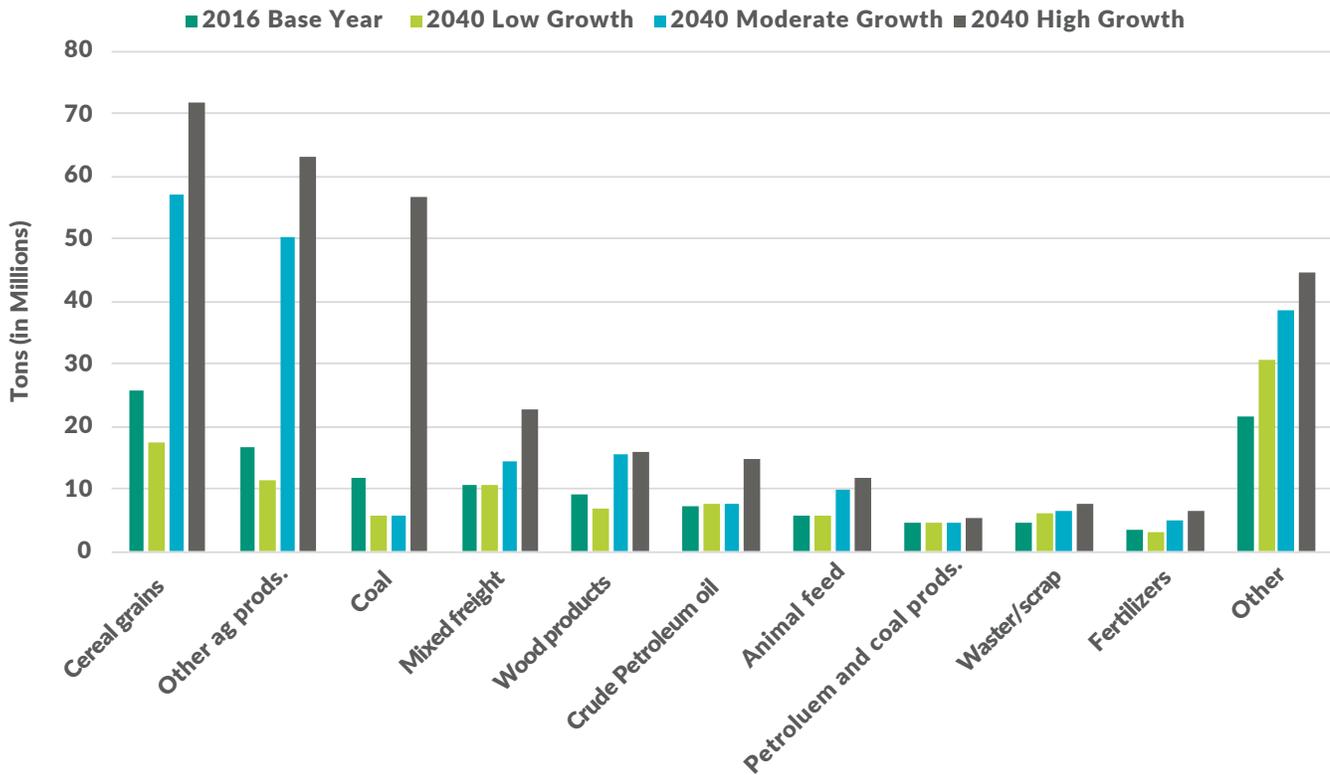
⁹ Classified based on the type of rail equipment used to transport cargo. Bulk service includes freight shipment in covered hopper cars which carry dry bulk commodities such as grain and coal, and tank cars which move compressed or liquid commodities like chemicals and crude oil; intermodal service includes intermodal cars and moves a wide variety of goods; motor vehicle service include vehicular flat cars carrying motorized and other vehicles; and general merchandise service are all other equipment types including box cars, flat cars and refrigerator cars and move commodities such as paper, lumber, and seafood.

By tonnage, the top ten commodities accounts for 82% of total rail tonnage in 2016. Cereal grains¹⁰ and other agricultural products¹¹ are expected to stay as the top two commodities moved by rail in Washington under all of the forecast scenarios, as shown in Exhibit 3-9. Under the low and moderate growth scenarios coal shipments are expected to decline by half, as inbound shipments to Washington to the Centralia Power Plant and through shipments to Portland General Electric are expected to cease within the next decade. Nationwide, rail coal volumes have declined in recent years, primarily due to domestic power plants converting to natural gas or other alternatives, but coal remains a crucial commodity for U.S. freight railroads. With the decline in coal for domestic consumption, coal export is expected as the main type of coal shipment by rail handled through Washington in the future. Coal export volumes will depend on the availability and capacity of coal export facilities, market forces such as the price of coal versus alternatives, and government policies. The high growth scenario attempts to capture the potential of export markets for coal, and takes into account proposed facilities for coal and oil export which are currently under permitting or legal process, assuming high potential growth in energy exports related to those facilities. If those facilities were built and operated, coal and crude petroleum volumes are forecasted to grow significantly, driving the rail tonnage increase under the high growth scenario.

Rounding out the top four commodities in 2016 is mixed freight, a category for which the specific commodity is not identified. This commodity class is handled almost entirely in intermodal service, and the majority of the mixed freight are containerized cargo moved through Washington ports. Mixed freight is expected to stay flat under low growth scenario, and grow steadily under the moderate and high growth scenarios, displaying particular sensitivity to international trade policy, which has high potential effects on international containerized trade. The “other” category includes all other rail freight which are not among the top commodity group based on tonnage, such as paper, chemicals, motorized and other vehicles, etc. The other rail commodities account for about 18% of total rail tonnage in 2016, and are expected to grow under all three scenarios.

Cereal grains and agricultural products are expected to stay as the top commodities moved by rail in Washington under all of the forecast scenarios.

Exhibit 3-9: Top rail commodities by tonnage, 2016 and forecasted 2040 scenarios



Based on the demand forecast results, North Dakota is anticipated to continue to be Washington’s greatest trade partner for rail traffic through 2040. Most of the rail traffic with North Dakota is inbound crude oil, cereal grains and agricultural products. Other key trading partners for cereal grains and agricultural products are Minnesota, Illinois, South Dakota, Nebraska and Montana. Montana and Wyoming are also strong trading partners for coal shipments to Washington.

Based on the demand forecast results, North Dakota is anticipated to continue to be Washington’s greatest trade partner for rail traffic through 2040.

3.3 Class I railroads

The two Class I freight railroads that operate in Washington are BNSF Railway and the Union Pacific Railroad. Together, they own 60% of the rail infrastructure by mileage and carry millions of carloads of commodities each year. These two railroads are responsible for moving the vast majority of freight handled by rail into, out of, within and through Washington.

State role and interest

BNSF and UP are important to Washington by virtue of the volume of freight traffic hauled, the rail infrastructure that serves freight (and passenger) rail traffic in the state, the economic impact of these two Class I railroads and the benefits they provide to the economy. The two railroads connect short line railroads to the national rail network, and host most of the passenger rail service.

A well-functioning rail system provides considerable benefits to Washington's economy. For example, availability of reliable rail service can make Washington ports more competitive for discretionary cargo – cargo that could easily be routed to ports outside of Washington.

Rail is typically more cost-efficient at carrying bulk loads and intermodal freight distances of approximately 500 miles or more. By weight, the rail share of freight shipment in Washington state is about 13%, and the multiple modes share (including rail intermodal shipment) is about 6%, while truck share of total freight shipment is roughly 65%.¹² A decline in rail service or service limitations on key infrastructure may shift freight traffic to trucks for high-value goods that are typical of the manufacturing and retail sectors. This would negatively affect the state's economy. Taxpayers would bear the costs for increased wear and tear and congestion on Washington's roadways and those increased costs could lead to rising prices or loss of trade and industry. Overall, the federal Government Accountability Office (GAO) has estimated the per-ton-mile social costs of trucking are six times greater than for rail.¹³ These costs include collisions and pollution.

Rail is very energy-efficient. In 2017, U.S. freight railroads moved a ton of freight an average of 479 miles per gallon of fuel.¹⁴ This efficiency allowed railroads to move nearly 10% of the freight tonnage in the U.S.¹⁵ while accounting for only 2% of U.S. transportation greenhouse gas emissions in 2017.¹⁶ To the extent that freight can be shifted from trucks to rail, Washington state can benefit from reduced greenhouse gas emissions related to energy consumption.

Existing and future conditions

The physical condition of railroads can be measured by two metrics:

- Percent of railroad system that can be operated at 25 mph or above
- Percent of railroad system capable of handling 286,000-pound rail cars

BNSF and UP are capable of handling 286,000 pound rail cars over all of their main routes in Washington. Almost all of the BNSF and UP mainlines can be operated at 25 mph or above. The BNSF corridors which accommodate Amtrak Cascades and Amtrak long distance services support higher operating speeds for freight trains up to 60 mph.

Issues and needs

Higher freight rail volumes

The freight volume forecasts indicate that some Class I rail corridors in Washington could see volumes that exceed current capacity. Maintaining reliable service while moving additional volume could require changes. Unless rail system infrastructure is enhanced, this future growth could overwhelm rail system capacity due to shortcomings, such as passenger/freight conflicts, height limitations on rail tunnels and bridges, inadequate siding lengths or bridge capacity. (Please see section 5.3, which provides 2040 rail system capacity analysis results for varying future scenarios.)

Rail capacity is not static. The volume of traffic a railroad can handle depends not only on infrastructure, but also on the railroad's operating strategies, traffic mix, use of technology and many other business decisions. The privately-owned Class I railroads (BNSF and Union Pacific) manage their operations and capital investments to meet changes in traffic volumes on their network.

The actions the railroads take to meet freight rail demand can have public benefits. Working with freight and rail stakeholders to ensure rail service is comparable or better than its modal competitors helps Washington stay nationally and internationally competitive. Since people have other options for personal travel or shipping goods, a well-functioning rail system will protect and grow rail's mode share. For example, maintaining and improving reliable rail service could help Washington ports compete for discretionary cargo. Additionally, the increased movement of manufactured and retail products by rail helps minimize congestion on the state's highways, providing additional positive benefits to the state economy. Taxpayers could benefit from the decreased wear and tear on Washington's roadways and efficiencies in rail service could lead to lower prices and increased industrial business opportunities. The potential public benefits of increased freight movement by rail can be increased with careful land use planning, such as concentrating warehouses near rail intermodal facilities.

Capacity along the state's three east-west rail corridors have long been key to the competitive position of Washington's ports as well as the region's freight shippers and short lines. Improvements such as the implementation of directional running over Stampede Pass and the construction of additional sidings and sections of second main track between Vancouver and Spokane by BNSF has deferred the immediate need for more extensive action. However, ensuring the availability of adequate east-west capacity is vital to the future of rail service in Washington if volumes grow in the future.

3.4 Short line railroads

Short line railroads provide a vital link to the two Class I railroads in Washington and provide access to the national freight rail network for communities and businesses. Switching or terminal railroads that primarily offer services to other railroads also are considered short line railroads.

State role and interest

Washington's short line railroads are tied to the economies of the region where they operate, including industries of great importance to the state, such as agriculture, food processing, forestry and industrial manufacturing.

Washington state law directs WSDOT to invest in the short line rail system to address a number of transportation needs.¹⁷ In the absence of short line railroads, freight currently carried on rail would likely be diverted to trucks using Washington's roads. This would increase wear and tear with associated roadway preservation costs, congestion, as well as increase the safety concerns caused by potential truck/vehicle interactions. In addition, short line rail provides cost-effective service to important industries, in particular, those in rural areas and those with limited road access. Finally, in some areas, they provide competition to trucking, which can improve the cost effectiveness and reliability of shipping.

Existing and future conditions

The condition of short line railroads in Washington state is quite varied. To assess the current conditions of the state's short line railroads, WSDOT surveyed 26 short line railroads in 2019 and received responses from 19 of them. These 19 short line railroads combined manage about 1,110 miles of tracks in Washington, accounting for 82% of the total short line mileage in the state. Although the survey results did not fully capture condition data for the entire short line system throughout the state, it does provide a reasonable assessment of the system based on survey data. The survey results indicate that out of the 1,110 miles of short line railroads:

- 91% are still active and in operation
- 61% can be operated at 25 mph or above
- 55% are capable of handling 286,000-pound rail cars

The future viability of the short line system is largely driven by rail industry trends. As the industry standard has moved towards use of 286,000-pound railcars rather than 263,000-pound cars, only about 55% of the surveyed short line railroads can handle the heavier cars. It will be critical for the future success of Washington state short line railroads to make improvements in order to meet the industry's 286,000-pound rail car standards.

In the absence of short line railroads, freight currently carried on rail would likely be diverted to trucks using Washington's roads.

Issues and needs

Addressing deferred maintenance and optimizing for economic sustainability

Many short line railroads were created from lines that were determined to no longer be viable by their previous Class I owners. Some short line railroads continue to struggle to overcome decades of deferred maintenance along their right of way. Maintenance needs often compound over time, making deferred repairs even more costly than if they had been addressed in a timely manner. In addition, substandard or nonexistent maintenance programs do little to instill confidence in attracting new businesses or encouraging past shippers to return to rail transportation.

The future of Washington's short line railroads is very much tied to the success of the state's Class I railroads and the entire national rail network. Successful short line railroads align with Class I railroads in implementing new technology, and increasing efficiency and streamlined marketing. This only can be achieved if short line railroads are able to overcome the deferred maintenance of their infrastructure and succeed in profitably growing their businesses.

Class I railroads encourage efficiency and modernization by providing shippers with incentives to ship larger quantities of product. While increasing efficiency is a long-term benefit, it requires short line railroads to make costly improvements to bridges and track in order to handle the increased tonnage. This can be seen in the adoption of 286,000-pound capacity rail equipment.

Car weight and operating speed are closely related. Track capable of handling 286,000-pound cars is usually FRA Class 2 or higher track where railroads can operate freight trains at least 25 miles per hour. On track classified as either FRA Class 1 or excepted track, freight trains can operate only at 10 mph.¹⁸ This type of operation can take at least twice as long to service customers, which increases operating costs. Additionally, maintenance costs are generally higher with lighter rail and risks of derailments are increased.

WSDOT completed a short line rail study¹⁹ in 2015 to evaluate the condition and needs of the entire short line rail system in the state. It focused on two metrics: the ability to operate 286,000-pound railcars and the amount of track classified as FRA Class 2 track. While some short lines or parts of short lines may not benefit from meeting these metrics, these are useful to assess the condition of the system.

Part of the existing short line rail system in Washington only can accommodate cars with gross weights of less than 268,000-pounds. Over 55% of the system has less than 112-pound rail, the recommended weight to operate the 286,000-pound railcars currently in use on most of the Class I system. Moreover, one quarter of short line miles have a rail weight of less than 90 pounds, the absolute minimum rail weight required to operate 286,000-pound cars. Failing to meet new standards set in place by mainline railroads could make portions of the short line rail system obsolete and unavailable to shippers that require the heavier cars.

Short line railroads may need other infrastructure investments to successfully work with Class I railroads. Short lines that are successful in generating higher freight volumes may find their facilities for exchanging freight cars with Class I railroads are too small and inefficient. In addition, they may need track expansions to handle longer unit trains.

Paying for work to address deferred maintenance and make improvements necessary to work successfully with Class I railroads can be a challenge for many short lines.

¹⁸ 49 CFR § 213.9 - Classes of track: operating speed limits https://www.ecfr.gov/cgi-bin/text-idx?SID=88c2ec37b28a3b1d1c6bb3d69b849fce&mc=true&node=se49.4.213_19&rgn=div8

¹⁹ Washington State Short line Rail Inventory And Needs Assessment www.wsdot.wa.gov/research/reports/fullreports/842.1.pdf

Palouse River and Coulee City (PCC) Rail System

WSDOT described system needs and growth strategies for the state-owned Palouse River and Coulee City (PCC) Rail System in the 2015 PCC Rail System Strategic Plan. The plan identified and prioritized \$58 million in infrastructure projects to be implemented over ten years. Preservation projects include identifying and replacing defective rail through integrity testing, addressing ongoing maintenance needs, and rehabilitating track located in moderate and sharp curves in order to allow for increased speeds. The plan also describes the need to inspect and load rate bridges along the PCC and establish a programmatic response to prioritize additional capital requirements that will result from those bridge inspections.

River navigation

The U.S. Army Corps of Engineers, the Bureau of Reclamation, and the Bonneville Power Administration are preparing the Columbia River System Operations Environmental Impact Statement (EIS)²⁰ to assess and update their long-term strategy for the operation and configuration of the multiple-purpose Columbia Snake River Navigation System. The three federal agencies are evaluating four multi-objective alternatives that would affect navigational operations of the system over a span of five years. They issued a Draft EIS for public review in February 2020. If selected, three of the alternatives evaluated would result in minor changes to navigation channel depths and the timing of navigation operations. A fourth alternative includes breaching the four Lower Snake River dams, which would eliminate the navigation channel and the ability for barges to move up and down the Snake River. If implemented, this may disrupt transportation operations that have relied on a navigable river system. The Draft EIS identified a preferred alternative that does not involve breaching the dams. However, the EIS process is still in progress and the alternative selected could change before the process is completed.

Washington grain moves to export ports primarily (60%) by barge.²¹ Rail carries 37% and trucks carry around 3% to the exporting port. Much of the grain moved by barge originates from terminals on the Snake River. If the three agencies move forward with breaching the Lower Snake River dams, commodities currently transported by barge on the lower Snake River would likely be shipped by rail or truck. Rail could become the most economically viable means for affected shippers to move their products to market. However, shifting this freight from river barges to the railroads could present challenges. Rail rates could potentially rise without competition from barges, resulting in increased shipping costs that could make products currently shipped on the river less competitive. Short line rail infrastructure may need rehabilitation and some expansion to handle the increased volume. Shippers and short lines may need assistance ensuring they have a consistent supply of rail cars to meet the additional demand. At the time of writing, the EIS process is still ongoing and the subsequent results of EIS decisions are unknown.

CHAPTER 4

PASSENGER RAIL SYSTEM STRENGTHS AND CHALLENGES

Passenger rail services provide high capacity transportation between locations served along their respective routes. Within the borders of Washington, these passenger services operate on tracks owned predominantly by BNSF (discussed in the previous section on freight rail). Each of the service classifications (long distance, intercity and regional/commuter) provides a unique role within the system for their respective routes.

This chapter examines the trends affecting passenger rail demand, and analyzes the existing conditions, future ridership and important challenges and issues for each type of passenger rail service in state. Key findings most relevant to identifying needs and developing plan recommendations are highlighted in this chapter.



Amtrak Cascades trains at King Street Station in Seattle

4.1 Trends that may affect passenger rail demand

Population growth is one of the key factors affecting demand for passenger rail service. Washington's population grew from 4.1 million in 1980 to 6.7 million in 2010 and is expected to reach 9.2 million by 2040, mirroring national population growth rate projections.¹ In 2018, Washington's population grew by an additional 93,200 people to 7.5 million residents. Most of that increase, roughly 75%, occurred in the states' five largest metropolitan counties: Clark, King, Pierce, Snohomish and Spokane. Four of these five counties are served by Amtrak Cascades and three by Sounder commuter rail.

According to the Washington Office of Financial Management (OFM), in 2016 the state had about 1,073,300 persons ages 65 and older, representing 15% of Washington's total population. By 2040, the adult population age 65 and older is forecast to reach 2,000,000 people, representing 22% of the state's total population. Another way to look at it: by 2030, more than one of every four Washingtonians will be 65 or older. Amtrak Cascades is popular with people in this demographic. Nearly 25% of riders indicated they were over 65 in an on-board survey performed in 2017. As the population ages, more people are likely to experience limitations to their mobility, which may create a greater need for transportation options like passenger rail. This could include more off-peak regional commuter rail service, as well as long distance and intercity service.

In 2015, millennials surpassed baby boomers² as the nation's largest living generation. This millennial group

promises to influence a range of policy decisions across the state and the nation, including transportation. This segment of the population includes people born in the 1980s through the late 1990s and accounts for just over 27% of Washington’s population. This generation is, thus far, largely choosing to live in affordable neighborhoods and suburbs in and around urban areas. Numerous studies show they are choosing to live in areas that provide the best options for transportation that do not involve driving their own cars alone. According to the Puget Sound Regional Council’s 2014 Regional Travel Study³, the most significant decreases in automobile use for the Puget Sound region between 2006 and 2014 were among millennials. Passenger rail can be an attractive option for this age group, supporting car-free travel between urban centers. The different types of passenger rail service can also play important roles in an equitable transportation system, particularly for people with disabilities who might find other modes challenging to use or people with low incomes who may find reduced-fare commuter rail service valuable for getting to job centers from areas with affordable housing.

4.2 Long distance

Long distance, multistate passenger rail services are provided by Amtrak’s Empire Builder and Coast Starlight. These two services have many things in common and a few differences based on geography and markets served.

The trains are operated by Amtrak, using tracks owned by BNSF, UP and other railroads outside Washington and Oregon. These routes are funded by ridership revenue and federal subsidies, and are managed by Amtrak with no WSDOT involvement.

State role and interest

The National Railroad Passenger Corporation (Amtrak) is a federal corporation with direct oversight by the FRA, and has private contracts with freight rail infrastructure owners within Washington. Therefore, the state of Washington has a limited role and limited involvement with Amtrak’s long distance services.

Long distance trains, including the Empire Builder and the Coast Starlight services, have played an important role in supporting the development of regional intercity services. Their presence allowed for the implementation of new intercity services, where it otherwise would be extremely difficult. The Pacific Northwest Rail Corridor is one such example. Furthermore, by providing national connectivity, the long distance trains feed traffic into the regional intercity services, and as these regional services grow, long distance services stand to benefit, and vice versa.

The Empire Builder provides the only passenger rail service in eastern Washington. The Coast Starlight service follows the same route as the state-sponsored Amtrak Cascades service between Seattle and Eugene, but with fewer station stops.

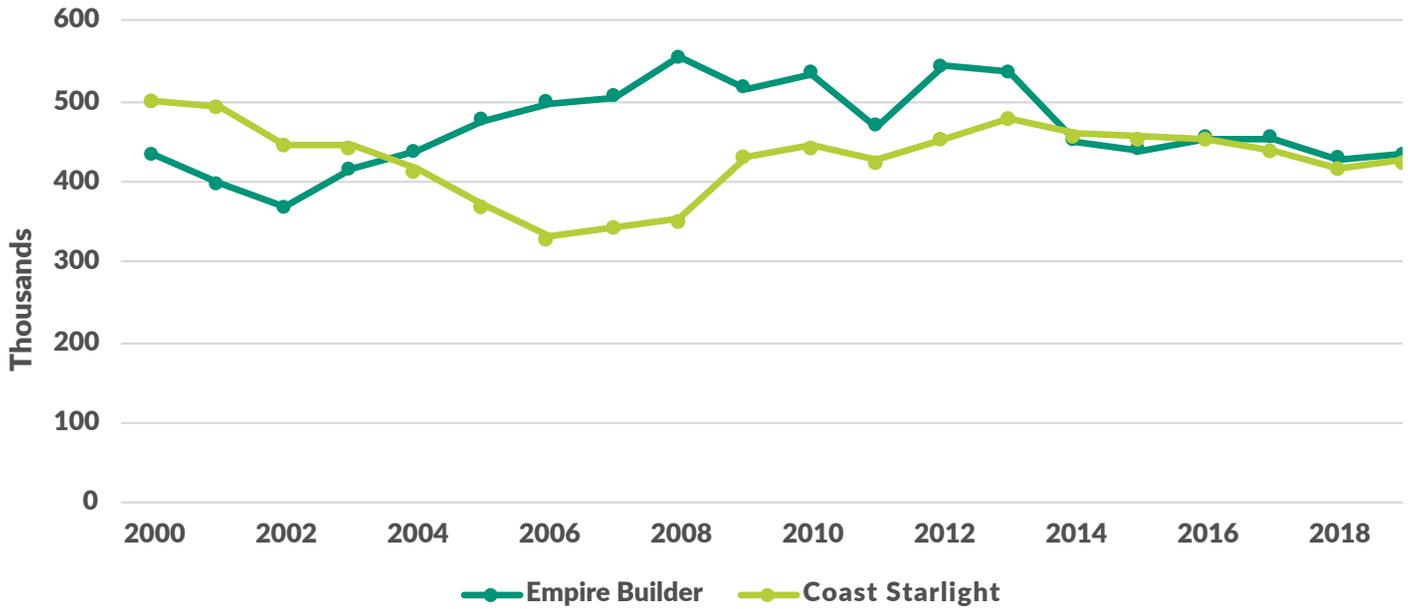
One area where the state directly interacts with the long distance trains is at train stations. Stations were once typically the responsibility of the owning railroad and perhaps Amtrak. In recent years the responsibility for stations has largely fallen on the communities.⁴ In Washington, the state has provided financial assistance for station projects served exclusively by Amtrak long distance trains.

Existing and future conditions

Existing conditions

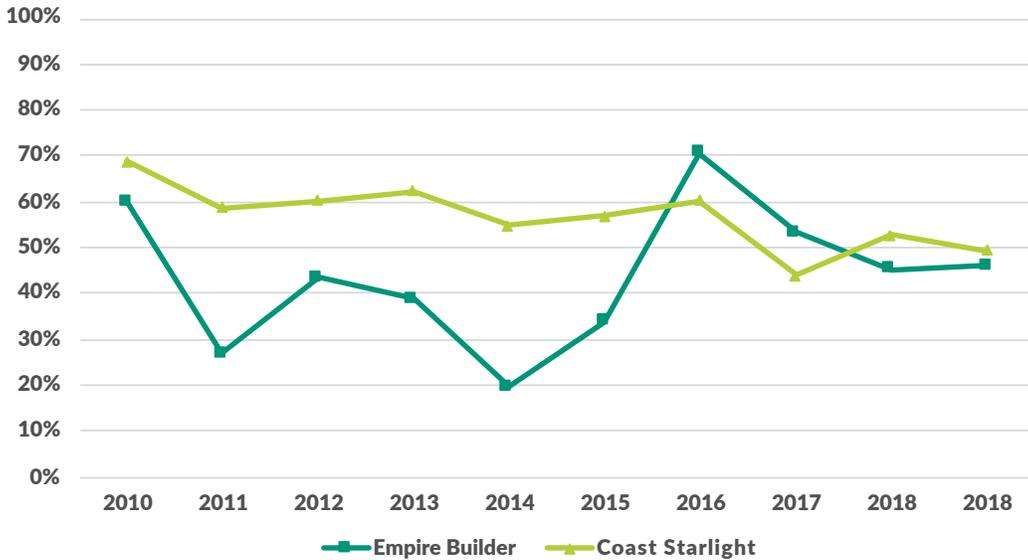
In federal fiscal year 2019, the two Amtrak long distance trains that operate in Washington – Empire Builder and Coast Starlight – had approximately 433,000 and 426,000 riders respectively. About 43% of Empire Builder riders and 50% of Coast Starlight riders got on or off at stations in Washington or the station in Portland, Oregon. As shown by Exhibit 4-1, the Empire Builder’s ridership increased in the 2000s and peaked in 2008 with approximately 554,000 passengers; Coast Starlight’s ridership peaked in 2000 with 502,000 passengers and declined until 2006, and then rebounded to 433,000 in 2009. The ridership for both services declined slowly during the past six years.

Exhibit 4-1: Empire Builder and Coast Starlight ridership, fiscal year 2000 – 2019



On-time performance is one of the influential factors affecting system ridership. For Amtrak long distance trains, on-time performance is measured as the arrival performance at all stations along the entire route, and a train is considered on time if it arrives a station within 15 minutes of scheduled arrival time. As shown by Exhibit 4-2, the on-time performance of Coast Starlight trains was relatively stable at about 55 to 60% between fiscal year 2010 and 2016; and declined in the past three years to 49% . Negatively affected by surging freight train volume, Empire Builder service suffered during the high oil production years in the Bakken shale region. It experienced poor on-time performance between 2011 and 2014, and saw a significant improvement between 2014 and 2016, reaching its record high at 71% in 2016. In the past three years it declined to 46%. Compared to intercity passenger rail, long distance trains operate over much longer distance (over 1,300 route miles for Coast Starlight and 2,200 miles for Empire Builder) with long journey time, and are more likely to be delayed by multiple causes along its route affecting its on-time performance.

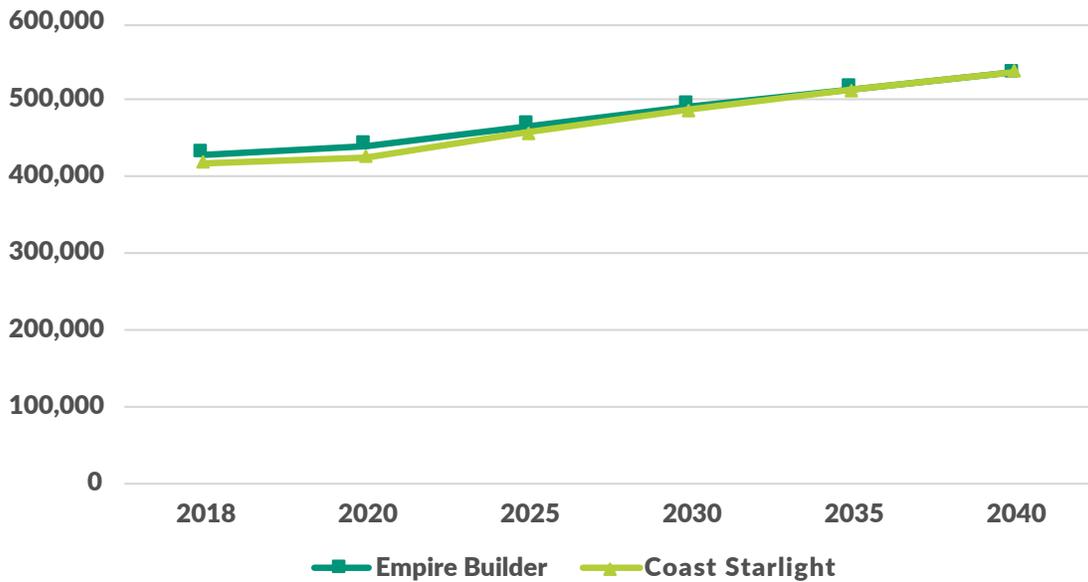
Exhibit 4-2: Empire Builder and Coast Starlight on-time performance, fiscal year 2010 – 2019



Future ridership

Overall ridership is expected to increase steadily through 2040 for both the Empire Builder and Coast Starlight (Exhibit 4-3). Annual ridership on the Empire Builder is projected to increase from 428,900 in Fiscal Year 2018 to 536,000 in Fiscal Year 2040, representing 25% growth over 22-year period. Annual ridership on the Coast Starlight is projected to increase from 417,800 in Fiscal Year 2018 to 537,000 in Fiscal Year 2040, representing a total of 29% growth⁵.

Exhibit 4-3: Empire Builder and Coast Starlight ridership projection, fiscal year 2018 – 2040



Issues and needs

On-time performance

Poor on-time performance continues to plague long distance passenger routes nationwide. Unreliable service is a major inconvenience for travelers and costs Amtrak millions of dollars in operational delays. Some delays, including some slow speed orders for maintenance and inspections, are unavoidable, but delays caused by dispatching decisions usually are avoidable. Interference from freight trains is a common reason for delays, but there are other contributing factors including equipment failures, track maintenance, weather, and passenger train interference. BNSF is the host railroad for Amtrak trains in Washington, but the issues affecting the long distance trains here go beyond the borders of the state. On-time performance can be affected by events in other states and on other host railroads.

Equipment replacement

Amtrak operates a fleet of equipment, a significant portion of which is at or nearing the end of its useful service life. In Washington, Amtrak diesel locomotives and Superliner passenger cars are used on the Empire Builder and Coast Starlight long distance trains.

Amtrak's fleet of 200 P-40 and P-42 locomotives, currently used on the Empire Builder and Coast Starlight long distance routes in Washington and occasionally on Amtrak Cascades, is rapidly approaching the end of its useful life. They suffer from increased mechanical challenges to reliable operation due to their age and worn condition. Amtrak has seen an approximate 20% increase in both incidents and minutes of delay due to mechanical problems with P-42 diesel locomotives.

The Superliner passenger cars used by Amtrak on its long distance trains are also nearing the end of their lifespan. The oldest cars, 244 of them, were built between 1979 and 1981. The newest cars, a group of 184 cars, were built between 1993 and 1995. Amtrak has performed extensive overhauls, retrofits and repairs to keep this aging fleet in operating condition, fashioning custom made parts to replace original equipment manufacturer-supplied components that are no longer available.



Amtrak P-42 locomotive

4.3 Intercity

Amtrak Cascades is a multi-frequency intercity service linking Vancouver, British Columbia with Eugene, Oregon via Seattle and Portland (467 miles). The route generally parallels Interstate 5, calling at a total of 18 stations, 12 in Washington. King Street Station in downtown Seattle and Portland's Union Station serve the largest number of passengers. Many stations also have public transit service and bicycle/pedestrian facilities, which provide multimodal connections for travelers.

State role and interest

Amtrak Cascades is part of the state's strategy to provide a multimodal transportation system to move people and goods. Intercity passenger rail plays an especially important role in providing travel options that reduce reliance on single-occupancy vehicles along the I-5 corridor. Shifting trips from single-occupancy vehicles to rail can both help alleviate congestion and also reduce greenhouse gas emissions. For a trip between Seattle and Portland, an individual could lower their personal greenhouse gas footprint up to 78% by switching from driving alone to riding Amtrak Cascades trains.

Existing and future conditions

Existing conditions

Exhibit 4-4 shows the annual ridership on Amtrak Cascades corridor between Eugene, Oregon and Vancouver, British Columbia since 1996. Amtrak Cascades annual ridership has increased 175% between 1996 and 2010, largely driven by service improvements. Major service improvements within that time period include:

- Adding third round trip between Seattle and Portland in 1998
- Adding new round trip between Seattle and Bellingham in 1999
- Adding second round trip between Portland and Eugene in 2000
- Adding new station stops at Tukwila and Oregon City in 2001 and 2005
- Adding fourth round trip between Seattle and Portland in 2006
- Extending service from Bellingham to Vancouver, BC for second daily round trip to Canada in 2009

In 2011, the total annual ridership on the Amtrak Cascades corridor reached its record high at approximately 848,000. Between 2011 and 2017, WSDOT delivered federally funded rail infrastructure projects to enhance the Amtrak Cascades program. In the short term, interruptions caused by these construction projects contributed to a drop in ridership between 2012 and 2017. In 2018, 802,000 passengers traveled on Amtrak Cascades, a decrease from the previous year that was primarily due to a 19% decrease in ridership in January 2018 – the month following the derailment of an Amtrak Cascades train. Ridership returned to more consistent levels in subsequent months, and reached a five-year high of 829,000 in 2019.

WSDOT plans to add two more daily round trips between Seattle and Portland for a total of six round trips to meet the growing demand and customer expectations of shorter travel times and increased reliability between the two cities.

Exhibit 4-4: Amtrak Cascades ridership between 2000 and 2019

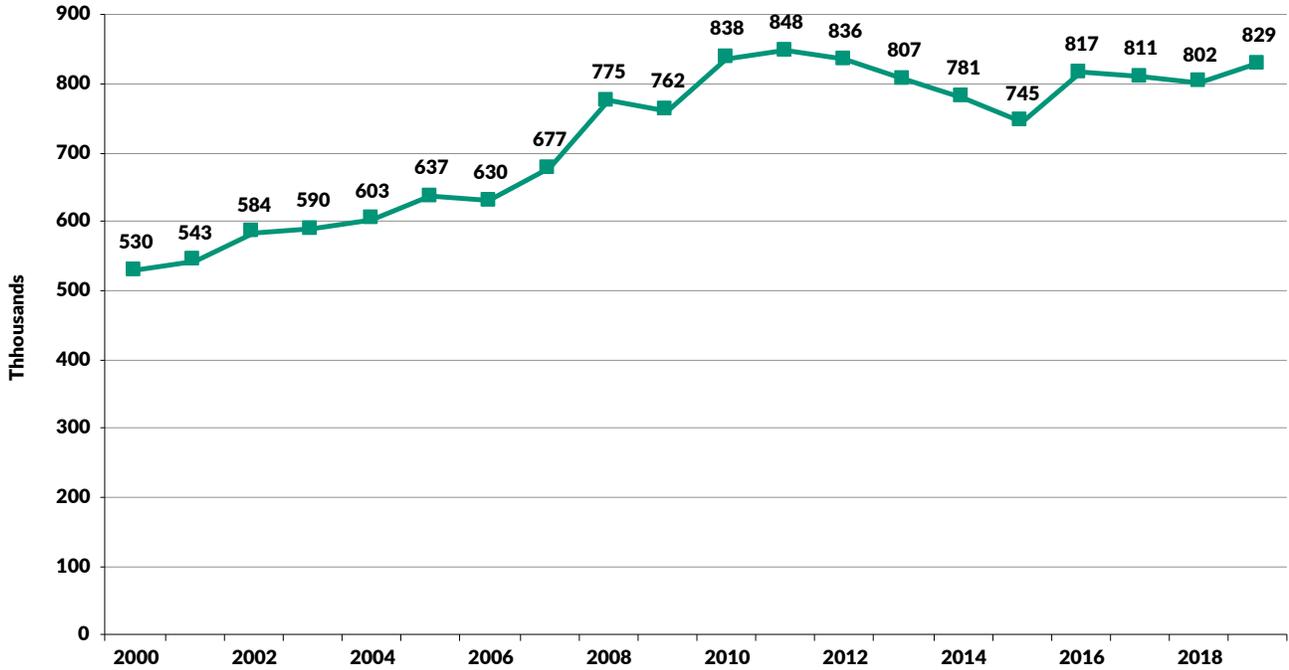


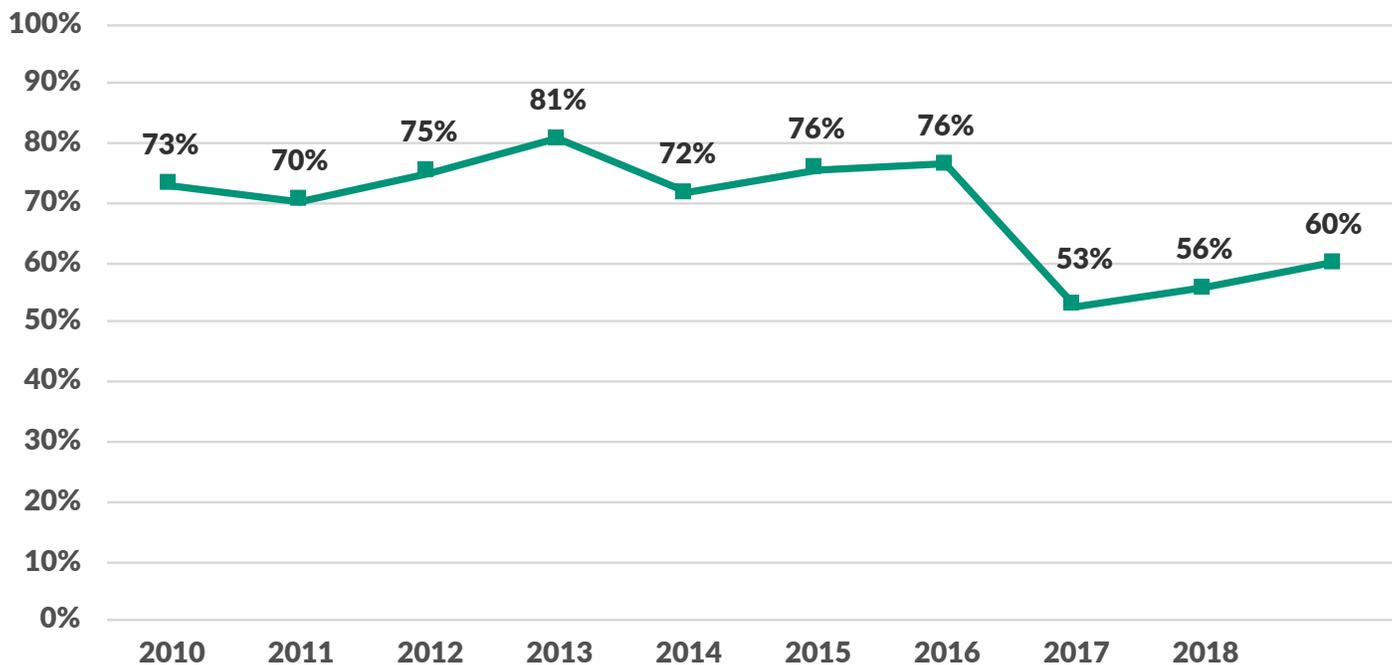
Exhibit 4-5 shows the passenger miles by corridor segments in the past ten years. Passenger miles measure the person miles traveled by Amtrak Cascades riders between their origin and destination stations along the corridor. Amtrak Cascades passenger miles reached its highest record in 2011 at 132 million, and then dropped between 2011 and 2015 due to the effect of infrastructure construction projects. It leveled off between 2016 and 2018, and increased by 3% in 2019. The segment between Seattle and Portland is the most heavily used along the corridor, accounting for 69% of total passenger miles in 2019.

Exhibit 4-5: Amtrak Cascades passenger miles between 2010 and 2019



Exhibit 4-6 shows the Amtrak Cascades on-time performance for the entire corridor between Vancouver, British Columbia and Eugene, Oregon in the past ten years. On time performance measures how a train performs compared to the scheduled arrival time at the endpoint station. With the completion of WSDOT’s federally-funded rail capital improvement projects in 2017, the goal for Cascades service is to achieve 88% on-time reliability between Portland, Seattle, and Vancouver, B.C. Between 2010 and 2016, Amtrak Cascades on-time performance was relatively stable and ranged between 70 and 81%, but dropped to 53% in 2017, and gradually bounced back to 60% in 2019, which is still below the goal of 88%. The decline in on-time performance in 2017 is mostly due to more frequent slow speed restrictions and longer delays caused by freight and passenger train interference. These top three causes resulted in a 19% increase in total delay minutes from 2016 to 2017 between Portland, Oregon and Vancouver, British Columbia. Amtrak Cascades on-time performance improved noticeably over the course of 2019, rising from 47% in the first quarter to 71% in the last quarter.

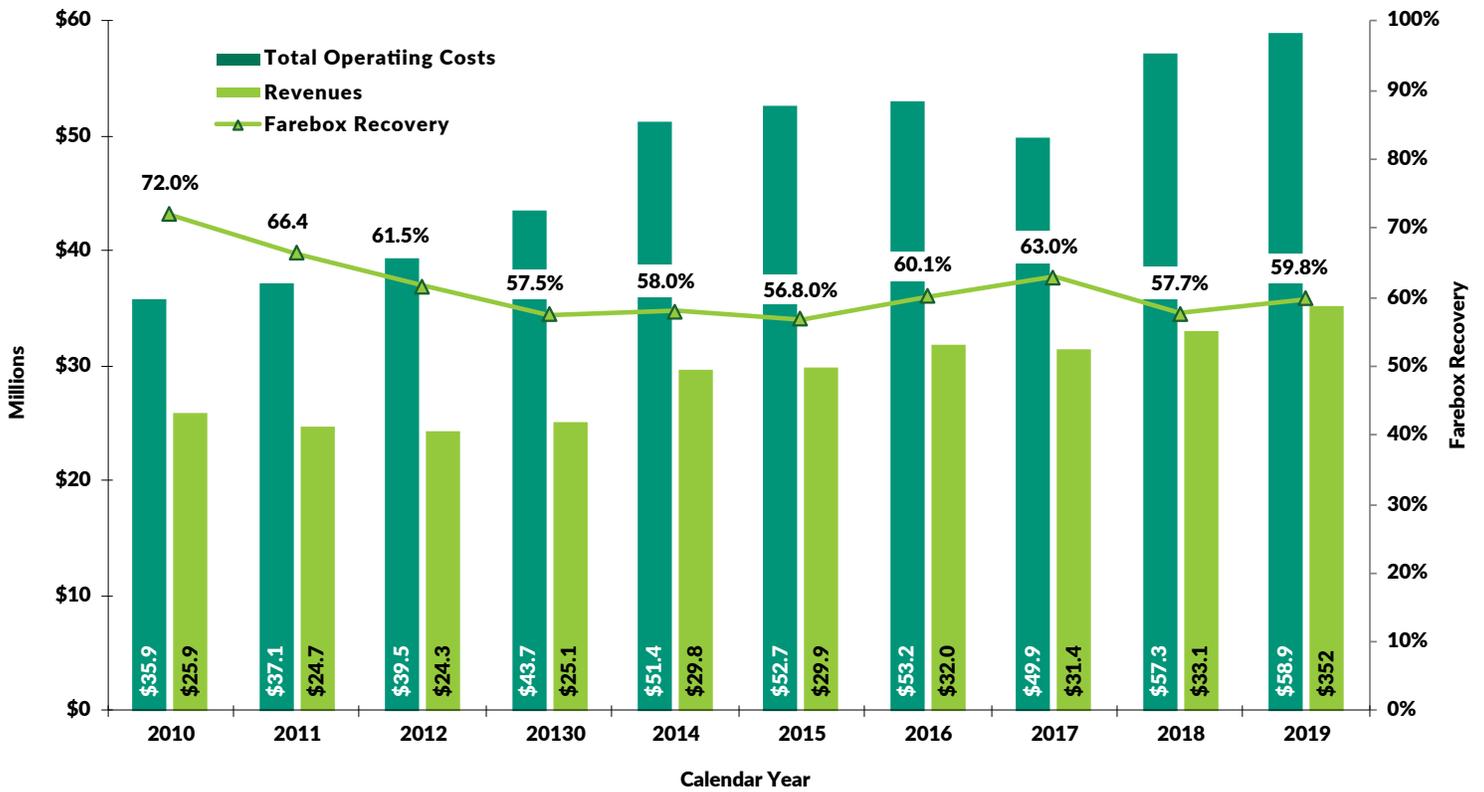
Exhibit 4-6: Amtrak Cascades on-time performance between 2010 and 2019



Note: Between 2009 and 2017, trains were considered to be on time if arriving at the scheduled final destination station within a tolerance of 10 to 15 minutes, depending upon route length. Beginning from 2018, all trains overseen by WSDOT are considered on time if they arrive within 10 minutes of scheduled arrival at endpoint station within each segment (Seattle to Portland, and Seattle to Vancouver).

Exhibit 4-7 shows the operating cost, total revenue, and farebox recovery rates for Washington-funded trains. In late 2013, the federal government shifted responsibility for funding Amtrak Cascades services completely to the states, and as a result, the state of Washington incurred higher costs starting in 2014. The annual revenue has increased 36% since 2010, and the farebox recovery rate (revenue divided by operating cost) fluctuated between 58% and 63% in the last four years, and reached 59.8% in 2019.

Exhibit 4-7: Amtrak Cascades operating cost, revenue and farebox recovery rate for Washington-funded trains



Future ridership

Passenger rail ridership is driven by a number of factors, including but not limited to population and population density, average income, the type of rail service offered, the presence of competing transportation options (such as intercity air service, bus or highways), travel time, schedule reliability and travel costs.

This section presents a summary of ridership forecasts for the Amtrak Cascades corridor between Eugene, Oregon and Vancouver, British Columbia. This forecasting model adopts a high-level direct demand approach which forecasts ridership at the station level, and is built based on key input variables including service frequency, travel time, on-time performance, and station catchment area population. This model also incorporates elements such as station access and egress modes and capacity constraints to consider the effect of those factors on passenger rail demand.

Four scenarios were established to forecast future ridership under various service alternatives, ranging from no improvement to a full set of service enhancements. These scenarios were developed in consultation with ODOT, to ensure consistency with its plans for future service between Portland and Eugene. The service level assumptions for Seattle to Portland service under high growth scenario are aligned with the assumptions adopted in WSDOT’s previous rail planning efforts – such as the 2006 Long Range Plan, 2014 State Rail Plan, and 2017 Fleet Management Plan – to ensure consistency. Implementation of these scenarios would require consultation and agreements with host railroads on the specific actions needed to attain the listed performance goals.

The baseline scenario assumes maintaining status quo and no improvements beyond adding the two additional trips between Seattle and Portland once the Point Defiance Bypass is reopened and replacement equipment is available. The low growth assumes a small increase in reliability, service frequency, and minor reduction in travel time. The moderate growth assumes moderate service enhancement by adding additional trips and reducing travel time across the corridor. The highest growth assumes the most aggressive set of service improvements, with significant reduction in travel time, much more frequent service, longer trains, and much higher reliability. See Exhibit 4-8

for current service level in base year 2018, and detailed service level assumptions in future year 2040 by each scenario. These forecasts help predict ridership demand and potential capacity constraints resulting from various growth scenarios.

Exhibit 4-8: Amtrak Cascades scenarios for demand forecasting

Scenarios	Frequency and Travel Time by Segments (in hours and minutes)			Reliability	Train Capacity (seats)
	Vancouver BC to Seattle	Seattle to Portland	Portland to Eugene		
2018 Base year	2 daily round trips in 4h 5m	4 daily round trips in 3h 30m	2 daily round trips in 2h 35m	56%	268
Baseline scenario 2040	2 daily round trips in 4h	6 daily round trips in 3h 20m	2 daily round trips in 2h 35m	88%	268
Low growth scenario 2040	2 daily round trips in 4h	8 daily round trips in 3h 10m	2 daily round trips in 2h 35m	90%	300
Moderate growth scenario 2040	3 daily round trips in 3h 50m	8 daily round trips in 3h 10m	4 daily round trips in 2h 25m	90%	300
High growth scenario 2040	4 daily round trips in 2h 37m	13 daily round trips in 2h 30m	6 daily round trips in 2h 20m	95%	300

As shown in Exhibit 4-9, system-level ridership is forecasted to range from 1.28 million passengers in 2040 for the baseline scenario to over 2.5 million for the high growth scenario, representing a range of 60% to 214% growth over 2018 ridership.

Exhibit 4-9: Amtrak Cascades ridership, 2018 and 2040 scenarios

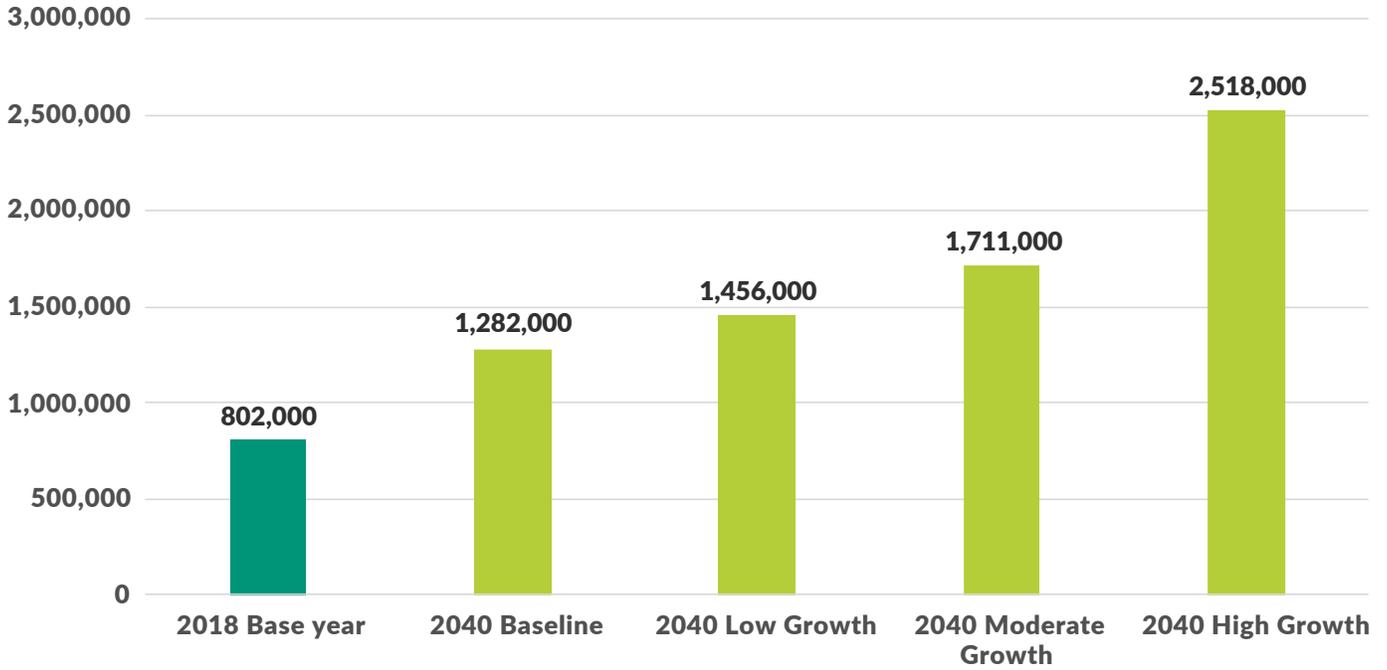


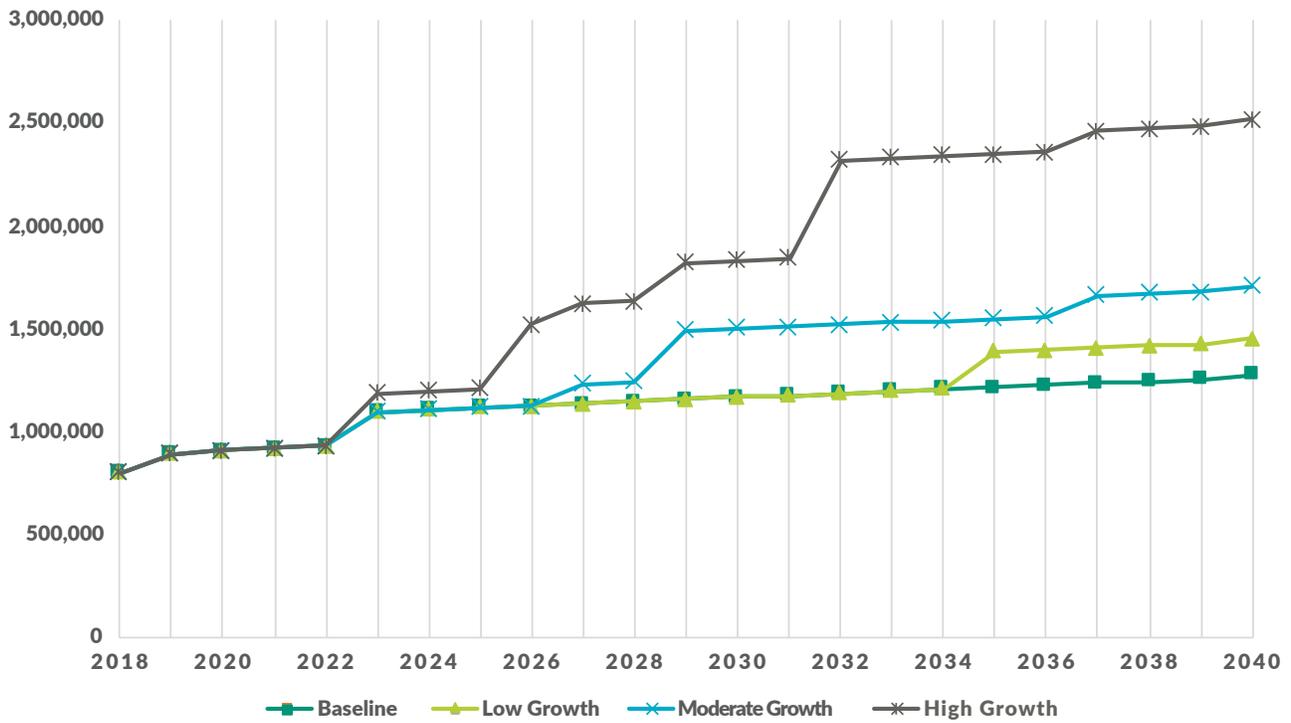
Exhibit 4-10 shows ridership forecasts by year for each scenario. Future ridership growth is due to steady population growth. The baseline scenario shows a spike in ridership in 2023 due to the projected addition of two round trips in 2023 between Seattle and Portland.⁶ For the low growth scenario, ridership growth tracks the baseline until 2035 when additional train trips are assumed to be added between Seattle and Portland. 2040 ridership is 13% higher under the low growth scenario compared to baseline.

The moderate growth scenario forecasts ridership for 2040 at over one third higher than the baseline, and 15% higher than the low growth, with notable spikes in ridership occurring in 2029 and 2037 when service improvements are assumed to occur. The ridership increases follow service improvements associated with this scenario.

The high growth scenario has substantially higher forecasted growth – 47% above moderate growth and 96% above the baseline in 2040. The 2040 high growth scenario ridership is more than three times that of 2018.

⁶ The timing for introduction of additional Amtrak Cascades trips was chosen for modeling purposes. Additional trips will be added when feasible.

Exhibit 4-10: Amtrak Cascades ridership forecast by year, 2018-2040



Under current conditions, Amtrak Cascades trains experience some days of crowding, particularly on weekend days of summer months. The effect of potential train crowding on future ridership is evaluated by examining load factors, which is the ratio of passengers on board to seats provided, focusing on July and August weekend peak days. The analysis shows that the peak load factors are expected to exceed 1.0 between 2019 and 2022 for all scenarios, implying peak demand will exceed the number of seats available. Since standees are not allowed on intercity trains, the peak summertime overcrowding may result in 0.2% to 0.4% dip in total annual system ridership between 2019 and 2022. Starting from 2023, peak load factors reduce below 1.0 as additional train trips are added between Seattle and Portland, indicating that no crowding issue is anticipated for future years between 2023 and 2040.

Improvements to station access/egress can positively affect Amtrak Cascades ridership, particularly transit improvements. Significant improvements to connectivity are planned by regional or local transit agencies at several of the station areas, particularly those within the Sound Transit district service area⁷, and other major metropolitan areas. Such regional transit service improvements are expected to enhance transit connections to stations, and may attract additional riders to Amtrak Cascades.

⁷ Sound Transit 3 Appendix C: <https://www.soundtransit.org/sites/default/files/project-documents/st3-system-plan-2016-appendix-c.pdf>

Issues and needs

On-time performance

Like other modes of transportation, all passenger rail services in Washington experience delays. Reliability, measured as on-time performance, is an important factor that travelers consider when choosing how to get to their destination. It can be particularly important in some situations, like going to work, traveling to an appointment, or making a trip that would require connecting to another scheduled transportation service. On-time performance continues to challenge Amtrak Cascades service, although it gradually increased over the course of 2019 and reached 71% in the 4th quarter. More details about Amtrak Cascades train on-time performance can be found in section 4.3 under existing conditions.

To track delays, Amtrak has developed a set of delay categories. Train delays are recorded in minutes. Delays are classified by specific cause. Types of delay causes have been grouped together into the eight general categories. WSDOT uses these delay types, described below, to track delay on the Amtrak Cascades route in Washington.

- **Track and signal delays:** All delays related to the railroad infrastructure. Any type of delay involving problems with the tracks or the signals, or delays involving maintenance work being done on the tracks or signaling systems. This includes delays from reduced speeds to allow safe operation due to track problems.
- **Train interference delays:** All delays related to other train movements in the area. Primary causes of these types of delays are freight trains but also can include commuter trains and other Amtrak passenger trains. This category also includes delays due to switching to alternate tracks or routes to operate around other trains.
- **Equipment delays:** All delays related to problems with the passenger train cars or locomotives. These delays can be due to unplanned equipment servicing or due to an equipment failure that may have occurred enroute or at the initial terminal. This includes delays due to a disabled passenger train ahead.
- **Weather delays:** All delays related to weather conditions, including speed restrictions due to excessive heat or flash flood warnings, an infrastructure failure due to severe weather, such as flooding, mudslides, washouts, wind damage, fallen trees, lightning strikes and power outages.
- **Passenger delays:** All delays related to assisting passengers. These delays include holding a station departure for passengers boarding or detraining, for passengers connecting from another train or for assistance to an ill or injured passenger. Also included are any necessary delays for providing appropriate assistance to disabled passengers.
- **Operational delays:** All delays related to the late arrival and turning of train equipment at an initial terminal, movement of train equipment between the servicing yard and the initial terminal and all train crew related delays, such as providing adequate crew rest or re-crewing as required by the federal hours of service law. Also included are delays over a detour route.
- **Non-railroad delays:** All delays related to a non-railroad third party. These delays can be due to customs and immigration, a bridge opening for waterway traffic, police activity, grade crossing collisions, or loss of power due to a utility company failure.
- **Other:** A unique delay occurrence which does not fall under any of the normal delay categories.

WSDOT tracks delays on the Amtrak Cascades route in Washington through the Cascades Performance Database, which collects and reconciles daily Cascades train delay data from Amtrak and BNSF for service outcome reporting. Cascades delays reported by Amtrak delay categories in 2019 are shown in Exhibit 4-11. Delay types are categorized into three groups to identify responsibility: host railroad, Amtrak, and third party.

Exhibit 4-11: 2019 Amtrak Cascades delays by category (minutes) between Vancouver, BC and Portland, OR

Delay Code	Description	Responsible party	Total minutes	% share
DSR	Slow Order Delays	Host	24,876	18.7%
FTI	Freight Train Interference	Host	20,439	15.3%
PTI	Passenger Train Interference	Host	17,246	12.9%
SYS	Crew & System	Amtrak	10,083	7.6%
RTE	Routing	Host	9,974	7.5%
DCS	Signal Delays	Host	8,103	6.1%
ENG	Locomotive Failure	Amtrak	4,303	3.2%
MBO	Drawbridge Openings	Third party	3,896	2.9%
ADA	Disabled Passenger Related	Amtrak	3,751	2.8%
OTH	Miscellaneous Delays	Amtrak	3,659	2.7%
DMW	Maintenance of Way	Host	3,631	2.7%
POL	Police-Related	Third party	3,516	2.6%
HLD	Passenger Related	Amtrak	3,283	2.5%
SVS	Servicing	Amtrak	2,823	2.1%
CAR	Car Failure	Amtrak	2,767	2.1%
CCR	Cab Car Failure	Amtrak	2,476	1.9%
TRS	Trespassers	Third party	2,429	1.8%
CUI	Customs	Third party	1,544	1.2%
WTR	Weather-Related	Third party	1,466	1.1%
CTI	Commuter Train Interference	Host	1,463	1.1%
ITI	Initial Terminal Delay	Amtrak	788	0.6%
DBS	Debris	Third party	506	0.4%
CON	Hold for Connection	Amtrak	269	0.2%
INJ	Injury Delay	Amtrak	21	0.0%
Grand Total			133,312	100.0%

The total delay minutes of Amtrak Cascades trains between Vancouver, BC and Portland, OR reduced 8% from 2018 to 2019. In 2019, nearly 64% of the delay minutes was identified as host railroad (BNSF) responsible categories. The majority of BNSF-responsible delays were due to slow order delays, freight train interference, and passenger train interference, which were identified as the top three causes of Amtrak Cascades service delays. Compared to 2018, the total delay minutes resulted from the top three causes dropped by 19%. About 26% of the total delay minutes was identified as Amtrak responsible categories, largely due to equipment failures (locomotives, cars, and cab cars). Third parties (not Amtrak or the host railroad) were responsible for the remaining 10% of total delay minutes. Those included drawbridge openings, police-related incidents, people trespassing on the railroad, and customs delays.

Equipment needs

The four Talgo Series 6 Amtrak Cascades trainsets, representing two-thirds of the Amtrak Cascades fleet, were built in 1999 and are approaching the planned end of their useful life. The equipment's condition will begin to deteriorate at an accelerated pace; therefore, continued operation means WSDOT will incur increases in annual operation and maintenance (O&M) costs. In keeping with its Amtrak Cascades Fleet Management Plan, WSDOT planned to replace its Talgo Series 6 trainsets in the mid-2020s. The need to acquire new trainsets has been accelerated by the National Transportation Safety Board's recommendation that Talgo 6 trainsets be replaced as soon as possible.

Amtrak provides P-42 locomotives to supplement the Amtrak Cascades fleet. As noted in the discussion of long distance passenger rail, these locomotives have increased mechanical challenges to reliable operation due to their age and worn condition. To the extent that these locomotives are needed to substitute for the newer WSDOT-owned Charger locomotives, Amtrak Cascades service can be affected by their reliability. WSDOT has identified a need for three more locomotives to eliminate the use of Amtrak locomotives as substitutes when locomotives are out of service for maintenance or repair.

Requests for additional stations

WSDOT receives requests for additional Amtrak Cascades stations from local jurisdictions and individuals. In recent years, these requests have included stations in Blaine, Mukilteo, Auburn, Lakewood, and Ridgefield. Determining where and when a train stops involves an assessment that is laid out in the Amtrak Cascades Station Stop Policy. This assessment provides a data-driven evaluation that weighs providing access to additional travelers, consideration of potential ridership increases, and review of the need to maintain suitable travel times across the entire corridor. On average, a new stop adds approximately five minutes to the train schedule. A key finding from a previous study indicated that longer travel times can outweigh potential ridership gains from adding stations, which result in incremental losses to larger markets (e.g., Vancouver, British Columbia, Seattle and Portland) traveling through the station.

Planning for future demand

More planning is needed to develop an intercity passenger rail system in Washington state that meets future demand. Plans are used to guide WSDOT activities, inform decision makers, and qualify for funding opportunities. This Rail Plan is not intended to provide detailed proposals for increasing passenger rail service. Further planning studies are needed to develop detailed strategies for reaching service goals.

Amtrak Cascades improvements

This rail plan confirms the long-term vision for intercity passenger rail based on strategic planning that was set out in earlier plans (Long-Range Plan for Amtrak Cascades, 2006; and Amtrak Cascades Mid-Range Plan, 2008):

- Portland, Oregon to Seattle: 13 daily round-trip trains; 2 hours, 30 minutes total travel time
- Seattle to Vancouver, British Columbia: 4 daily roundtrip trains; 2 hours, 37 minutes total travel time
- Vancouver, British Columbia to Portland, Oregon: 5 hours, 22 minutes total travel time

Much has changed since the long-range plan was published in 2006. A fresh look at the future of Amtrak Cascades is warranted to update the planning for future incremental improvements to the service.

East-west intercity rail service

Some rail advocates have encouraged WSDOT to add state-supported passenger rail service on an east-west corridor between Seattle and Spokane, with stops in cities not currently served by Amtrak's long-distance service. The only passenger rail service in eastern Washington is Amtrak's Empire Builder, a train operating between Seattle/Portland and Chicago. The Empire Builder stops at several communities in central and eastern Washington, but intrastate service is not its primary function. It offers only one train a day each direction, and trains often arrive in the middle of the night. Train arrivals are unreliable. Other public transportation options are limited, especially for those who look to transit service to travel between cities or to access passenger rail service. Drivers frequently cancel or avoid travel across the mountain passes due to adverse weather in the winter and recreational traffic in the summer. Intercity train travel could be a viable solution to improve mobility, access to services, and economic development across the state. In 2019, the State Legislature funded a study to evaluate the viability of a potential east-west intercity rail line, similar to Amtrak Cascades, to improve connectivity.

WSDOT last studied rail passenger rail service between western and eastern Washington on the Stampede Pass corridor in 2001. The study determined passenger service was technically feasible and identified infrastructure improvements that would be needed. Ridership was not estimated. A marketing survey performed by Central Washington University in 2017 showed considerable interest in cross-state passenger train service through south central Washington and documented substantial population growth along the corridor. To assess the current viability of establishing rail service between Seattle and Spokane, a ridership analysis and an updated list of infrastructure improvements are needed.

Ultra-high speed ground transportation

Looking to longer-term needs, WSDOT has been studying Ultra-High-Speed Ground Transportation (Ultra-High-Speed) under the direction of the legislature. Ultra-High-Speed is ground transportation capable of test speeds of up to 250 miles per hour, operating on an independent corridor separate from existing freight and passenger rail systems. The term is technology neutral, encompassing any mode of ground transportation capable of delivering such speeds, including heavy rail, MAGLEV and Hyperloop systems. Due to increasing congestion on highway, rail, and air travel systems in the Pacific Northwest, Ultra-High-Speed has attracted attention in recent years for its potential to enable one hour travel times between Seattle and Portland or between Seattle and Vancouver, BC.

Ultra-high-speed ground transportation is capable of test speeds of up to 250 miles per hour, operating on an independent corridor.

WSDOT completed a feasibility study in 2017 that concluded that an Ultra-High-Speed network between Vancouver, Seattle and Portland was feasible to build and operate in the Cascadia corridor and thereby positioning the Pacific Northwest megaregion to be globally competitive in the decades to come. A supplemental economic study by Microsoft and Washington Building Trades identified economic return and benefits of approximately \$355 billion in Gross Domestic Product over 30 years with an Ultra-High-Speed system.

In 2019, Washington state, in cooperation with British Columbia, Oregon, and Microsoft, performed a business case analysis of Ultra-High-Speed that validated the cost estimates from the feasibility study and showed how an ultra-high-speed system could form the spine of a transportation network capable of managing the Cascadia corridor's explosive economic growth and accompanying population increase.

Specifically, the 2019 Business Case Analysis found that ridership could be as high as three million annual passengers within the first years of operation and generate between \$160 and \$250 million in annual revenue. This

revenue could be adequate to pay for the annual operation and maintenance expenses of the system. The analysis also showed the system could potentially reduce greenhouse gas emissions by six million metric tons, capture 12 to 20% of intercity trips from other modes, and spur creation of up to 200,000 jobs related to construction and operation.

This foundational planning work has indicated that Ultra-High-Speed could be feasible and beneficial for the region, but there is still a good deal of work to be done. Establishing a new high speed ground transportation system that crosses state and international borders will require a high level of intergovernmental coordination. Understanding the entities, policies, and processes that need to be in place to plan and implement such a system would aid further work.

4.4 Commuter

Commuter rail systems typically offer passenger service within a single region, and occasionally between regions. In Washington, commuter train service is provided by the Central Puget Sound Regional Transit Authority (Sound Transit) with its Sounder train service. Sounder operates on an 82-mile route between Everett in the north and Lakewood in the south, providing morning and evening rush hour service during the week, with occasional weekend service for special events.

Sound Transit manages the service and owns the passenger cars and locomotives, and contracts with BNSF for operating crews and Amtrak for maintaining the equipment. Infrastructure access was gained by Sound Transit through the acquisition of operating easements between Everett and Tacoma over BNSF's track along the I-5 corridor. The line used by Sounder between Tacoma and Lakewood was acquired from BNSF, and thus is under the full control of Sound Transit.

State role and interest

Sounder provides high-capacity public transportation that increases travel options and relieves congestion. The service helps fulfill state objectives for reducing vehicle miles traveled and greenhouse gas emissions. WSDOT coordinates train schedules with Sound Transit for mutual benefit of Amtrak Cascades and Sound Transit's commuter services in the Puget Sound region. The state has contributed funds to Sounder projects that also provide benefits for other rail users.

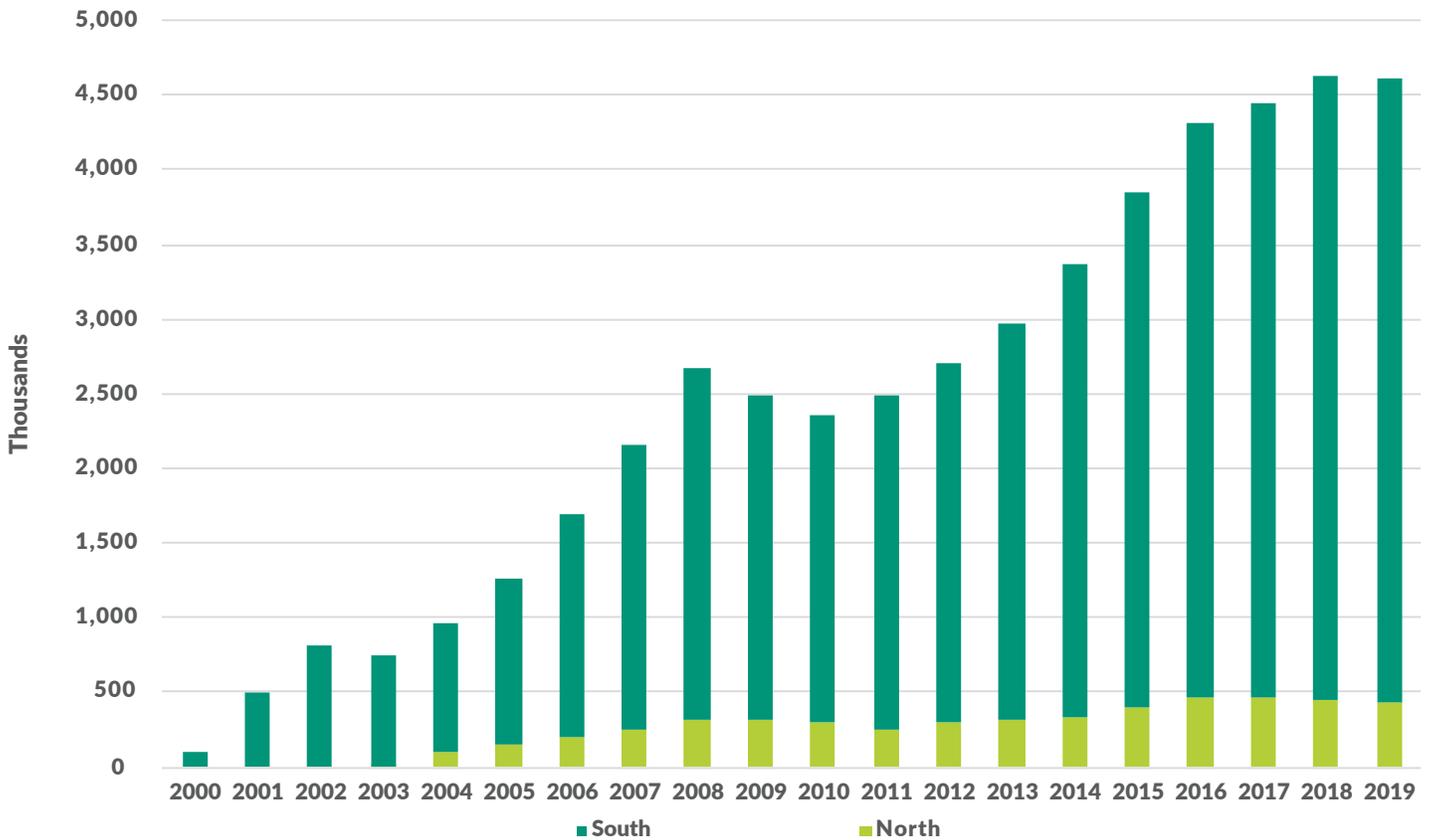
Existing and future conditions

Existing conditions

The total ridership on Sounder commuter rail, operated by Sound Transit, has grown steadily from about 2.1 million riders in 2010 to 4.6 million riders in 2019 (Exhibit 4-12), a 90% increase over past ten years. The ridership increase is mainly driven by growth in the number of daily trips on the South line, where annual ridership doubled over the past ten years and accounted for 90% of total riders in 2019. Two additional Sounder South line round trips were introduced in fall 2017 contributing to further ridership growth in 2018 and beyond.

Ridership on Sound Transit's Sounder commuter rail has grown over 86% in the past ten years.

Exhibit 4-12: Sounder train annual ridership by lines, 2010 – 2019⁸



Future ridership

Projections for total ridership on Sounder through 2040 were determined based on the Sound Transit 3 System Plan published by Sound Transit. The forecasts are based on the Puget Sound Regional Council’s published population and employment forecasts and a modeling methodology approved by Federal Transit Administration⁹.

Sounder commuter rail ridership is projected to reach 8 to 11 million by 2040 with Sound Transit 3 investments. Major Sounder improvements built into Sound Transit ridership forecasts include extending Sounder commuter rail service during peak hours from Lakewood south to new stations at Tillicum and DuPont. Sound Transit also is exploring the possibility of adding trips to its existing routes.

Issues and needs

Planning for future demand

Sound Transit has seen growing ridership on Sounder, particularly south of Seattle. Sound Transit 3 investments in Sounder South will address several challenges that constrain the ability of Sound Transit to accommodate additional passengers.

One challenge is station platforms that limit the length of trains. Stations south of King Street station which are served only by Sounder (i.e., not by Amtrak Cascades) have platforms that support train lengths up to the 7-car

⁸ Sounder annual ridership data was provided by Sound Transit.

⁹ Sound Transit 3: Appendix C https://st32.blob.core.windows.net/media/Default/Document%20Library%20Featured/8-22-16/ST3_Appendix-C_2016_web.pdf

trains currently operated by Sound Transit. Another challenge is station access. Stations have limited parking that often fill to capacity very early in the day. Making it easier to get to stations without personal vehicles would support higher ridership. Another challenge to adding capacity for more riders is track ownership. BNSF owns most of the route used by Sounder. As a result, Sound Transit needs to negotiate with BNSF to add more trains.

CHAPTER 5

INTEGRATED RAIL SYSTEM

The rail system connects and interacts with other elements of the transportation system in Washington, and are intertwined with the communities through which they pass. The following section addresses issues that are common to and affect the entire rail system.

5.1 Rail system capacity

How will the rail system operate in the future? This section provides an integrated system capacity analysis of freight and passenger rail services for the 2016 base year, and three scenarios of low growth, moderate growth, and high growth. This capacity analysis combines the freight rail demand and passenger rail demand forecasts developed in Chapters 3 and 4 to examine how changes in future rail traffic would affect rail system performance, and where bottlenecks are likely to occur if no additional capacity or operational improvements were made to the rail network in Washington state.

In reality, the Class I railroads (BNSF and Union Pacific) and other infrastructure owners will likely address key capacity issues as they emerge. Therefore, the 2040 capacity assessment is included here to illustrate the magnitude of future rail traffic anticipated for the rail system in Washington. It underscores the need for continued planning and action to address capacity and mobility concerns throughout the system.

Neither BNSF nor Union Pacific have validated or endorsed this capacity analysis.

Three future scenarios were evaluated for system capacity analysis:

- Low growth scenario (LGS): combines the low growth scenario established for freight rail volume forecast, and for Cascades passenger rail ridership forecast;
- Moderate growth scenario (MGS): combines the corresponding moderate scenarios established for freight rail volume forecast and for Cascades passenger rail ridership forecast;
- High growth scenario (HGS): combines the corresponding high growth scenarios established for freight rail volume forecast and for Cascades passenger rail ridership forecast.

These three scenarios include existing long distance and commuter services for capacity analysis, but do not account for additional Amtrak long distance trains nor Sounder commuter rail trains.

The capacity analysis results are expressed as level of service (LOS) grades, by comparing combined freight and passenger train volume to the practical capacities of each segment. The general approach for the capacity analysis is by identifying the rail network's physical attributes, estimating the base and future rail traffic over the network, determining the capacity by route, and calculating base year and future LOS by route. The LOS grades and descriptions correspond generally to the LOS grades used in the Federal Highway Administration's Highway

Performance Monitoring System (HPMS)¹. The V/C ratios and the corresponding LOS grades are listed in Exhibit 5-1.

Exhibit 5-1: Volume-to-capacity ratios and level of service grades

LOS Grade		Description		Volume/Capacity Ratio
	A	Below Capacity	Low to moderate train flows with capacity to accommodate maintenance and recover from incidents	0.0 to 0.2
	B			0.2 to 0.4
	C			0.4 to 0.7
	D	Near Capacity	Heavy train flow with moderate capacity to accommodate maintenance and recover from incidents	0.7 to 0.8
	E	At Capacity	Very heavy train flow with limited capacity to accommodate maintenance and recover from incidents	0.8 to 1.0
	F	Above Capacity	Unstable flows; service breakdown conditions	> 1.00

The results of capacity analysis are summarized in Exhibit 5-2 and visually represented in Exhibits 5-3, 5-4, 5-5 and 5-6 for existing conditions (2016) and the different future scenarios (2040). These exhibits provide an indication of current and future demands for capacity and resulting congestion, absent any operational change and investments to increase capacity. The capacity analysis results identified multiple segments where capacity would be insufficient to handle projected traffic without changes. In 2016, a substantial portion of the Class I rail network in Washington was operating below capacity, primarily LOS C. However, there also were particularly congested segments, including Lakeside-Spokane and Vancouver-Pasco, both at LOS E.

Under the low growth scenario, none of the major corridors except Portland, OR – Vancouver are projected to experience higher train volumes and a decreased LOS by 2040. Some corridors would experience reduced volumes and a higher LOS. Although the low growth scenario would result in fewer trains on the statewide rail system, there would be a corresponding decrease in economic growth associated with this scenario.

Under the moderate scenario, 79% of network mileage and 89% of train miles would operate at capacity (LOS E) or above capacity (LOS F) in 2040. The following major corridors are expected to deteriorate to LOS F:

- Vancouver – Pasco
- Everett – Spokane
- Lakeside – Spokane
- Spokane – Sandpoint, Idaho (BNSF)

Notably, these include both of BNSF’s primary northern transcontinental routes across Washington – the northernmost Everett-Spokane route, and the low-grade Columbia River route. The BNSF Auburn-Pasco corridor parallel to these routes continues to operate below capacity even as rail volumes increase. This is due to Stampede Pass tunnel clearance restrictions that limit the types of rail cars that can pass through it, requiring trains with those cars to use one of the other two routes.

Under the high growth scenario, conditions will worsen with 82% of the network and 96% of the train miles operating at (LOS E) or above capacity (LOS F). The following corridors are expected to deteriorate to LOS F by

2040 without any improvements in capacity and/or operational changes:

- Everett – Vancouver, British Columbia
- Hinkle, OR – Lakeside
- Pasco – Lakeside
- Vancouver – Pasco
- Tacoma – Vancouver
- Seattle – Everett
- Everett – Spokane
- Lakeside – Spokane
- Spokane – Sandpoint, Idaho (BNSF)
- Spokane – Sandpoint, Idaho (UP)

If the high growth scenario is realized, changes to Washington’s entire primary rail network would be required or it would cease to function reliably. All of Washington’s passenger service would be affected, with the higher freight volumes causing even greater effects on service reliability than would be the case with the 2040 moderate scenario.

Exhibit 5-2: Level of service estimation for base and forecast year scenarios

Name of Corridor	2019 State Rail Plan Update LOS			
	2016 Base year	2040 Low growth	2040 Moderate growth	2040 High growth
Auburn-Pasco	B	A	B	B
Everett-Vancouver, B.C., Canada	C	C	E	F
Hinkle, OR-Lakeside	C	B	E	F
Pasco-Lakeside	C	C	E	F
Vancouver-Pasco	E	D	F	F
Seattle-Tacoma (BNSF)	C	C	D	E
Seattle-Tacoma (UP)	A	A	B	B
Tacoma-Vancouver (BNSF/UP Shared Use Segment)	C	C	E	F
Seattle-Everett	C	C	E	F
Everett-Spokane	C	C	F	F
Lakeside-Spokane (BNSF/UP Shared Use Segment)	E	D	F	F
Spokane-Sandpoint, ID (BNSF)	C	C	F	F
Spokane-Sandpoint, ID (UP)	C	B	E	F
Portland, OR-Vancouver (BNSF/UP Shared Use Segment)	B	C	C	E
Fallbridge-Chemult, OR	A	A	A	A

Exhibit 5-3: Mainline level of service analysis for base year 2016

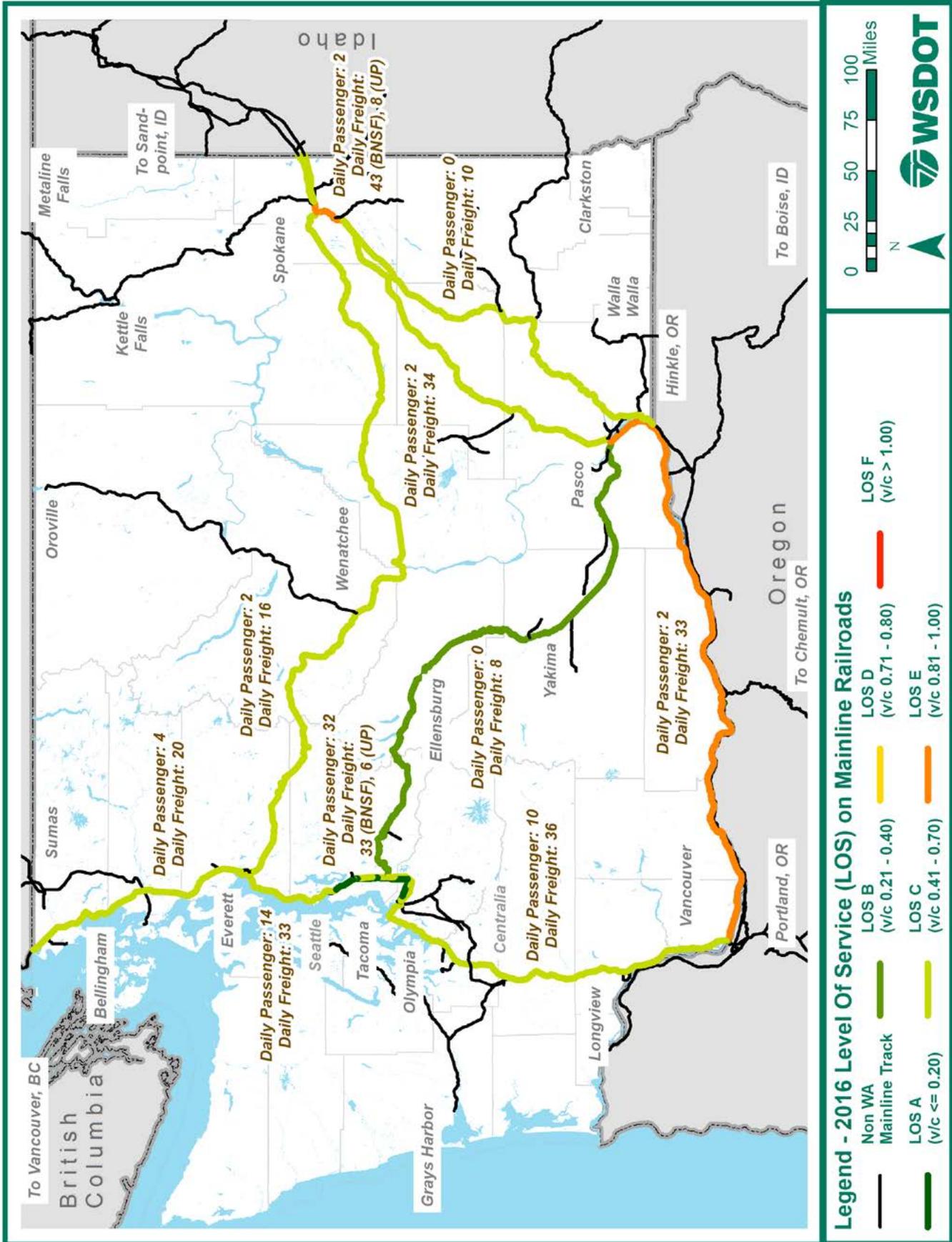
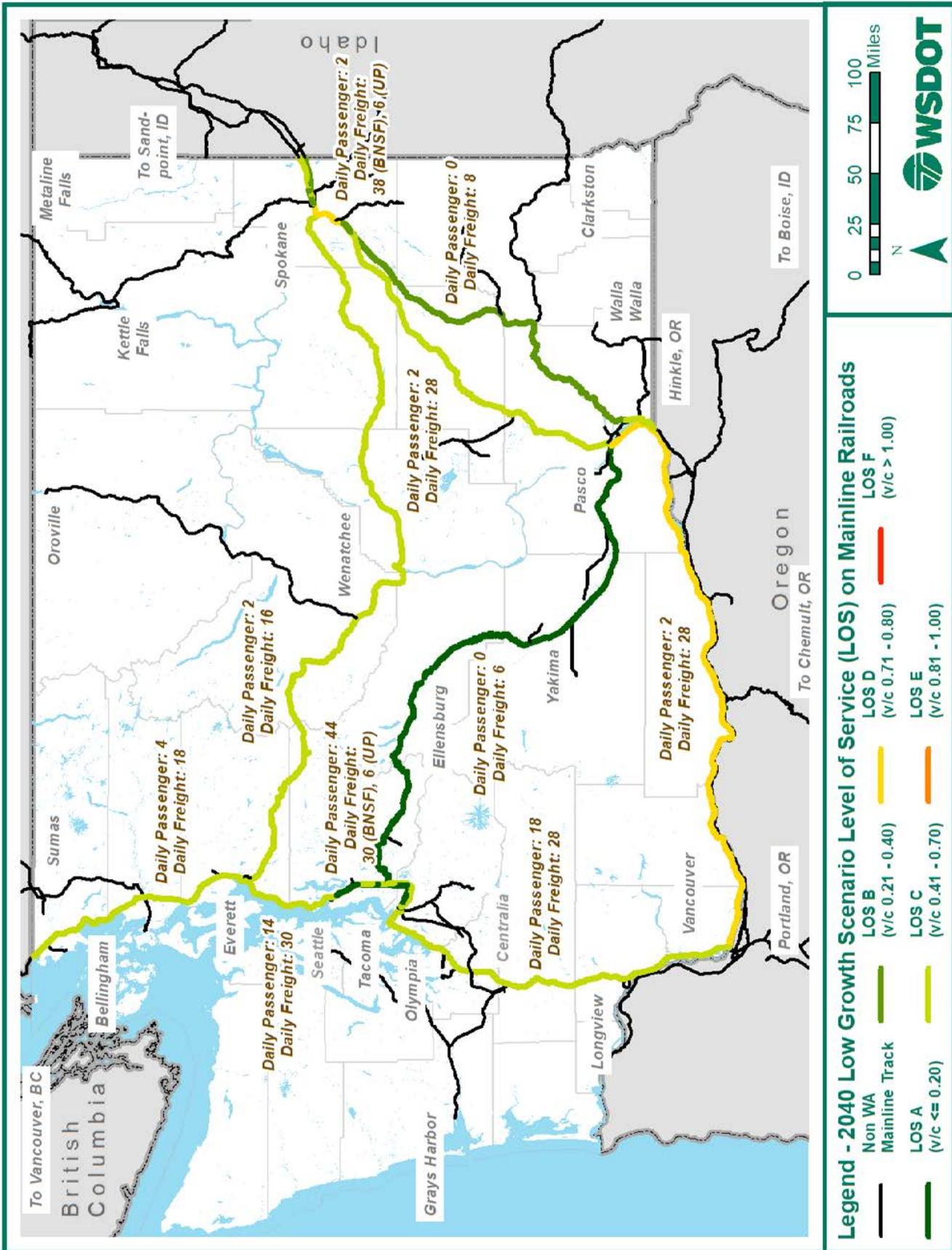
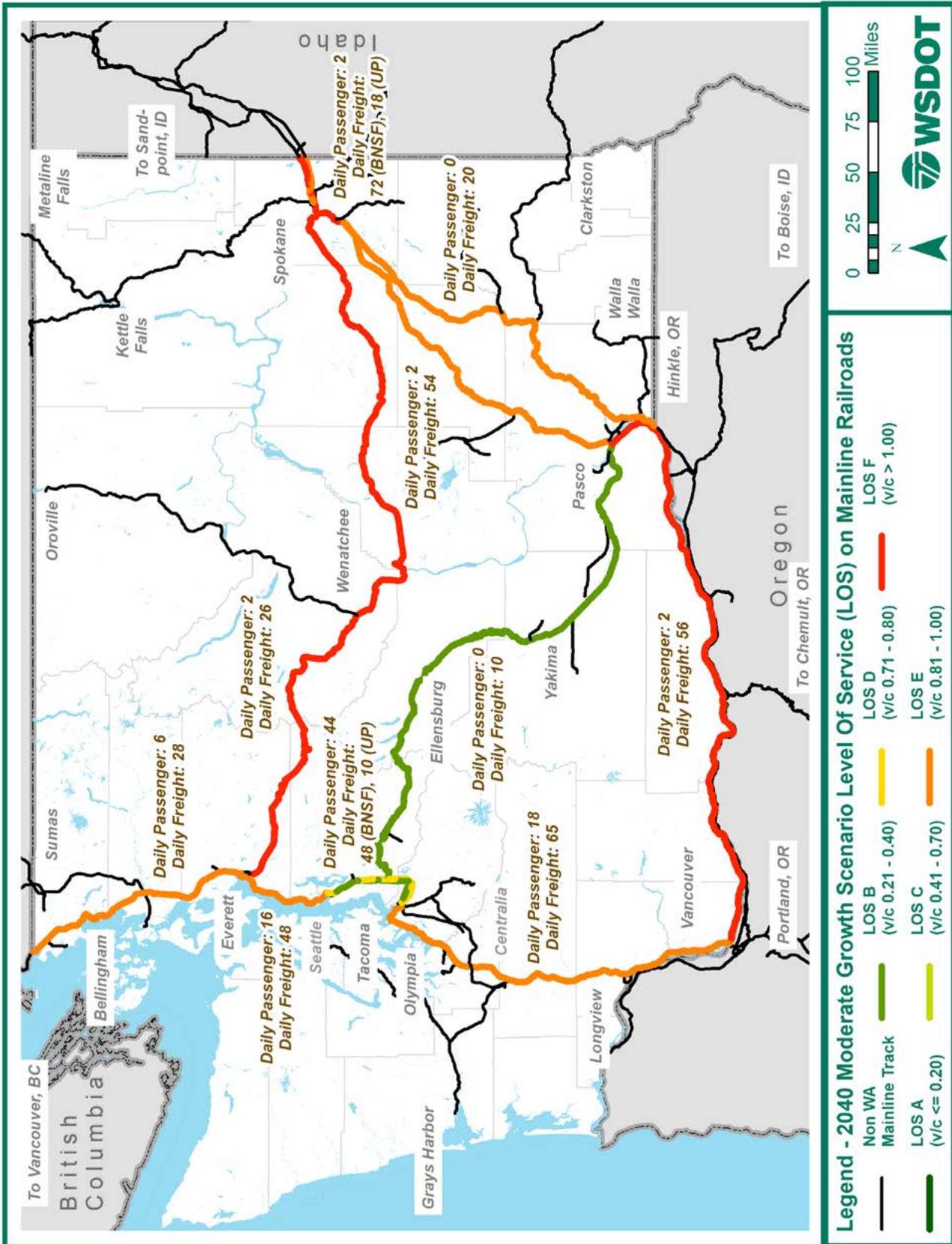


Exhibit 5-4: Mainline level of service analysis for 2040 Low Growth Scenario



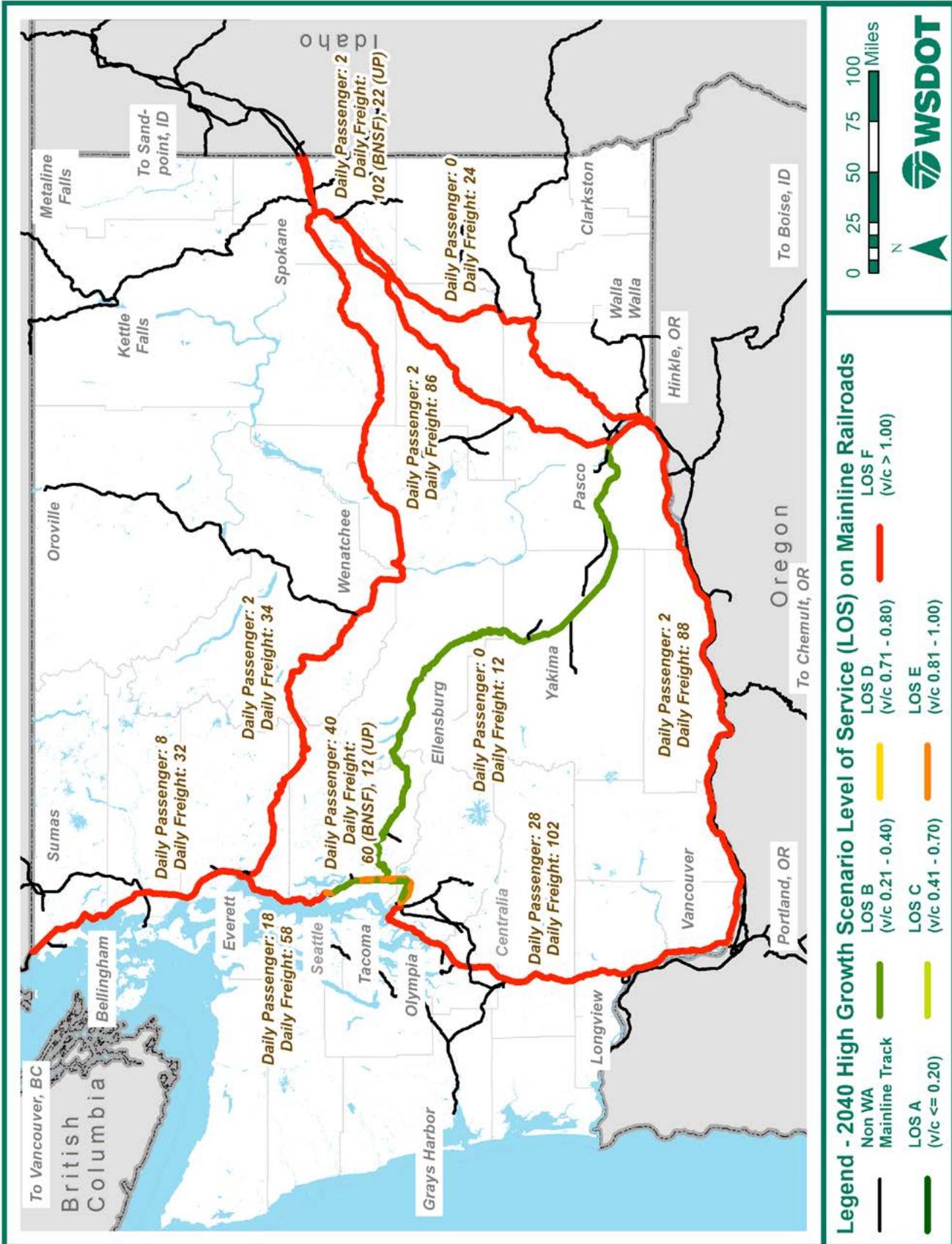
Note: Analysis assumes future growth with no additional capacity or operational improvements made.

Exhibit 5-5: Mainline level of service analysis for 2040 Moderate Growth Scenario



Note: Analysis assumes future growth with no additional capacity or operational improvements made.

Exhibit 5-6: Mainline level of service analysis for 2040 High Growth Scenario



Note: Analysis assumes future growth with no additional capacity or operational improvements made.

5.2 Multimodal connectivity for freight rail

Connections from rail to other modes of transportation are important for freight rail. Reliable and efficient access to the rail system throughout the state increases attractiveness of Washington ports and helps make Washington's goods more competitive in the global market. There are several types of rail transfer facilities, each suited for a different purpose.

An example of an intermodal freight movement is a container that is imported on a ship and then transferred to a truck and then transferred to a railcar. Intermodal container terminals provide for connectivity to other modes such as trucking and shipping. These terminals typically move 40-foot containers but also move containers of various sizes, including 53-foot containers that serve North America exclusively. Ships carrying international and domestic containers can be loaded directly onto railcars at on-dock intermodal facilities within NWSA terminals at Port of Seattle and Port of Tacoma, or containers can be drayed by trucks and then loaded onto railcars at near-dock or off-dock facilities. BNSF has three commercial intermodal yards: Seattle, South Seattle, and Spokane. Union Pacific has two commercial intermodal container yards: Argo in Seattle and TacSim in Fife.

Bulk transfer facilities are used for transloading bulk goods between rail and other modes, typically highway and water, and facilitate transferring the commodity from one mode specific vehicle to another. Grain elevators are an example.

Specialized yards are used for automobile loading/unloading facilities and other commodities that require special handling. Automobile facilities are located in Spokane, Tacoma, Kent, and Tukwila.

Transload terminals transfer carload freight between rail cars and trucks. Some facilities offer storage services for customers. BNSF and Union Pacific partner with the operators of these facilities to offer affiliated networks of transload terminals. Common commodities that move through these facilities include lumber and bulk goods (dry or liquid), such as plastic pellets and vegetable oil.

State role and interest

Terminals and yards facilitate the movement of freight by providing essential functions in support of other carriers. As one example, intermodal terminals are key links in supply chains that use Washington's ports. They serve as the primary means of providing access to the U.S. interior. Intermodal terminals are especially important for Washington as they support the Puget Sound region's growing intermodal container trade. In Washington, rail intermodal traffic accounted for 18 million tons, or 15% of total freight commodity flow in 2016. Terminals are also important for the movement of Washington agricultural products and other freight, allowing shippers not located on a rail line to access the rail system.

Maintaining the supply of suitable industrial lands around rail terminals is important to encourage future industrial and rail growth.



Electrically-powered intermodal cranes at Seattle (BNSF photo)

Issues and needs

Land use

Maintaining the supply of suitable industrial lands around rail terminals is important to encourage future industrial and rail growth. Industrial access to freight railways is critical for many industries to remain competitive. These industries often supply family-wage jobs to areas where economic growth can be scarce.

Railroads and cities have grown symbiotically in the western United States since the industrial revolution with rail-centric industry and passenger rail being a principal driver in westward expansion. This trend resulted in population centers surrounding rail facilities. As urbanization brings more people into cities, gentrification and housing shortages increase pressure to redevelop rail-dependent industrial areas. When this happens, industrial land values can increase to a point where the land may be more valuable for residential developments than manufacturing or distribution facilities. Additionally, many obsolete rail-served industrial facilities are not economically feasible to be redeveloped for modern industry. Local governments face a dilemma of whether or not to hold onto industrial areas for future use or rezone them to increase tax revenues. However, if these industrial areas are rezoned for residential uses, new conflicts may develop between new residents and the adjacent railroad.

Land use is also an important consideration for the location of rail customers who use trucks to access the rail system. With the increasing volume of shipments entering the rail system using trucks instead of being directly loaded on rail cars, the number of trucks traveling to rail intermodal and transload terminals on regional highways has increased, adding to congestion.

Washington ports

Railroads have an important role as Washington ports adapt to a changing maritime industry. These changes include changing trade economics (primarily due to tariffs), competition from other ports, the trend towards larger ships, and the growing practice of transloading containers.

A prosperous Washington economy depends heavily on goods imported by container through marine and land-side transportation infrastructure and the ability to economically export products. In addition to supporting jobs in trade and logistics sectors, container imports benefit manufacturers and agricultural producers that export through the ports by spreading total port capital and operations costs across a wider area. Two-thirds of the U.S. population lives east of the Mississippi River, and up to 70% of containers imported through the Ports of Seattle and Tacoma in the past decade were destined for the Midwest and eastern seaboard.

Larger vessels using the Panama Canal and a shift in manufacturing from China to other nations has changed the economics for some shippers moving freight to the central and eastern parts of the United States, with total annual tonnage increasing 22% between 2016 and 2017. This increase reflects bulk and containerized freight that once passed through ports on the West Coast and traveled across the country by rail. Much of that freight now is passing through ports closer to where it is destined.

Expansion of ports in British Columbia has increased the number of containers moving by rail through Canada to locations in the eastern half of the United States. In 1995, Seattle and Tacoma combined had five times the market share of the Ports of Prince Rupert, British Columbia and Metro Vancouver, British Columbia combined. Now they are nearly equal.² The Port of Prince Rupert, developed as part of the Canadian government's national

² Washington State Freight Trends & Policy Recommendations. http://www.fmsib.wa.gov/fac/20140602-FINALComplete%20Folio_for%20printer5-7-14.pdf

trade strategy, has been particularly effective in competing with ports in Washington for containerized freight. Its container volume growth rate is outpacing ports in Washington due to a variety of advantages, including transit time and cost. Because of the remoteness of the port from major population centers, rail moves 99% of cargo processed via Prince Rupert. The port advertises rail transit times to Chicago nearly a day faster than the transit time from Seattle, and has closer proximity to key Asian markets. It also costs much less to ship a container from Asia to Chicago through Prince Rupert versus other west coast ports, partly attributable to the differences in tax structures. The Harbor Maintenance Fee (HMF) adds to the cost of each container imported through a U.S. port. In contrast, U.S. imports moving through Canadian ports do not pay the tax. The Port of Prince Rupert recently completed a 500,000 TEU expansion in 2017 to further expand its capacity. Canadian ports also compete for movement of bulk freight.

Changes in containerized freight movement are straining the inland transportation system supporting Northwest Seaport Alliance terminals in Seattle and Tacoma. Container ships are getting larger every year due to economies of scale. This allows shipping companies to cut costs by consolidating cargo into larger loads and call at fewer ports. In the 1970s, the average size was 1,100 twenty-foot equivalent units (TEU), a unit of capacity based on the volume of a 20-foot-long intermodal container. Between 2010 and 2015, the average vessel size increased from 5,500 to 6,500 TEU in the Trans-Pacific Fleet. Today, 10,000 TEU ships are becoming a common sight in Puget Sound. While this trend is beneficial to ocean carriers, the large spike in volume when a ship arrives places pressure on ports and inland transportation systems to handle higher volumes in more compressed periods.

An increasing portion of containers passing through Northwest Seaport Alliance terminals are going to local warehouses to be resorted and transloaded into larger domestic containers for rail shipment to inland destinations. This practice allows shippers to combine freight from multiple originating points bound for a single destination and they also can save money by using domestic containers that are longer than international containers. This trend creates additional truck trips between the port, the warehouses, and the domestic intermodal terminals operated by the railroads in Seattle and Tacoma. To compete with other ports and support the state economy, Washington ports need an efficient reliable inland transportation system, with roadway networks that provide access to the rail network.

First/last mile connectors

Intermodal transportation uses multiple modes and combines each mode's strength to produce the most efficient freight movement. Freight railroads are an important part of the intermodal network, providing cost effective service for shippers moving goods over long distances. Freight rail and trucking complement each other for intermodal shipment, and freight rail's role as a long distance partner has enabled trucks to leverage their speed and agility for short hauls.³ By tonnage, multimodal shipments including rail intermodal account for 6% of total freight moved in Washington state; by value, multimodal shipments account for 20% of total freight moved in Washington, carrying more high value goods such as electronics, pharmaceuticals, and manufacturing products.⁴

In the context of freight rail, first/last mile connectors are the roads that connect rail facilities with farms, warehousing or manufacturing facilities, ports, freight corridors, and the rest of the transportation system. Rail cargo including containerized freight travels by truck to and from the rail facilities and intermodal terminals using first/last mile connectors. Current supply chain and economic trends are creating even more pressure on these routes. Many rail-served facilities, including mills and grain elevators, are consolidating. Ports use the rail system for much of their freight. While some shippers can move freight directly into or out of rail cars, freight is often loaded onto trucks to get to or from the rail system. As the use and volume of freight rail increases, these connectors are

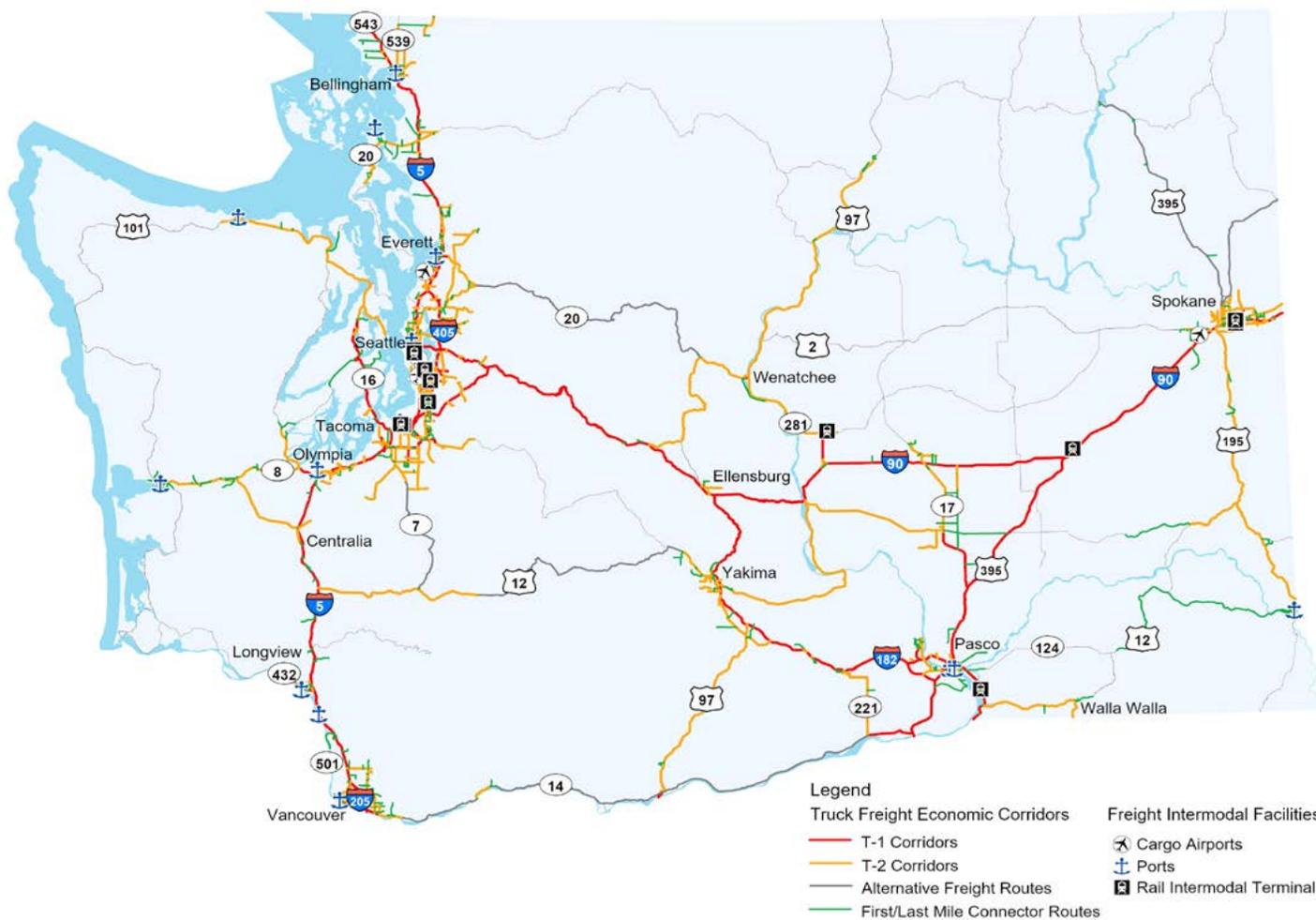
³ <https://www.aar.org/article/trains-trucks-intermodal-partnership/>

⁴ Federal Highway Administration, Freight Analysis Framework, version 4.5.1, state summary 2018: <https://faf.ornl.gov/fafweb/FUT.aspx>

at risk of becoming overwhelmed. Increased truck traffic could cause congestion and wear out pavement faster. A 2017 FHWA Freight Intermodal Connector Study found that only nine percent of National Highway System Freight Intermodal Connectors nationwide have a good or very good pavement condition.⁵

WSDOT collaborates with local and regional partners to identify first-mile and last-mile connections on the freight system. WSDOT established the Truck Freight Economic Corridors under the 2014 State Freight Mobility Plan, which include local connections to freight-intensive land uses and freight intermodal facilities critical to supply chains in the state. WSDOT revisited and updated the 2014 first/last mile designation in 2019 by seeking input from regional and local partners and filing missing gaps based on most current data. Exhibit 5-7 shows the current designation of first/last mile connectors as part of the 2019 network update.⁶

Exhibit 5-7: Truck Freight Economic Corridors in Washington state



⁵ FHWA Freight Intermodal Connectors Study, April 2017: <https://ops.fhwa.dot.gov/publications/fhwahop16057/fhwahop16057.pdf>

⁶ Washington State Freight and Goods Transportation System 2019 Update: <https://www.wsdot.wa.gov/freight/fgts>

5.3 Multimodal connectivity for passenger rail

Rail passenger trips start and end somewhere other than the train station. Riding a passenger train is typically just one part of a journey, with passengers using some other mode of travel to get to or from the train station. Seamless connections with other modes is important to integrate passenger rail into the statewide transportation system and making it a viable, attractive option for travelers.

Access to passenger rail train stations by car, bike, transit or walking is often referred to as multimodal connectivity. Passenger rail becomes more attractive and easier to use as access to and from train stations becomes more multimodal, frequent, and efficient. A primary component of connectivity that must be considered when assessing station accessibility is “first and last mile” connectivity: the idea that a passenger is able to conveniently and efficiently access the rail station and system to begin their journey and/or conveniently and efficiently reach their final destination through transit connections, walking, biking or a personal vehicle.

State role and interest

Easy connections for passengers to get to and from the stations by multiple transportation modes would make train travel more attractive and support higher ridership. With higher ridership, passenger rail service providers can cover more of their operating costs with fares. High-quality multimodal connections at passenger rail stations can also facilitate higher volumes of passengers. The need for high quality connections between modes will increase as WSDOT adds Amtrak Cascades trips and Sound Transit increases Sounder commuter rail capacity to meet demand.

Because many of the rail stations serve multiple services, there are opportunities for Amtrak, WSDOT and Sound Transit to partner on things like shared parking, improved transit connections, or a seamless fare payment system.

Existing conditions

Nearly all passenger rail stations in Washington have dedicated parking spaces, local transit service, paratransit service, and sidewalks. Many also have connections to intercity bus routes. Dedicated bicycle lanes or trails connecting to stations are less common. Only Leavenworth has a shuttle service available to the general public. WSDOT evaluated multimodal connectivity at Amtrak Cascades stations from Portland, Oregon to Vancouver, British Columbia, which can be found in Appendix C.

Amtrak Cascades and Sounder commuter rail jointly serve four stations – Everett, Edmonds, Seattle, and Tukwila. Once Amtrak Cascades trains return to the Point Defiance Bypass, they will jointly serve the Tacoma Dome station as well. Travelers can transfer between Sounder commuter rail and Amtrak long distance trains at the same stations, except for Tukwila. The Empire Builder stops at Everett, Edmonds, and Seattle. The Coast Starlight stops at Seattle and will eventually move to Tacoma Dome station when the Amtrak Cascades trains begin serving that station again. Amtrak Cascades and the Coast Starlight also share stations in Washington at Olympia-Lacey, Centralia, Kelso-Longview, and Vancouver.

Detailed information about modal connections and supporting infrastructure at passenger rail stations in Washington is provided in Exhibit 5-8.

Exhibit 5-8: Modal connections and supporting infrastructure at Washington state passenger rail stations

Location	Owner	Service	Local Bus	Paratransit	Intercity Bus	Regional Express Bus	Local Public Shuttle	Parking	EY Changing	Ferry	Light Rail	Commuter Rail	Intercity Rail	Long Distance Rail	Stairwalks	Bike Lanes or Sharrows	Bike Racks	Bike Lockers or Boxes
Auburn	Sound Transit	Sounder	•	•		•		•			•			•	•			•
Bellingham	Port of Bellingham	Cascades	•	•	•			•				•		•		•		
Eingen/White Salmon	BNSF Railway	Empire Builder	•	•				•					•					
Centralia	City of Centralia	Cascades, Coast Starlight	•	•				•				•	•	•			•	•
Edmonds	BNSF and Sound Transit	Cascades, Empire Builder, Sounder	•	•	•			•	•		•	•	•	•				•
Ephrata	City of Ephrata	Empire Builder	•	•	•			•					•	•	•			
Everett	City of Everett	Cascades, Empire Builder, Sounder	•	•	•			•			•	•	•	•			•	•
Kelso/Longview	City of Kelso	Cascades, Coast Starlight	•	•	•			•				•	•	•				
Kent	Sound Transit	Sounder	•	•		•		•			•			•			•	•
Lakewood	Sound Transit	Sounder	•	•		•		•			•			•			•	•
Leavenworth	City of Leavenworth	Empire Builder		•		•	•						•					
Mount Vernon	Skagit Transit	Cascades	•	•	•			•				•		•			•	
Mukilteo	Sound Transit	Sounder	•	•				•	•		•						•	•
Olympia/Lacey	Interity Transit	Cascades, Coast Starlight	•	•				•				•	•				•	
Pasco	City of Pasco	Empire Builder	•	•	•			•					•	•				•
Puyallup	Sound Transit	Sounder	•	•		•		•			•			•			•	•
Seattle	City of Seattle	Cascades, Coast Starlight, Empire Builder, Sounder	•	•	•	•			•		•	•	•	•	•	•	•	•
South Tacoma	Sound Transit	Sounder	•	•				•			•			•	•	•	•	•
Spokane	City of Spokane	Empire Builder	•	•	•			•					•	•	•			•
Stanwood	WSDOT	Cascades	•	•				•				•		•				
Sumner	Sound Transit	Sounder		•		•		•			•			•			•	•
Tacoma (Tacoma Dome)	WSDOT and Sound Transit	Cascades, Coast Starlight, Sounder	•	•	•	•		•	•		•	•	•	•	•			•
Tukwila	Sound Transit	Cascades, Sounder	•	•				•	•		•	•		•	•	•	•	•
Vancouver	City of Vancouver	Cascades, Coast Starlight, Empire Builder		•				•				•	•					
Wenatchee	BNSF	Empire Builder	•	•	•			•					•	•				
Wishram	BNSF	Empire Builder	•	•				•					•					

Issues and needs

Station access

All passenger rail stations have opportunities for improving connectivity with other modes.

The largest cities on the Amtrak Cascades route (Seattle, Portland, Oregon, and Vancouver, British Columbia) have the best multimodal connectivity, reflecting surrounding land uses that are conducive to multiple modes as well as the transportation infrastructure and services available around the stations.

Olympia-Lacey and Vancouver (WA) have the greatest connectivity challenges among Amtrak Cascades stations, largely due to their locations. Olympia-Lacey is located at the east edge of Lacey, where suburban land uses transition to rural. While bus transit service is available at the station, the circuitous route it takes to downtown Olympia results in an hour-long trip. The station is isolated from the pedestrian and bicycle infrastructure in Olympia and Lacey, on a highway with no shoulder or separation. Vancouver is located in an industrial area, in the middle of one of the busiest rail junctions in Washington. While the Vancouver station is not very far from downtown, viable pedestrian and bicycle routes to the station are minimal. Frequent, unpredictable rail traffic makes the station difficult to serve with scheduled bus transit service and no routes currently stop in the immediate station area.

WSDOT's Travel Washington Intercity Bus Program⁷ provides bus service to rural residents so they can connect to major transportation hubs and urban centers. The intercity bus program fills gaps in the public transportation network and makes travel more accessible, reliable and convenient. Travel Washington is the first public/private partnership model in the country where transportation companies provide in-kind (non-monetary) contributions to an intercity bus program, such as aligning schedules for passengers from rural areas to seamlessly connect to nationwide bus and train networks, airports, state ferries and other transportation hubs. All of the Travel Washington bus routes connect to Amtrak stations served by the Empire Builder. Only the Dungeness Line makes a direct connection to the Coast Starlight and Amtrak Cascades service as well, at King Street Station in Seattle.

Schedule coordination

The passenger rail services coordinate their schedules to make passenger operations as smooth as possible. This includes train schedules of Amtrak long distance trains, Amtrak Cascades intercity trains, and Sounder commuter trains, as well as intercity thruway bus routes to improve connections outside stations. Thruway bus routes can build ridership on passenger rail corridors by connecting them to communities away from the corridor. They can also be used to connect stations along a passenger rail corridor, adding service in advance of increasing rail trips.

Coordination with local and regional transit service is also important, to make the whole door-to-door trip efficient for rail passengers. Sound Transit has been working with local transit agencies to coordinate local bus service with Sounder train schedules. Comprehensive coordination of local bus service and Amtrak Cascades schedules can be a challenge in some communities because there are train arrivals outside the service hours of local buses.

Planning coordination

With multiple planning processes underway to expand passenger rail service, coordination will be needed to ensure these expansions are well-integrated with each other and with other parts of the transportation system, including commercial airports and light rail transit systems. WSDOT and Sound Transit already coordinate closely where Amtrak Cascades and Sounder service overlap, as well as with planning for Link light rail extensions that propose stations serving passenger rail stations. Similar coordination will be needed for any Ultra-High Speed Ground Transportation system.

⁷ <https://www.wsdot.wa.gov/transit/intercity>

Shared passes

The RailPlus program allows Sound Transit passengers to use Amtrak Cascades trains at Seattle’s King Street Station, Edmonds and Everett by purchasing an Amtrak RailPlus ticket. Tickets can be purchased with an ORCA card, ORCA Passport card, or at the regular Amtrak ticket rate. Likewise, Amtrak Cascades ticket-holders can ride designated Sounder trains between Seattle and Everett at no additional charge. This opportunity strengthens both services.

5.4 The rail system in communities

The rail system, like the rest of the transportation system, does not exist in isolation. It is intertwined with our communities and our environment.

Safety is critically important for communities. Though rail is considered a safe, efficient mode of transportation, continued work is needed to maintain and improve rail safety. Therefore, WSDOT and its partners remain focused on providing and operating safe rail infrastructure.

The environment can be affected by the rail system. Air quality and fish passage are two examples. The environment can also affect the rail system. Natural events like landslides, floods, and fires affect the resiliency of the rail system.

Existing conditions

Rail safety is an important consideration for state and federal agencies, and it is regulated through several different public agencies including the FRA and the UTC.

Exhibit 5-9 shows the rail incidents in the past ten years in Washington reported by FRA’s Office of Safety Analysis⁸. The total rail incidents have dropped from 254 in 2009 to 213 in 2018, a 16% decrease over the last ten years. Highway-rail collisions at crossings accounted for 17% of total rail incidents in 2018, while train incidents accounted for 16%, and other incidents accounted for 66%. The total rail incidents in Washington comprised 2% of the total number of incidents nationally in 2018.

The rail system can affect the environment, including air quality and fish passage. The environment also can affect the rail system, such as landslides, floods, and fires.



⁸ FRA Office of Safety Analysis: safetydata.fra.dot.gov/OfficeofSafety/Default.aspx, data retrieved in July 2019.

Exhibit 5-9: Washington rail incidents, 2009 – 2018

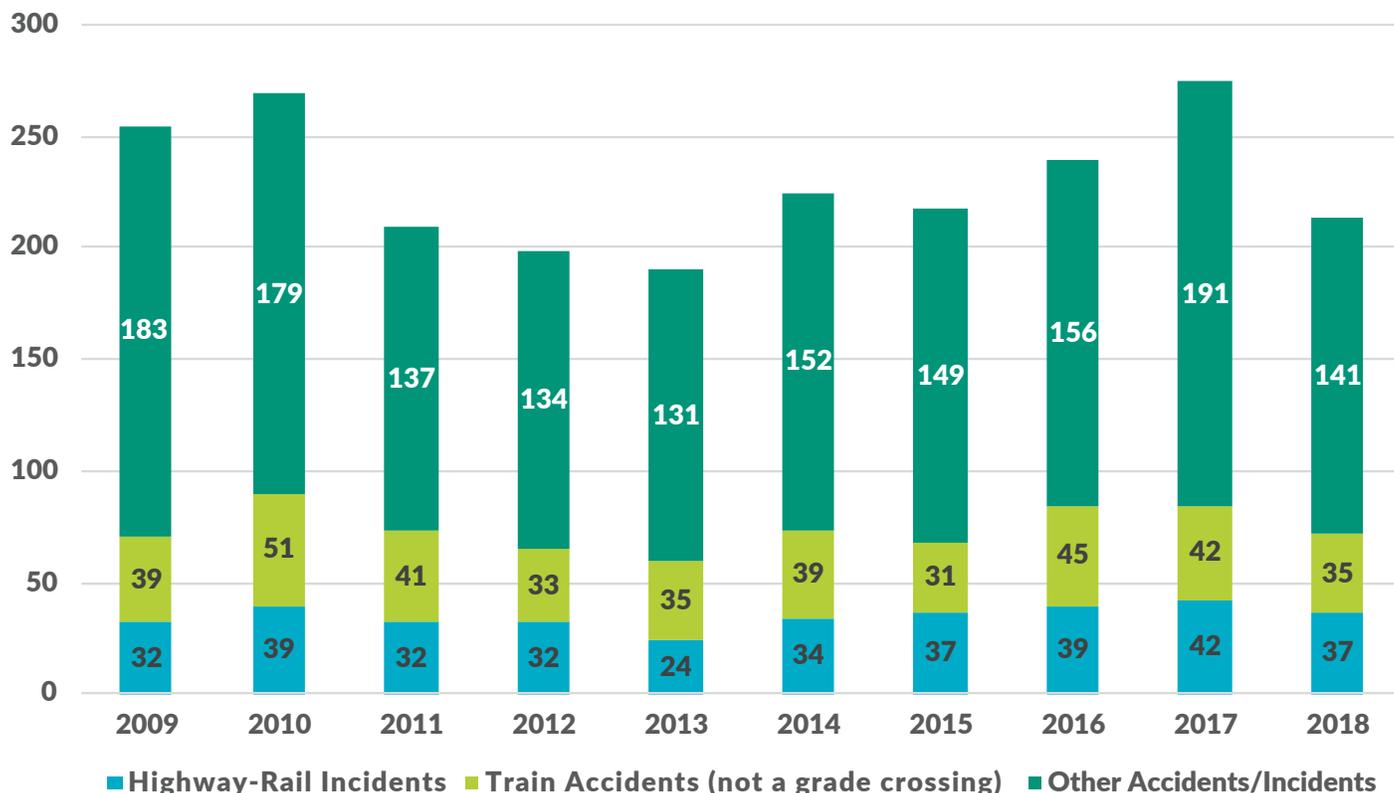


Exhibit 5-10 shows the rail crossing collision and trespassing data collected and reported by UTC⁹ from 2010 through 2018. The number of crossing collisions¹⁰ and crossing fatalities declined for several years, but increased in 2016 and 2017. The safety performance improved significantly in 2018 with a drop in crossing collisions and crossing fatalities. In 2018, there were 34 collisions at crossings, resulting in 12 injuries and 6 fatalities. Fatalities related to accidental or purposeful trespassing incidents vary from year-to-year on active rail lines, ranging between 7 and 23 trespassing fatalities during this period.

Exhibit 5-10: Washington rail crossing/trespassing incidents, 2010 – 2018

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018
Crossing Collisions	36	29	33	20	35	37	40	40	34
Crossing Injuries	10	4	18	10	10	7	13	5	12
Crossing Fatalities	4	8	2	4	5	4	7	10	6
Trespassing Fatalities	15	22	10	17	9	23	7	21	18

Note: crossing fatalities are the number of fatalities resulted from crossing collisions. The trespassing fatalities are number of fatalities not at highway/rail crossings.

⁹ Rail Crash Statistics, Washington Utilities and Transportation Commission: <https://www.utc.wa.gov/publicSafety/railSafety/Pages/default.aspx>, data retrieved in August 2019.

¹⁰ A variance is noted between UTC and FRA crossing and trespassing statistics.

State role and interest

Given the potentially severe outcomes of rail incidents, rail safety is a serious consideration for state and federal agencies. Rail safety and security is regulated through several different federal and state agencies, including the FRA, the Washington Utilities and Transportation Commission, and the Department of Homeland Security. WSDOT serves primarily as a public educator. In 2016-2017, WSDOT developed its own multi-faceted rail safety education campaign, Stay Back From The Tracks, which was recognized with a national award from the American Association of State Highway and Transportation Officials (AASHTO).

Issues and needs

At-grade rail crossing safety and trespassing

Highway-rail grade crossing collisions and pedestrians trespassing on tracks together account for over 94% of all railroad-related fatalities and injuries.¹¹

At-grade rail crossing safety

Railroad crossing incidents are the second leading cause of rail-related deaths in America. Data collected by FRA identified driver behavior as the main cause of highway-rail grade crossing collisions. Between 1994 and 2003, 94% of grade crossing collisions were attributed to risky driver behavior or poor judgement. Those collisions resulted in 87% of grade crossing fatalities during that period.¹² Approximately half of all collisions at grade crossings occur where active warning devices are present.¹³ Nearly one-quarter of all crossing collisions involve a motor vehicle striking the side of a train already occupying the crossing.

Collisions at at-grade highway-rail crossings in Washington declined to 20 in 2013, but have increased in subsequent years, varying from 34 to 40 per year since then.¹⁴ Because of the large number of significant variables to be considered, no single standard system of traffic control devices is universally applicable for all railroad crossings. Not all crossings have or require the same level of protection. Only 20% of all public crossings in Washington have gate arms which can physically deter vehicles from crossings in front of trains. Decisions about the appropriate traffic control system to be used at a crossing are determined through an engineering study involving the road authority and the railroad, in coordination with the UTC. At a minimum, crossings must have crossbuck signs, emergency notification system signs and advance warning signs. A stop or yield sign is required at all crossings without flashing lights and/or gates.

Highway-rail grade crossing collisions and pedestrians trespassing on tracks together account for over 94% of all railroad-related fatalities and injuries.

¹¹ FRA <https://railroads.dot.gov/highway-rail-crossing-and-trespasser-programs/railroad-crossing-safety-trespass>

¹² USDOT Report on the Audit of the Highway-Rail Grade Crossing Safety Program, <https://www.oig.dot.gov/library-item/30001>

¹³ FRA Highway-Rail Grade Crossing Safety Fact Sheet. <https://railroads.dot.gov/newsroom/fact-sheets/fra-highway-rail-grade-crossing-safety>

¹⁴ Washington Utilities and Transportation Commission, <https://www.utc.wa.gov/publicSafety/railSafety/Pages/WARailCrashStats.aspx>

Trespassing

Accidental or intentional trespassing occurs regularly on active rail lines. This practice is illegal and strongly discouraged. Trespassing is the leading cause of rail-related fatalities in the United States. Of the 161 trespassers involved in incidents between 2013 and 2017 in Washington, nearly 60% resulted in fatalities.

Trespassing incidents occur when a person who should not be on railroad property does not observe posted signage, does not understand the hazards of being around an active railroad, or intends self-harm. This includes travelling over or along railroad property. Railroad tracks are often trespassed because they offer the shortest route and easiest grade between two points. Railroad property is linear, at times without grade crossings to allow safe crossing. At some locations, the property passes over bridges or through tunnels where there are limited transportation options.

In recent years, some railroads have seen an increase in homeless encampments on or near railroad property. Railroads in both urban and rural areas have reported being challenged by this issue. These encampments are a safety issue for both the people living in them and the railroad workers who encounter them. While it is a problem for both Class I and short line railroads, short line railroads can face a higher burden in dealing with the issue since they tend to have fewer resources than the larger railroads.

Rail crossing conflicts in communities

As both rail and highway traffic increases and trains get longer, at-grade crossings can result in adverse effects to mobility in communities. These include:

- Long and unpredictable travel delays for both the general public and freight users
- Collisions between trains and vehicles, bicycles, or pedestrians
- Temporary increase of emergency response times

With the growth of the state's population and increasing highway and rail traffic, communities throughout the state are concerned about the reliable and safe movement of rail and truck freight, general traffic, and emergency vehicles. A key concern with long trains is the length of time that road crossings are occupied by trains. While a 10,000 foot train going 60 miles per hour takes two minutes to clear a crossing, at 10 miles per hour it takes 12 minutes, thus increasing the amount of time roadway traffic has to wait. Blocked railroad crossings are a national issue. Existing state rules are unenforceable due to court rulings, and states are strongly requesting that the FRA develop regulations to address blocked crossings. Until federal rules are developed, the UTC collects and forwards blocked crossing complaints to the FRA, and works with railroads when there is an imminent safety hazard resulting from a blocked crossing. Blocked crossings can be reported to the FRA through its "Blocked Crossing Incident Reporter" site.¹⁵ Through this site, the FRA collects information to learn where, when, and how long crossings are blocked, as well as what effects result from blocked crossings.

Addressing the problems caused by road-rail conflicts is challenging. High costs and the lack of available funding make it difficult to identify, develop, and complete plans and projects to address road-rail conflicts.

¹⁵ RA Blocked Crossing Incident Reporter website <https://www.fra.dot.gov/blockedcrossings/>

Energy products transportation

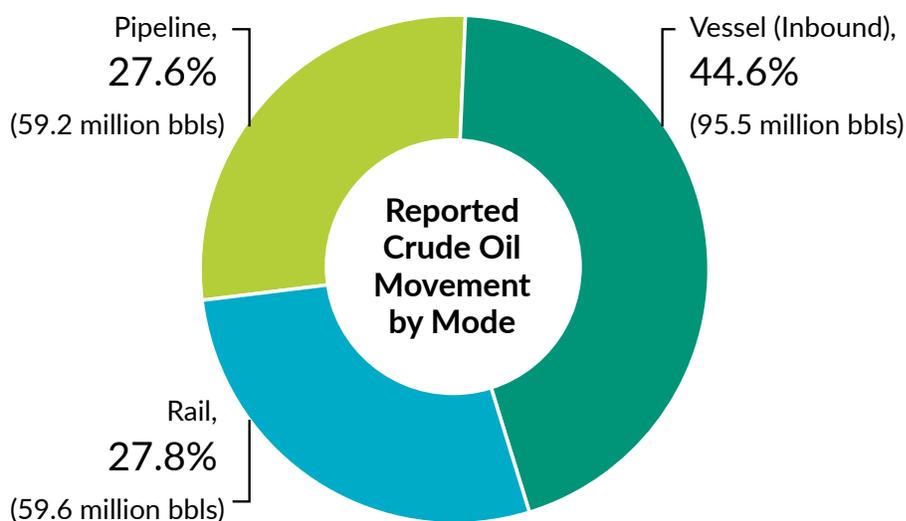
Communities have expressed concerns related to the transport of oil and coal by rail.

Oil

In recent years, Washington has seen a shift in crude oil transportation to refineries and ports. Virtually all oil received in Washington previously was received by ship or pipeline. The development of the Bakken oil fields in North Dakota, Montana, and Canada, has resulted in oil also now arriving by rail.

Rail shipment has provided a quicker, more flexible alternative to new pipeline projects. In 2014, nearly 9% of the oil shipped to Washington moved by rail. In 2018, nearly 28% moved by rail. Crude oil transportation by mode is shown in Exhibit 5-11.

Exhibit 5-11: Crude oil transportation volume in Washington state by mode, January 1 – December 31, 2018



Rail routes transporting crude oil enter the state from Idaho near Spokane and from British Columbia near Bellingham. Large segments of the rail routes travel along the I-5 corridor, and cross or run next to major waterways, including the Columbia River and Puget Sound.¹⁶

While regulatory agencies and first responders have been prepared for the potential risks associated with shipping oil by ship or pipeline, shipment of oil by rail presented new risks related to spills. Several explosive derailments involving trains carrying Bakken oil have raised concerns about the volatility of the oil and the potential effect of a derailment in Washington communities.

Coal

While multiple proposals for new export coal terminals in the Pacific Northwest heightened concern about the effects of coal transportation on communities, only one project is still active. The proposed Millennium Bulk Terminals project in Longview was denied required state permits and approvals and is now working through the court system.

¹⁶ Washington Department of Ecology, Crude Oil Movement by Rail and Pipeline Quarterly Report: October 1, 2018 through December 31, 2018 fortress.wa.gov/ecy/publications/documents/1908005.pdf

Liquefied Natural Gas

Methane, when refrigerated to a liquid form, is known as liquefied natural gas (LNG). When warmed, LNG returns to a gaseous state and is used the same way as natural gas supplied by a pipeline.

Marine vessels and trucks have been used to transport LNG in the United States for decades. Unlike other flammable cryogenic liquids, such as ethylene, transportation of LNG in railroad tank cars is not typically allowed. LNG may only be transported via rail with a special permit from the Pipeline and Hazardous Materials Safety Administration (PHMSA) or in a portable tank with approval from FRA. This could change in the near future. PHMSA, in coordination with FRA, published a proposed rule in October 2019 that would authorize the bulk transportation of LNG by rail. Shipment of LNG by rail may occur where demand exceeds available natural gas pipeline capacity or pipelines do not exist. LNG could also be shipped by rail to ports for export.

LNG does not pose the same spill concerns as crude oil. However, natural gas is combustible like other gaseous or vaporized fuels. An uncontrolled release of LNG poses a risk of fire or, in confined spaces, explosion. Due to its low temperature, LNG also could injure people or damage facilities through direct contact. The possibility of LNG shipment by rail has been controversial in some communities because of these safety risks.

Corridor preservation

While abandonment of rail lines slowed in recent years, some lines are at risk of eventual abandonment. Currently two separate abandonment proceedings are in progress for the Columbia and Cowlitz Railway/Patriot Woods Railroad – one for the Longview to Ostrander Junction (7 miles) and one for the line from Ostrander Junction to the end of the railroad northeast of Longview (21.5 miles).

Once abandoned, a rail line is very difficult to reconstruct. Rail infrastructure is typically removed from abandoned lines and would need to be rebuilt to reinstate rail service. Encroachments on the unused right-of-way can be an impediment to rebuilding a line for rail service. And if the right of way parcels end up in the ownership of multiple parties after abandonment through sale or reversion, recreating the linear corridor could be very challenging. Adjacent property owners sometimes prefer to see rail corridors revert to private ownership.

Some rail corridors without rail service have been purchased to preserve the right of way for other transportation purposes. For instance, portions of the Palouse to Cascades State Park Trail were purchased from the railroad by the state of Washington prior to abandonment. Other corridors are railbanked during the formal federal abandonment process. Railbanking is a program that preserves rail corridors not presently needed for rail service. Any qualified private organization or public agency that has agreed to maintain the corridor for future rail use is eligible to negotiate for railbanking. A railbanked corridor is technically not abandoned, which allows the railroad to sell, lease, or donate it to an organization for trail use. If a rail line is formally abandoned, the railroad may lose any rights to possess or transfer parcels of land within the corridor that it held as an easement with use limited to railroad purposes. While an abandoned rail corridor still can be preserved intact, it becomes a more complex and uncertain process because it may be owned by many different people.

While the railroad has the legal right to reestablish rail service on a corridor it railbanked, the interim trail use can become important to the communities it serves and a potential source of conflict if a need for rail service returns. In some communities around the country, multiuse trails have been established alongside rail lines. These “rails-with-trails” projects demonstrate that rail can coexist with other modes of transportation in certain circumstances.

Diesel emissions

Diesel exhaust is considered a hazardous air pollutant by the U.S. Environmental Protection Agency (EPA), and contains several air pollutants, including particulate matter less than 2.5 microns in diameter (PM_{2.5}), nitrogen oxides, volatile organic compounds, and carbon dioxide. PM_{2.5} from diesel emissions are associated with adverse health conditions like cardiovascular and respiratory disease. Diesel exhaust puts healthy people at risk for respiratory disease and worsens the symptoms of people with health problems such as asthma, heart disease, and lung disease.

In 2015, particulate matter emission was estimated to be 65% lower for freight trains than trucks.

Rail is a relatively fuel efficient and therefore cleaner, way to move freight. In 2015, particulate matter emission was estimated to be 0.008 grams per ton-revenue mile for rail, and 0.023 grams for trucks, indicating that rail emission rate for particulate matter is 65% lower than trucks.¹⁷ In 2014, Railroad locomotives accounted for 365 tons of the 8190 tons of PM_{2.5} contributed by mobile sources in Washington.¹⁸ This is down from 457 tons attributed to locomotives in 2011 out of 10,600 tons attributed to mobile sources in the state.¹⁹

In June 2008, EPA finalized a three-part program to dramatically reduce emissions from diesel locomotives of all types – line-haul, switch, and passenger rail. The rule cuts particulate matter (PM) emissions from these engines by as much as 90% and oxides of nitrogen (NO_x) emissions by as much as 80% when fully implemented. The standards are based on the application of high-efficiency catalytic after-treatment technology for newly manufactured engines built in 2015 and later. Remanufactured locomotives also must meet EPA standards. There also are requirements in place to reduce idling for new and remanufactured locomotives.²⁰

As railroads acquire new or remanufactured locomotives and retire older locomotives, overall emissions from rail locomotives will continue to decline. In 2017, WSDOT purchased eight new Siemens Charger locomotives to power Amtrak Cascades passenger trains. These diesel-electric locomotives meet EPA's strictest Tier 4 emission standards and reduce PM and NO_x emissions by more than 80% over the locomotives they replaced.

Diesel emissions also include greenhouse gases that contribute to climate change. Nationwide, rail accounts for 2% of the greenhouse gases produced by the transportation sector.²¹ Some of the technologies that reduce diesel emissions also reduce greenhouse gases.

Fish passage

Rail lines cross streams and rivers in many places around Washington, especially routes that follow shorelines. Some culverts that carry water under the tracks may allow water to flow, but impede fish migration by not providing conditions that fish can swim through. The water that flows through culverts may block fish migration because the flow is too swift, too shallow, or has a waterfall into or out of the culvert. Coordinated investments to remove barriers can deliver important benefits, improving fish access for miles both upstream and downstream. When rivers and streams are connected, fish can better access the habitat they need.

Fish passage barriers have not been fully inventoried on rail lines in Washington.

While much attention has been given to fish passage barriers on roads and highways in recent years, fish passage barriers have not been fully inventoried on rail lines in Washington.

¹⁷ AASHTO Freight Rail Bottom Line 2018 Report.

¹⁸ EPA, 2014 National Emissions Inventory (NEI) Data <https://www.epa.gov/air-emissions-inventories/2014-national-emissions-inventory-nei-data>

¹⁹ EPA, 2011 National Emissions Inventory (NEI) Data <https://www.epa.gov/air-emissions-inventories/2011-national-emissions-inventory-nei-data>

²⁰ EPA, Regulations for Emissions from Locomotives <https://www.epa.gov/regulations-emissions-vehicles-and-engines/regulations-emissions-locomotives>

²¹ Fast Facts: U.S. Transportation Sector GHG Emissions

In 2019, an EPA-funded inventory of all stream crossings within 200 feet of the marine shoreline was completed along the BNSF between Olympia and Canada. The inventory identified 196 stream crossings within this area, where BNSF has 52 route miles directly along the marine shoreline and another 73 miles within 200 feet in this area. The researchers collecting this data used it to identify high-priority sites for replacing culverts that will provide significant habitat benefits for Chinook and other salmon species.

Resiliency

System resilience is the capacity of a system to absorb disturbance and retain its basic function and structure. For the rail system, these disturbances can be sudden (e.g., earthquake, flood) or can be more gradual, permanent changes (e.g., change in sea level) that affect rail infrastructure. Natural disasters like landslides, fires, volcanic eruptions, earthquakes, and flooding can affect rail operations in the state. Disturbances can be especially troublesome for the rail system, which has fewer and longer detour options than the highway system.

Landslides are one of the most frequent natural disturbances that affect railroads in Washington. Railroads often can clear landslides to allow resumption of freight traffic movement in a few hours, but those delays can sometimes mean a shipment misses a connection. Passenger trains on BNSF lines are subject to a 48-hour moratorium after a landslide to ensure safe operating conditions. Many landslide-prone slopes can be easily identified and some locations have recurrent slope failures, which can help focus preventative measures. Some historically stable slopes can suddenly fail. In those cases, land development at the top of the slope is often a factor leading to landslide issues.

Climate change has the potential to increase the frequency and intensity of disturbances to the rail system. Washington has developed an integrated climate change response strategy, which identifies several potential risks to transportation infrastructure:

- Sea-level rise and storm surge will increase the risk of major coastal damage, including temporary and permanent flooding of the rail system in low-lying areas.
- More intense downpours will increase the risk of flooding, erosion, landslides, and damage. Travel disruptions and delays could increase and seriously affect the state's economy and public safety.
- An increase in extreme heat could negatively affect rail tracks and other materials in the summer, but warmer winters could offer benefits from reduced road closures and snow and ice removal costs.
- Larger and more severe wildfires could cause temporary rail system closures and increased risk of erosion due to loss of vegetation, which stabilizes soil.

Fire is a high risk to the state-owned PCC rail system in eastern Washington.

WSDOT examined climate risks to state transportation assets using climate projections from the University of Washington Climate Impacts Group. The assessment identified fire as a high risk to the state-owned PCC rail system in eastern Washington. More than 140 wooden trestle bridges are on these lines, and some are over 100 years old. These bridges are vulnerable to wildfires. The trestles are made of creosote-coated timber that can burn for weeks. This vulnerability will increase under a scenario that has more wildfires.

WSDOT has not assessed climate risks for privately-owned rail lines. However, some of the risk factors that apply to highways also would apply to rail lines. Applying these risk factors, rail lines with high vulnerability are found either above or below steep slopes; in low-lying areas subject to flooding or coastal areas vulnerable to rising sea levels; and along rivers fed by glaciers where the glacial melt deposits rocks in the riverbed and causes the river to change course.

CHAPTER 6

RAIL SYSTEM STRATEGIES

Overall, Washington’s rail system provides a safe and efficient transportation option to support the movement of people and goods throughout the state. However, there are challenges that must be addressed for the system to continue to function well as demand for rail transportation grows in the future. Though many of those challenges will be the responsibility of the private-sector rail stakeholders who own or operate over rail infrastructure, the public sector also has an interest in ensuring there is a viable system to support movement of people and goods.

The following pages articulate strategies for addressing the issues and needs facing today’s rail system. These strategies draw from the analysis of rail system strengths and challenges completed during development of this State Rail Plan, as well as input solicited throughout the effort.

6.1 Freight rail strategies

Class I railroads

Managing capacity to meet future demand

Railroads can use a variety of strategies to deal with freight volume growth

Railroads typically respond to growth in freight demand with a mix of operational strategies and capital improvements including:

- Operation of longer trains
- Schedule and train speed adjustments
- Segregation of traffic by direction and/or type (e.g. separate bulk from intermodal, etc.), where multiple routes are available
- Application of advanced traffic management systems that improve meet/pass planning, management of train speeds and a reduction in headways
- Construction of additional main track, new and/or lengthened passing sidings
- Expansion of industry, yard and terminal facilities
- Installation of signals and/or improvements to existing signal systems, including the installation of Centralized Traffic Control¹
- Building additional infrastructure can help a railroad manage increased volumes, but it is not always the best choice. As private businesses, railroads look to gain benefits that exceed the costs of obtaining them. They calculate the potential financial return on a given capital investment, considering the costs and risks of the investment. If the costs and risks are projected to exceed the expected financial return, railroads rely on other strategies to manage freight volume increases.

Operating longer trains has been a common strategy for moving higher volumes of freight. Longer trains allow more

¹ CTC is a form of railway signaling that consolidates train routing decisions that were previously carried out by local operations.

freight to be moved by fewer people, improving productivity. Distributed power, the placement of locomotives across the length of the train rather than only in the front or back of a train is notable for helping to improve operational performance. The distribution of locomotive power allows the internal forces within longer trains to be safely handled, and is how railroads have been able to move trains of 10,000 feet in length or longer. However, these very long trains have challenges. Long trains take more time to build and break down, and their sheer length can complicate operations in terminals and along single track main lines. Furthermore, fixing mechanical problems can take more time than they do with shorter trains. Railroads have found the benefits of longer trains great enough to address these challenges and continue to experiment with even longer trains.

Building additional infrastructure can help a railroad manage increased volumes, but it is not always the best choice.

Railroads also can manage the volume of freight by choosing to make business adjustments. These include selective price and service level changes, which directly affect capacity needs. Examples include things like pricing actions, service frequency, and managing rail car availability to shippers that do not own their own cars. Not all railroads embrace these methods, which can sometimes negatively affect shippers and short line connections by increasing their direct and indirect costs.

BNSF can increase east-west capacity if needed

Washington has three primary east-west routes across the state, all owned by BNSF. All of them ultimately funnel into a single route east of Spokane to Idaho. In recent years, BNSF has improved capacity by adding track and implementing operational efficiencies in other corridors within the state. If rail traffic continues to grow, similar actions are likely to be taken by BNSF. Particularly robust rail traffic growth (freight and/or passenger) could require expanding the size of the tunnel on Stampede Pass. It currently has clearance restrictions limiting the types of rail cars that can pass through it, forcing trains with those cars to use one of the other two routes. An enlarged Stampede Pass tunnel could provide more operational flexibility and allow more trains to get across the Cascades mountain range as part of a comprehensive response to higher rail volumes.

Washington's participation in corridor partnerships can advance shared interests

Continuing existing agreements and initiating new planning initiatives with state and provincial governments, public ports, and railroads are opportunities for continuing to strengthen ties throughout the region. Key issues motivating these ties include corridor-level improvement opportunities and rail lines that cross borders. Examples include corridor planning groups, such as the Great Northern Corridor Coalition, the Inland Pacific Hub project, Pacific Northwest Gateway Coalition, Freight Action Strategy for Seattle-Tacoma (FAST) Corridor Partnership, and the International Mobility and Trade Corridor project. Efforts elsewhere on the west coast to improve transportation corridors can serve as models to maintain and improve upon Washington's current successes. Maintaining and improving reliable rail service could increase the attractiveness of Washington ports for discretionary cargo, and could contribute to increased competitiveness for Washington ports. Importers and exporters have flexibility in their choice of port and could use the ports in British Columbia (Vancouver, Prince Rupert) or California to reach interior markets. In addition, the newly expanded Panama Canal is more competitive for Pacific Rim trade at ports along the U.S. eastern seaboard (including Miami, Savannah, Norfolk and others).

If surface transportation capacity or efficiency is not adequate, Washington ports could become less attractive to ocean carriers, leading to a loss of business and export opportunities. To ensure this does not happen, bottlenecks at intermodal terminals and on the trunk network must be identified and addressed. Addressing these bottlenecks to ensure that corridors serving Washington ports are reliable will require coordination among states, local governments, ports, and the railroads.

Short line railroads

Addressing deferred maintenance and optimizing for economic sustainability

Short line railroads and the state can work together to address deferred maintenance and compatibility with Class I railroads

Short line railroads continue to invest, as they are able, to maintain and improve infrastructure condition. Some short line railroads continue to struggle to overcome decades of deferred maintenance along their right of way. WSDOT will continue to support the short line rail system in Washington by managing the programs that support short line rail freight, such as the Freight Rail Investment Bank (FRIB) program, the Freight Rail Assistance Program (FRAP), and the Grain Train program as directed by the legislature.

Some short line railroads continue to struggle to overcome decades of deferred maintenance along their right of way.

WSDOT can continue to work to improve the condition of the PCC rail system

WSDOT is making improvements to the state-owned PCC rail system as funding is made available. As part of the Connecting Washington transportation funding package approved by the state Legislature in 2015, the PCC was allocated \$6.7 million every two years through 2031 (\$47M in total) to undertake rehabilitation and improvement projects. In 2019, WSDOT leveraged this state funding as match to secure a \$5.7 million grant through the USDOT Better Utilizing Investments to Leverage Development (BUILD) program.

Congress can enhance the ability of short lines to invest in their infrastructure by making the Short Line Tax Credit permanent

The Short Line Tax Credit, was first enacted by Congress in 2005 and was extended five times before it expired in 2017. In December 2019 it was extended for five years, retroactively, from 2018 through 2022. The credit, also known by its tax line item reference, 45G, allows a credit of 50 cents for each dollar railroads invest in track and bridge improvements, capped at \$3,500 per mile. Congress is currently considering the BRACE Act (Building Rail Access for Customers and the Economy Act of 2019) to permanently extend the 45G tax credit.

River navigation

WSDOT and short line railroads can monitor the Columbia River System Operations EIS process

With the completion of the Columbia River System Operations Draft EIS, WSDOT and short line railroads can monitor the Columbia River System Operations EIS process and stay engaged if there are additional opportunities to do so.

6.2 Passenger rail strategies

Long distance

On-time performance

Amtrak can work with host railroads to improve on-time performance

Amtrak can address poor on-time performance by collaborating with host railroads to identify the root cause of delays and actions to reduce them. These actions could include changes to operations or infrastructure. While Amtrak has limited funds for infrastructure improvements on host railroads, a cooperative assessment of delays could identify small projects that could make Amtrak long distance trains more reliable. Strategic schedule adjustments could also improve on-time performance.

Amtrak can address poor on-time performance by collaborating with host railroads to identify the root cause of delays and actions to reduce them.

The federal government can require performance guarantees when awarding grants for infrastructure improvements

Host railroads can be held accountable to financial partnerships. The Federal Railroad Administration has tied infrastructure grants to on-time performance level guarantees, with the funded improvements providing host railroads the ability to reach an agreed level of reliability.

Equipment replacement

Amtrak can refurbish existing equipment until new equipment is delivered

Replacing aging rail cars and locomotives will continue to be a priority for Amtrak moving forward. Passenger rail car fleet replacement for long distance trains can be expensive, reflecting customization and the relatively small quantities purchased by Amtrak. Replacement of rail cars is usually spread out over a period of years, with procurements focused on specific types of equipment. To keep the interiors attractive to passengers until the cars are replaced, Amtrak periodically refreshes them with new materials and improved components.

Intercity

On-time performance

WSDOT can continue to track the cause of Amtrak Cascades delays

Tracking the cause of delays helps inform strategies for improving on-time performance. In 2016, WSDOT developed the Amtrak Cascades Performance Database to monitor and track service outcomes related to on-time performance and travel times. WSDOT can continue to use and improve this system to develop approaches to reduce delays.

Signatories to the Amtrak Cascades Service Outcome Agreement can work together to meet performance targets

WSDOT, Amtrak, FRA, and infrastructure owner BNSF entered into a legally binding Service Outcome Agreement (SOA) for Amtrak Cascades when WSDOT invested nearly \$800 million in American Recovery and Reinvestment Act (ARRA) and High-Speed Intercity Passenger Rail (HSIPR) funds to improve the corridor. The agreement requires meeting an on-time performance of 88% or a defined threshold of BNSF-responsible delay minutes for any calendar quarter on specific segments of the rail line. The Amtrak Cascades SOA requires that BNSF fully mitigate the effects of any changes in freight traffic volumes and operations on passenger train performance. Specifically, BNSF is required to develop and implement a corrective action plan when not meeting the service outcome goal.

After seeing unsatisfactory results in 2018, WSDOT, BNSF, and Amtrak initiated a focused, collaborative approach to improving performance. On-time performance showed noticeable improvement in 2019, reaching 71% in the 4th quarter. Through implementing operational improvements and reducing slow order delays, BNSF achieved the service outcome goals for all segments in the last quarter of 2019. WSDOT, BNSF, and Amtrak will continue to work together towards achieving and sustaining the service outcomes for Amtrak Cascades trains.

Implementation of preclearance could reduce delays for Amtrak Cascades trains entering the United States

WSDOT is working with U.S. Customs and Border Protection, Canada Border Services Agency, and the British Columbia Ministry of Transportation and Infrastructure to implement preclearance, which would allow U.S. Customs and Border Protection to conduct all immigration and custom inspection activities at Pacific Central Station in Vancouver, British Columbia, potentially eliminating the second southbound customs inspection stop at the border. This change could reduce scheduled travel time for southbound trains by 10 minutes if the inspection stop is discontinued and eliminate additional delay risks associated with the stop at the border.

Equipment needs

WSDOT can work with Amtrak and other states to acquire passenger rail cars

Earlier this year WSDOT began working with Amtrak and other states on a multi-year process to acquire new passenger rail cars to replace aging equipment in their fleets. By coordinating to acquire similar passenger rail cars, Amtrak and the states can enjoy economies of scale with a large order.

Requests for additional stations

Communities can follow existing station stop policy guidance

In 2016, WSDOT and ODOT issued a joint Station Stop Policy Guidance Document² that defines a three-step evaluation process to be used for evaluating station stop proposals. This process provides a framework for evaluating corridor performance, ownership, including operating and financial roles and responsibilities for adding or removing a station stop. It can also be used to evaluate skip-stop service, express service, or station relocations.

Planning for future demand

WSDOT can prepare a Service Development Plan to define future Amtrak Cascades improvements

The state can continue to use an incremental approach to achieving this long-term vision for Amtrak Cascades, focusing on enhancements and expansion efforts that provide immediate public benefits. During the planning process, already slated for 2020, WSDOT will conduct a detailed analysis of the state's needs, update service goals, and develop an incremental plan for achieving them. An incremental approach allows WSDOT to reach service goals over an extended period in the face of uncertain transportation funding. By preparing a Service Development Plan, WSDOT will inform decision makers and citizens, describe a multi-year plan to follow, and help to further qualify for federal funding opportunities.

The Legislature can consider establishing east-west intercity rail service

Further study is needed for the Legislature to determine if an east-west intercity service is warranted. A more up-to-date and in-depth study would provide insight into whether intercity passenger rail service would be beneficial and feasible. Preliminary studies like this are used by decision makers to provide insight into the potential direct and indirect effects the service would have for Washington.

WSDOT can prepare for long-term needs by continuing to plan for an Ultra-High-Speed Ground Transportation system

The next step for studying Ultra-High-Speed Ground Transportation is developing governance structure recommendations. This work will explore options for effectively managing an Ultra-High-Speed system across two states and two countries. Establishing a governance structure for the project would provide a framework for developing and analyzing detailed route alternatives. Future planning for both Amtrak Cascades and any Ultra-High-Speed system needs to be closely coordinated by WSDOT to ensure both systems work and complement each other effectively and efficiently.

Commuter rail**Planning for future demand*****Sound Transit can make modifications to allow longer trains***

One way to accommodate more passengers is to make trains longer. In addition to making the trains longer by adding passenger cars, longer trains can require infrastructure improvements like longer platforms. Maintenance base capacity for a larger fleet of equipment also needs to be considered.

Sound Transit can implement station access improvements to accommodate more riders

Station access is another factor affecting the ability of Sounder to meet ridership demand south of Seattle. Parking facilities at Sounder stations fill up early. As a result, the earlier morning trains tend to be more crowded than later trains as people arrive early to secure a parking place. Managing the availability of parking spaces by allowing people to reserve space could distribute ridership more evenly, making better use of existing seating capacity. Adding parking spaces by constructing more or larger parking facilities could also encourage riders to use later, less crowded trains, but at a higher cost. Other station access improvements can help meet future Sounder ridership demand. Improving infrastructure around stations for pedestrians, bicyclists, transit riders, and drop-off passengers make it easier for people to get to stations.

Extending the route could improve rider access to Sounder

Sound Transit has funding from Sound Transit 3 to extend Sounder South from Lakewood to DuPont, adding two more stations. These stations could redistribute where riders board trains, freeing up space for new riders.

Sound Transit can negotiate with BNSF to add more trips

Adding additional trips also would increase the capacity of Sounder to carry more passengers. However, Sound Transit would need to negotiate with BNSF to determine the cost of adding trips on its line between Seattle and Tacoma. Additional infrastructure, such as more double-track or triple-track mainline and additional or longer sidings, could be needed on the BNSF line, as well as the line south of Tacoma owned by Sound Transit.

6.3 Integrated rail system strategies

Multimodal connectivity for freight rail

Land use

Local jurisdictions can ensure compatible land uses adjoin rail lines

The FHWA Freight and Land Use Handbook outlines possible solutions to address the problem of industrial land around rail lines being converted to incompatible uses. Arguably, the most important tool is outreach. Local planning organizations regularly include the public in their planning processes. WSDOT encourages regional and local planning authorities to incorporate the needs of freight and industrial use in their plans. State law requires Seattle and Tacoma to include a Container Ports Element in their respective comprehensive plans to address transportation and land use near rail and other port infrastructure. In 2017, the Legislature amended the Growth Management Act to allow “freight rail dependent uses” and gave Clark and Okanogan counties authority to allow these uses next to short line railroads.³

Land use compatibility can also include encouraging the development of manufacturing and warehousing districts near rail intermodal terminals. Clustering these land uses around rail terminals can provide more efficient logistics solutions and reduce truck traffic on regional highways.

While some areas around rail should be preserved for future industrial growth, it is equally important to designate land use buffers between these areas and residential developments. For example, a warehouse can be built between a rail yard and housing development to prevent noise and odors from disturbing residents. Many cities have tax incentives to encourage industrial redevelopment near rail to prevent infill of industrial areas, preserve jobs, and protect residents.

Washington ports

Ports and railroads can invest in improvements that make operations more efficient

To stay competitive, Washington ports can continue to work with the railroads to ensure that trains can move efficiently in and out of port facilities. This can include rail infrastructure improvements within port terminals or on the railroads that provide access to them. The state or ports may choose to partner with railroads on investments that provide important public benefits.

Public agencies can coordinate planning to ensure freight can easily move to and from rail terminals

WSDOT, regional planning organizations, and local jurisdictions can work together with ports to ensure that freight can easily move between container ports, warehouse districts, and rail intermodal terminals. Initiatives like the Puget Sound Gateway Program will improve highway access between Northwest Seaport Alliance (NWSA) and railroad terminals in Seattle and Tacoma with warehouses from Kent to Puyallup. Considering regional connections to rail terminals when planning for new warehouse districts is important for freight mobility and maintaining the competitiveness of NWSA ports.

Northwest Seaport Alliance can continue exploring the viability of an inland seaport

Some ports outside of Washington have adopted inland or dry port systems as a way to reduce truck movements in and out of the port. An inland seaport is a container terminal where international containers arrive on a train at an inland location approximately 100 to 400 miles from a marine terminal where they originated. The contents are then loaded into domestic containers and continue by rail to a further destination or are transferred into domestic containers or trucks and distributed to the local region. From inland seaports, international containers also are returned to a marine port loaded with goods for export. This model could alleviate congestion at marine ports and in surrounding metropolitan areas, reduce the number of long distance truck moves from inland locations to marine ports, and bring jobs to the inland port areas. However, it also likely would increase truck traffic in the community

around the inland port. Northwest Seaport Alliance has been exploring the possibility of establishing an inland seaport terminal that would move containers to and from NWSA terminals by rail. There is already a precedent for this type of rail service. Currently, Northwest Container Service partners with Union Pacific to move containers from Portland, Oregon to NWSA terminals in Seattle and Tacoma and BNSF offers a similar service. However, Portland is a much larger market for inbound and outbound containers than any potential inland seaport location in Washington. Data is needed to understand the potential positive and negative effects of an inland seaport proposal for Washington state.

First/last mile connectors

WSDOT and other agencies can use the Freight and Goods Transportation System to focus freight connectivity investments

WSDOT studies and classifies freight corridors using the Freight and Goods Transportation System (FGTS). The 2019 FGTS update includes a detailed list of first/last mile freight connectors. This can be used as a planning tool to assist state and other government organizations with identifying freight needs, support freight planning efforts and inform freight investment decisions. In 2017, WSDOT used the corridor designation as one quantitative criteria for evaluating freight project benefits and supporting freight investment decisions for National Highway Freight Program funding allocation.

Regional and local agencies can include intermodal freight connections in their planning activities

Intermodal connections are critical for moving freight between modes. It is important that cities, counties, ports, and tribal governments work together with their MPO and RTPD partners in identifying these routes in plans to ensure their importance to freight supply chains is recognized regionally. WSDOT will continue to work with partners to include intermodal connections in planning activities.

Public agencies can continue to improve intermodal connector routes

Improvements to connector routes are typically the responsibility of the owner or operator, such as WSDOT, local governments, and private companies. They can work with railroads to ensure these routes are designed for expected freight volumes.

Multimodal connectivity for passenger rail

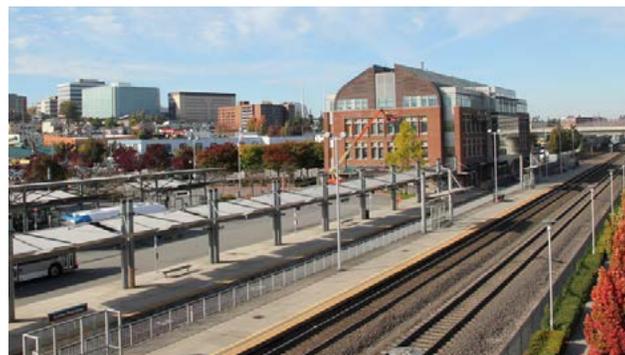
Station access

WSDOT can work with local jurisdictions and transit agencies to improve connectivity at Amtrak Cascades stations

WSDOT is interested in working with local jurisdictions and transit agencies to improve connectivity at Amtrak Cascades stations within the state. While no state funds are currently dedicated to this purpose, WSDOT can support grant applications for projects. Appendix C includes suggestions for connectivity improvements at each station. WSDOT is developing analytical methods for identifying and prioritizing bicycle and pedestrian improvements as part of the forthcoming Active Transportation Plan that could be used in the future to identify connectivity improvements at stations.

WSDOT can consider access to Amtrak stations when planning additional Travel Washington intercity bus routes

WSDOT is completing an update to the Travel Washington Intercity Bus Plan. Part of the study is evaluating potential new or revised routes. Ensuring timed connections to other modes, such as Amtrak, will be a consideration in planning new or revised routes.



Bus bays at Everett station

Passenger rail operators can use technology to improve the connectivity experience for passengers

WSDOT also is interested in opportunities to use technology to improve connections with other modes. Potential opportunities could include joint ticketing with Amtrak and local transit agencies or developing a way to notify bus drivers on local transit routes serving Amtrak stations about train status so they can decide to wait for passengers connecting from a late train. WSDOT could also work with local transit agencies to offer on-demand last-mile transit for stations that can be reserved through a smartphone application, particularly those that are difficult to serve with scheduled routes.

Sound Transit could continue to invest in station access improvements at Sounder stations

Sound Transit has been working to improve access to Sounder stations as it expands its system. These investments include improvements to parking, walking and cycling routes, transfers from partner transit services, and pick-up and drop-off areas at stations. Sound Transit could continue to make similar investments in the future.

Regional and local planning can identify passenger rail stations as multimodal hubs

Regional and local planning organizations can designate passenger rail stations as multimodal hubs and plan land uses around the stations that support multimodal activity as much as possible. As plans are periodically reviewed, planners can consider opportunities to optimize multimodal connections and supportive land uses around rail stations.

Schedule coordination***Local transit agencies can consider passenger rail coordination when planning schedules and additional service***

Local transit agencies can align their schedules with passenger rail schedules as much as possible. When expanding service hours to existing routes, agencies can consider better coordinating routes serving the rail station with the arrival and departure of passenger trains. Because they serve shared stations, Amtrak and Sounder trains need to be carefully scheduled, which provides opportunities to optimize connectivity between the different passenger rail services.

Planning coordination***Agencies can coordinate planning activities***

Passenger rail providers can coordinate planning activities to ensure the different services create an integrated passenger rail system for Washington state. By planning integrated stations, exploring opportunities to share track or right of way corridors, and coordinating operations as new service is added, passenger rail providers can maximize the value of their investments to the traveling public.

Shared passes***WSDOT and Sound Transit can explore expanding the RailPlus program.***

The Sound Transit/Amtrak Cascades RailPlus shared pass program leverages existing intercity rail service to provide commuter rail passengers more travel options by filling seats that otherwise would be empty. While intercity passenger trains won't have the capacity to carry as many people as a dedicated commuter rail train, they can be particularly useful in off peak periods when commuter rail demand is lower. Expanding the current program to Sounder South, to serve the Tukwila and Tacoma Dome stations during weekdays, would expand travel choices for passengers in both the peak and off-peak periods.

Rail system in communities

At-grade rail crossing safety and trespassing

Railroads and public agencies can partner on education initiatives

Education is a key strategy for addressing at-grade rail crossing safety and trespassing. It is important to continuously teach and remind people of all ages to maintain a safe distance away from railroad tracks, always be alert for trains when crossing or near rail lines, and keep in mind that trains require much more distance to stop than cars and trucks. WSDOT needs to continue its rail safety outreach activities, as well as continue to support Operation Lifesaver involvement throughout the state.

Public agencies and railroads can cooperate on at-grade crossing modifications and maintenance

Public agencies and railroads can work together, in coordination with the UTC, to ensure at-grade crossings have appropriate, working warning devices. The agency with jurisdiction over the roadway has the responsibility to specify the appropriate warning devices. Railroads install the devices on a reimbursable basis. In some cases, grade separation projects can be constructed, providing safety benefits in addition to mobility benefits.

Communities can identify safer alternate routes for pedestrians

Communities with recurring trespassing incidents on rail lines can evaluate their infrastructure for pedestrians and bicyclists to identify gaps in these networks that could be addressed to create safer routes. Where low-volume rail activity occurs, such as a typical short line, railroads and public agencies are encouraged to explore the viability of creating a “rail with trail” facility. Such a facility could help fill a gap in the pedestrian/bicyclist network to benefit the railroad and the public. When a trail is placed near an active rail line, care must be taken to discourage trespassing and maximize safety.

Railroads can work with communities to address homeless encampments

Many local jurisdictions and non-profit organizations have programs helping the homeless in communities served by railroads. Railroads can work with these groups to help people experiencing homelessness who are living on railroad property get the resources they need to find safer shelter options.

Rail crossing conflicts in communities

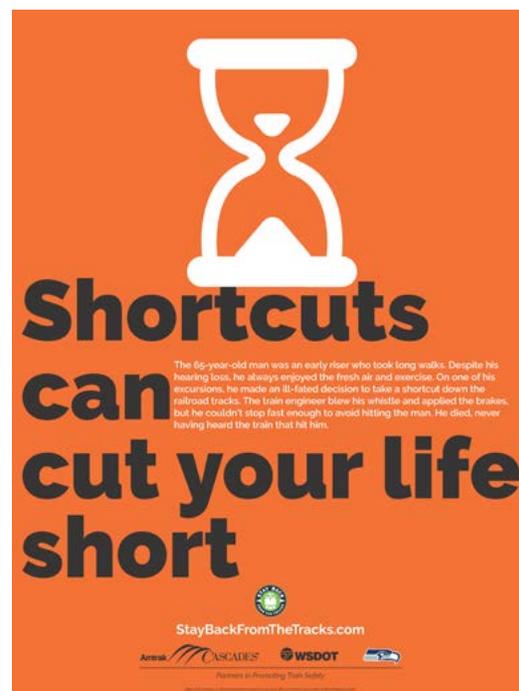
Local jurisdictions can take the lead on grade separation projects in their communities

To address grade crossing incidents, local jurisdictions can take the lead to plan grade separation projects. State and federal funds are available for these projects, but the amount of available funding is limited relative to the demand.

Projects can continue to be identified and prioritized statewide

In 2016, the Legislature directed the Joint Transportation Committee (JTC) to conduct a study evaluating the effects of prominent road-rail conflicts and to develop a corridor-based prioritization process for addressing them on a statewide level. The study produced an initial set of recommendations to assist in developing solutions and to prioritize investments. In 2017, the Legislature then directed the Freight Mobility Strategic Investment Board (FMSIB) to update the JTC’s Study of Road-Rail Conflicts in Cities.⁴ FMSIB updated the prior work, developed a corridor-based project prioritization process, and developed a prioritized statewide list of projects to alleviate road-rail conflicts. FMSIB also provided the following recommendations.

- Implement ongoing efforts to continuously identify and recommend funding for road-rail conflict needs throughout the state



⁴ <http://www.fmsib.wa.gov/roadRail.cfm>

- Prioritize road-rail projects based substantially on the evaluation criteria developed through the Phases 1 and 2 study process
- Prior to providing design or construction funding to projects, ensure that the project sponsor has provided verifiable status of project development and committed funding
- Before providing funding to project sponsors, require that the project sponsor coordinate with other existing road-rail conflict funding programs

The Legislature can provide funding to continue this work.

Confirming project readiness can direct funds to projects ready to use them

Implementation of a vetting process to ensure that projects receiving state funds for design or construction work can ensure that funds are going to project sponsors who are ready to proceed. This avoids committing funds that will not result in construction for extended periods of time.

Energy products transportation

Railroads and public agencies can work together to prepare for potential oil spills

In 2015, the Legislature passed the Oil Transportation Safety Act, ESHB 1449, to help protect the environment and Washingtonians from new oil spill risks, such as transporting oil by rail. The bill specifically directed the Department of Ecology's Spills Program to undertake multiple policy initiatives to help address these new risks. These initiatives include advanced notice of oil transfer, railroad contingency planning, geographic response plans, and spill response equipment cache grants. Subsequently the Legislature amended the state laws to require scaling of oil spill planning requirements based on the volume and type of oils that railroads move and later required that railroads take action to address oils that may sink or submerge after they are spilled into water. The success of these policy initiatives will require cooperation among stakeholders and continued funding.

In 2019, the Washington Legislature passed ESSB 5579.^{5 6} The law expands advance notice reporting requirements for facilities that receive crude oil by rail to include the type and vapor pressure of crude oil received from a rail tank car. This information would be used by the UTC to inform development of its annual work plan and inspection activities. The Department of Ecology is engaged in rulemaking to implement the law.

Corridor preservation

WSDOT encourages consideration of rail corridor preservation for future uses

Rail line owners are encouraged to work with qualified private organizations and public agencies that agree to maintain corridors for future rail use. Preserving these corridors keeps them intact for future transportation uses, including a return to rail service if needed. These corridors also can be useful as utility corridors, like fiber optic lines or electricity transmission.

Organizations can use statewide gap analysis to evaluate rail lines in abandonment proceedings for future trail use

WSDOT is preparing an Active Transportation Plan that will identify gaps in the state network of pedestrian and bicycle trails. This network analysis could help determine if rail lines entering the abandonment process can address an identified need for a trail.

Local jurisdictions can address corridor preservation in their plans

Counties and cities can include information in their six-year transportation improvement plans about how they will act to preserve railroad right-of-way in the event the railroad ceases to operate in the their jurisdiction, in accordance with state law⁷

⁵ Washington State Legislature, ESSB 5579 <https://app.leg.wa.gov/bills/summary?year=2019&billnumber=5579&initiative=false>

⁶ ESSB 5579 also contains provisions to limit the vapor pressure of crude oil that can be loaded or unloaded into or from a rail tank car by facilities in Washington state. In May 2020, the Pipeline and Hazardous Materials Safety Administration declared the crude oil vapor pressure limit preempted by the Hazardous Materials Transportation Act. The State of Washington Attorney General's Office is not appealing the determination.

⁷ RCW 36.81.121, Perpetual advanced six-year plans for coordinated transportation program, expenditures—Nonmotorized transportation—Railroad right-of-way. [counties] <https://app.leg.wa.gov/RCW/default.aspx?cite=36.81.121>

Diesel emissions

Railroads can continue to upgrade their fleets with cleaner locomotives

Class I railroads are purchasing new locomotives that meet EPA air quality standards to replace older, less efficient locomotives. Some of these older locomotives have been purchased by short lines to replace even less efficient locomotives. As a result, the overall locomotive fleet is becoming cleaner.

Railroads can explore different technologies to reduce locomotive emissions

Cleaner alternatives to diesel engines for rail locomotives could emerge as new technologies develop. Engines that use cleaner fuels could become viable.

Electrification is a potential way to reduce locomotive emissions. The infrastructure required for conventional electric locomotive technology in use around the world is not considered a viable investment by private freight railroads in the United States. However, development of battery technology could make electric propulsion more affordable in the future by eliminating the cost of overhead wire. While low-horsepower locomotives using batteries have been used in rail yards, technology limitations have kept them from being used on trains traveling long distances. With recent improvements in battery technology, BNSF is currently working with partners to develop and test a battery-electric high-horsepower road locomotive in California.

Until cleaner technologies are available, the overall emissions from railroad locomotive will gradually decline as new locomotives built to current standards replace older locomotives.

Fish passage

Railroads and public agencies can coordinate fish passage improvement projects to provide better benefits for fish

Since rail lines and highways often parallel each other, there may be locations where both create barriers to fish passage on a waterway. Railroads and public agencies can work together to identify fish passage barriers on rail lines and coordinate efforts addressing barriers to maximize fish habitat benefits.

Resiliency

WSDOT and BNSF can continue to address landslide prone areas that affect Amtrak Cascades service

The mitigation measures that WSDOT and BNSF have partnered to build between Seattle and Everett have proved successful at reducing the impact of landslides on Amtrak Cascades service. Additional areas in Washington along the Amtrak Cascades route are prone to landslide disruptions and would benefit from landslide mitigation. Continuing to invest in mitigation measures would benefit Amtrak Cascades and BNSF. Sound Transit also benefits from measures implemented between Seattle and Everett.

Railroads can assess their resilience to natural disturbances

Owners of rail lines in Washington can assess their resiliency to natural disturbances. Projects that reduce risk can be eligible for funding through the Freight Rail Investment Bank (FRIB) and the Freight Rail Assistance Program (FRAP), both administered by WSDOT.

RCW 35.77.010, Perpetual advanced six-year plans for coordinated transportation program expenditures—Nonmotorized transportation—Railroad right-of-way. [cities] <https://apps.leg.wa.gov/RCW/default.aspx?cite=35.77.010>

CHAPTER 7

RAIL INVESTMENTS AND INITIATIVES

This chapter provides an overview of how railroads and other stakeholders plan to implement investment options and operational changes needed to meet the challenges described earlier in this document. Government funding programs designed to help fund these investments are described in detail as well.

An illustrative list of rail projects have been identified by WSDOT through a stakeholder outreach and project validation process, which is shown in Appendix A. Most projects are unfunded or have secured only partial funding, and they are included to illustrate the examples of rail improvements identified. The illustrative list is not prioritized and does not capture nor represent the full set of investments needed to achieve future growth scenarios.

7.1 Freight rail

This section highlights planned investments and options intended to improve the rail system and prepare for the near future.

Class I

Near-term (5-Year: 2019-2024)

Over the last five years, BNSF has invested about \$5.4 billion in its Northern Corridor that spans from the Pacific Northwest to Chicago. This includes about \$1.3 billion on expansion and \$4.1 billion on maintenance. In 2019, BNSF spent approximately \$175 million on capital expenditures in Washington. Much of this was spent on preservation work, including approximately 820 miles of track surfacing and undercutting work, as well as the replacement of about 50 miles of rail and about 130,000 ties. Bridges are another focus of preservation work. This includes replacement of components near the end of their service life and sometimes the entire bridge is replaced. The railroad also constructed slope stability projects at various locations along Puget Sound. In addition to system preservation work, BNSF also invested in mainline capacity expansion on its network in Washington. BNSF installed nearly two miles of double-track near Wishram along the Fallbridge Subdivision in 2019. Near-term capital expenditures will likely follow a similar pattern with the majority spent on preservation work.

Class I railroads continue to explore operational improvements to increase efficiency and accommodate growth. These improvements included optimizing train schedules and traffic management; operating longer trains; and reducing conflicts by implementing directional running (operating trains in one direction on a line and in the opposite direction on a parallel route).

Long-term (20-year: through 2040 and beyond)

The two Class I railroads operating in the state, BNSF and Union Pacific, are private companies and share few details about their long-term investment plans with the public. Their plans are market dependent, reflecting where they foresee future business opportunities. The variability of annual growth across the growth scenarios in Chapter 3 illustrates how much influence political and market forces have on rail volumes in Washington. Rail investments are costly, and railroads must coordinate investments in response to changes in political and market forces. As such, freight railroad planners typically plan projects on a 2-3 year horizon. The categories of long-term investments

listed below are a list of potential investments rather than definitive plans.

Long-term investments in Class I railroads are typically maintenance and capacity projects. These can include, but are not limited to:

- Adding additional main tracks and lengthening sidings
- Improving track conditions and geometry to allow for more efficient movement of trains
- Resolve bottlenecks through clearance and weight capacity increases
- Replacing worn ties and other infrastructure
- High-value projects such as replacing bridges and expanding tunnels
- Ongoing slope stabilization and track maintenance work
- Improving connections to ports and branch lines

Two future investments that have been identified are the replacement of the BNSF bridge over Salmon Bay at the west end of the Lake Washington Ship Canal in Seattle and the BNSF bridge over the Skagit River in Burlington. BNSF initiated the permitting process for the Salmon Bay bridge in 2018 and the Skagit River bridge replacement project is listed in the Skagit 2040 Regional Transportation Plan. Union Pacific has identified improved access to the NWSA at Bullfrog Junction in Tacoma as a potential project.

Short line railroads

Near-term (5-year: 2019-2024)

Most short line railroads focus nearly all their infrastructure investments on preservation. The recent push to upgrade infrastructure to handle 286,000-pound railcars has put even more pressure on their limited funds. Short lines invest in heavier rail and tie programs, transload facility development, and improved interchange conditions. Many short line railroads have a long list of unfunded projects, but due to insufficient capital, project implementation plans remain tied to potential government grants and loans. Projects currently funded by the Freight Rail Investment Bank and Freight Rail Assistance Program, both administered by WSDOT, are listed below in Exhibit 7-1 and Exhibit 7-2. These projects have shown that they maintain or improve the state’s freight rail system and benefit the state’s interests. Short line railroads around the state are pursuing similar projects without funding from these programs.

Most short line railroads focus nearly all their infrastructure investments on preservation.

Exhibit 7-1: Freight Rail Investment Bank 2019-2021 projects

Applicant	Project	Amount
Port of Everett	South Terminal Modernization ^a	\$6,157,000
Tacoma Rail	Tote Yard (track upgrade)	\$400,000
Tacoma Rail	Mazda (track upgrade)	\$240,000
Port of Benton	Berry’s Bridge, Yakima Bridge, Jadwin Crossing	\$250,000
TOTAL		\$7,047,000

^a Not a short line rail project

Exhibit 7-2: Freight Rail Assistance Program 2019-2021 projects

Grant Recipient	Project	Amount
Central Washington Railroad	Sunnyside to Granger Track Rehabilitation	\$650,000
Puget Sound & Pacific Railroad	Hoquiam Bridge (repair) ^a	\$840,320
Port of Benton	Berry’s Bridge, Yakima Bridge, Jadwin Crossing	\$1,500,000
Columbia-Walla Walla Railway	Aggregate Hopper Cars (purchase) ^a	\$300,000
Columbia Basin Railroad	Wheeler to Moses Lake Rehabilitation	\$700,000
Washington Eastern Railroad	Milepost 11-24, 37-57 (track upgrade) ^a	\$780,730
Rainier Rail	Blakeslee to Chehalis Bridges (upgrade)	\$440,000
Pend Oreille Valley Railroad	Usk to Newport Track Rehabilitation	\$600,000
Spokane Spangle & Palouse Railway	Upgrade Line from Marshall to Oakesdale ^a	\$750,000
Tacoma Rail	MVD Track Rehabilitation ^a	\$1,100,000
TOTAL		\$7,661,050

^a Project deferred in response to the passage of I-976

Palouse River and Coulee City (PCC) Rail System

The Legislature has allocated \$6.7 million every two years through 2031 to undertake rehabilitation and improvement projects on the PCC. This funding is being augmented with a \$5.3 million USDOT BUILD grant. Work in 2020 will include track rehabilitation on three line segments:

- LaCrosse to Endicott – 8 miles
- Marshall to McCoy – 5 miles
- Geiger Spur to Davenport – 16 miles

In addition, eight bridges will be replaced, and two will be rehabilitated between Marshall and McCoy.

Long-term (20-year: through 2040 and beyond)

Short line railroads continue to invest, as they are able, to maintain and improve infrastructure condition. Some short line railroads continue to struggle to overcome decades of deferred maintenance along their right of way. Future projects likely will be similar to those made in the past and may include:

- Performing regular inspection-based maintenance to support the longevity and reliability of infrastructure and equipment
- Replacing worn and outdated infrastructure
- Continuing to upgrade tracks to handle new generations of heavier rail cars
- Developing transload facilities to serve additional customers and enlarging rail yards to accommodate unit trains

WSDOT invests in short line railroads through programs such as the Freight Rail Investment Bank program, the Freight Rail Assistance Program and the Grain Train program.

WSDOT can continue to support the short line rail system in Washington through programs such as the Freight Rail Investment Bank (FRIB) program, the Freight Rail Assistance Program (FRAP), and the Grain Train program.

Palouse River and Coulee City (PCC) Rail System

WSDOT will continue to advance the strategies in the 2015 PCC Rail System Strategic Plan. Long-term investments to the PCC likely will be similar to those made by other short lines in the state. WSDOT has identified and prioritized potential investments based on current traffic patterns and system conditions. These investments are needed to make the most used portions of the PCC system capable of handling 286,000-pound cars in trains operating up to 25 miles per hour (FRA Class II track). Exhibit 7-3 shows these investments. WSDOT will continue to address priority projects on the PCC as funding becomes available over the coming years.

WSDOT will update the strategic plan to reflect progress made since 2015 and address new challenges or opportunities that have emerged on the PCC since then.

Exhibit 7-3: PCC system prioritized investment needs by branch line

CW Branch	Begin	End	Cost
Priority 1 - Cheney to Geiger Spur	MP 1	MP 7.9	COMPLETE
Priority 2 - Geiger Spur to Davenport	MP 7.9	MP 41.74	\$27,880,000
Priority 3 - Davenport to Wilbur	MP 41.74	MP 74.44	\$22,660,000
Priority 4 - Wilbur to Coulee City	MP 74.44	MP 108.4	\$16,180,000
CW Branch Total			\$66,720,000
P&L Branch	Begin	End	Cost
Priority 1 - Bridge Replacement & Repair	MP 10.5	MP 29.5	IN PROGRESS
Priority 2 - Marshall to Garfield	MP 1	MP 50	\$24,010,000
Priority 3 - Garfield to Palouse	MP 50	MP 59.2	\$17,910,000
P&L Branch Total			\$41,920,000
PV Hooper Branch	Begin	End	Cost
Priority 1 - Hooper Junction to Endicott	MP 26.47	MP 57.9	\$21,560,000
Priority 2 - Winona to St. John	MP 0	MP 18.3	\$12,110,000
Priority 3 - Endicott to Mockonema	MP 57.9	MP 72.5	\$7,940,000
PV Hooper Branch Total			\$41,610,000
Total PCC System			\$150,250,000

7.2 Passenger rail

Long distance

Near-term (5-year: 2019-2024)

On-time performance

In Washington, the top three reasons for passenger train delays are slow speed orders (mandated slowdowns for maintenance and inspections), and freight and passenger train interference. Amtrak highlights its service improvement strategies for FY 20-24 in its 2019 Five Year Service Line Plan. Poor on-time performance resulting from freight train interference is listed as a paramount issue. The plan calls on policymakers to continue to give Amtrak trains preference on host railroad tracks to reduce delay resulting from conflicts with freight trains. Amtrak evaluates plans to continue to work with host railroads to understand both sides of this issue and find solutions. Amtrak has stated support for the Department of Justice's right to initiate enforcement actions when other solutions fail, but would like to supplement this power by creating a private right for action against host railroads.

Equipment replacement

Amtrak outlines its plan to address its aging fleet of locomotives and passenger cars in its [Equipment Asset Line Plan](#).

Amtrak plans to acquire 75 to 175 diesel locomotives to replace the current P-40/P-42 fleet used on long distance routes like the Empire Builder and the Coast Starlight. On December 20, 2018 Amtrak announced the award of a contract to Siemens for a base order of 75 Charger locomotives, with options for up to 100 additional units. Deliveries are forecast to begin in the second half of 2021, with all units delivered by the end of 2024.

The Superliner passenger cars used on Amtrak long distance trains in Washington are being reviewed for refresh by Amtrak's Product Development & Customer Experience group. Mechanical features will be assessed for refresh once the Superliner Life Extension Study that is currently underway is completed. This study will help Amtrak refine its plans for the remaining service life of these cars prior to replacement. Refresh work will include passenger seating, LED lighting, and surfaces. Upgrades to restrooms and plumbing systems may require more substantial work.

Station improvements

While Amtrak does not typically own station buildings in Washington, it does have responsibility for some of the infrastructure. In the near-term, Amtrak will be replacing the second platform at Centralia in 2020. New second platforms are also planned at Kelso and Olympia, but have not been scheduled yet.

Long-Term (20-Year: through 2040 and beyond)

Amtrak currently plans to replace its fleet of Superliner rail cars, used in Washington on the Empire Builder and Coast Starlight trains, between 2026 and 2031.

Intercity

Near-term (5-year: 2019-2024)

New equipment

In 2019, WSDOT was awarded a \$37.5 million Federal-State Partnership for State of Good Repair grant from the FRA to procure new passenger rail cars as part of Amtrak's national equipment replacement contract. The new passenger rail cars will replace the three WSDOT-owned Talgo Series 6 trainsets and are expected to be delivered in the mid-2020s. The total cost of the new passenger cars will be approximately \$75 million. The FRA grant will cover 50% of the cost. Insurance proceeds from the 2017 derailment in DuPont and some state funds will be used to fund the remaining 50%. Oregon DOT is also participating in Amtrak's national equipment replacement procurement.

New passenger rail cars to replace the three WSDOT-owned Talgo Series 6 trainsets are expected to be delivered in the mid-2020s, at a cost of approximately \$75 million.

In the short-term, prior to delivery of the new equipment, Amtrak is working to identify temporary passenger equipment to replace the Talgo Series 6 trainsets currently in service.

On-time performance

Tracking the cause of delays helps inform strategies for improving on-time performance. In the case of Amtrak Cascades, WSDOT, Amtrak, FRA, and infrastructure owner BNSF entered into a legally binding Service Outcome Agreement (SOA) when WSDOT invested nearly \$800 million in American Recovery and Reinvestment Act (ARRA) and High-Speed Intercity Passenger Rail (HSIPR) funds to improve the corridor. The agreement requires an on-time performance of 88% and a defined threshold of BNSF-responsible delay minutes on specific segments of the rail line. The Amtrak Cascades SOA requires that BNSF fully mitigate the effects of any changes in freight traffic volumes and operations on passenger train performance. Specifically, BNSF is required to develop and implement a corrective action plan when not meeting the service outcome goal. In 2018, only 56% of Amtrak Cascades trains were on time. WSDOT, BNSF, and Amtrak have been working together to improve on-time performance towards achieving the 88% target and will continue to do so.

BNSF is implementing delay mitigation strategies to reduce host railroad responsible delay minutes. WSDOT, BNSF, and Amtrak started an on-time performance workshop in 2019 to identify and implement strategies for improving on-time performance.

Federal preclearance program

Modifications will be necessary at Pacific Central Station to accommodate customs inspection activities. Once preclearance is implemented at Pacific Central Station, the scheduled travel time for southbound trains would be reduced by 10 minutes and reliability will be improved if the stop for customs inspection in Blaine can be eliminated.

Planning for future demand

Three different planning efforts are looking at different ways to meet the growing demand for intercity passenger rail in Washington. One is studying future improvement to the existing Amtrak Cascades service, another is assessing the viability of establishing new intercity passenger rail service between Seattle and Spokane, while a third is focused on ultra-high speed service between Vancouver, Seattle and Portland. These planning studies are expected to be completed within the next five years and could guide long-term investments.

Amtrak Cascades improvements

WSDOT received grant funding from FRA in 2019 to start a Service Development Plan for Amtrak Cascades between Portland, Oregon and Vancouver, British Columbia. The goal of this work is to perform an alternatives

analysis to identify a wide range of reasonable operational strategies and capital investment options that would improve the capacity, reliability, safety, and competitiveness of Amtrak Cascades. It builds upon the future ridership forecasts in this Rail Plan to identify what can be done to reach service improvement goals. The alternatives analysis will evaluate strategies and options to improve rail safety, service delivery options, travel times, passenger amenities, trip reliability, and on-time performance, without degrading freight service, incrementally through 2040. This work will be the starting point for environmental review and completion of a Service Development Plan.

East-west intercity rail service study

In 2019, the Washington State Legislature provided funding for the state's Joint Transportation Committee to conduct a study of an east-west intercity passenger rail corridor between Seattle and Spokane, with intermediate stops in Auburn, Cle Elum, Ellensburg, Yakima, Toppenish, and the Tri-Cities. The study will analyze potential ridership demand and provide a list of infrastructure improvements. It is scheduled to be complete on June 30, 2020.

Ultra-high-speed ground transportation

WSDOT is continuing to study Ultra-High-Speed Ground Transportation. The next phase will study governance in greater detail. This phase will explore options for a multi-jurisdictional authority to effectively procure, administer, own and operate an Ultra-High-Speed system across two U.S. States and one Canadian Province. It also will establish potential future tasks include robust public engagement, refinement of alignment and station locations, and a more detailed funding and financing strategy.

Long-term (20-year: through 2040 and beyond)

Addressing future demand

Over the long-term, depending on the results of planning work completed within the next few years and the availability of funds, projects identified during planning could move forward.

Amtrak Cascades

Once WSDOT completes a Service Development Plan for Amtrak Cascades, it will have an implementation strategy, including identification of specific infrastructure needs, to achieve the level of service described in the 2006 Long-Range Plan for Amtrak Cascades. WSDOT plans to continue using an incremental approach to increasing Amtrak Cascades service. If funded, improvements needed to implement one or more additional trips could be completed by 2040.

East-west intercity rail service

After the Legislature's Joint Transportation Committee completes its study of an east-west intercity passenger rail between Seattle and Spokane, the Legislature may choose to fund more detailed planning for this service. Depending on the results of the planning work and availability of funds, passenger service could be added to all or part of the Seattle-Spokane corridor by 2040.

Ultra-high-speed ground transportation

Additional tasks over the long term could include a range of project initiation and development activities such as risk assessment, environmental analysis and conceptual engineering, including construction activities such as final design and right of way acquisition.

Commuter

Near-term (5-year: 2019-2024)

Sound Transit is currently planning improvements to accommodate growing ridership on its Sounder South service. The first step for the Sounder South capacity expansion program is creation of a strategic plan to identify projects, service and completion dates. Sound Transit completed this plan in April 2020. Detailed planning for the first round of projects is expected to start later in 2020, and all expansion program improvements will be complete by 2036.

Sound Transit is scheduled to begin a five-year overhaul project of all Sounder train cars beginning in 2020.

Sound Transit will build a new Sounder maintenance base at the site of its existing rail yard between Steilacoom Boulevard Southwest and 100th Street Southwest in the City of Lakewood. The base will contain maintenance bays, material storage areas, and offices and facilities for employees. The maintenance base in Lakewood is expected to open in 2023.

Long-term (20-year: through 2040 and beyond)

In order to meet demand on the route between Seattle and Lakewood, Sound Transit plans to add more equipment and extend the route south to two more stations.

Lengthening train sets from the current seven car maximum up to ten cars could add 40% more capacity to the existing service. Sound Transit is beginning the procurement of additional equipment in 2020, anticipating four to five years to receive the equipment and prepare it for service. In addition to acquiring more equipment, this would require lengthening platforms to accommodate the longer trains. Sound Transit also expects that improvements would be required for longer trains at Holgate Yard in Seattle.

Extending commuter rail service south to Tillicum and DuPont will serve the residents of south Pierce County as well as Joint Base Lewis-McChord, a major military installation. Project planning will commence in 2025 and service is scheduled to start in 2036.

Sound Transit will negotiate with BNSF to increase the number of Sounder South trips. Adding additional trips would likely require infrastructure investments on the portion of the route owned by Sound Transit south of Tacoma.

Additional improvements to Sounder service and station access depend on funding availability.

In order to meet demand on the route between Seattle and Lakewood, Sound Transit plans to add more equipment and extend the route south to two more stations.

7.3 Integrated rail system

Multimodal connectivity for freight rail

Land use

Clark County is currently developing development codes that would allow freight rail-dependent development adjacent to the county's short line Chelatchie Prairie Railroad. The proposed development regulations include a list of industrial activities that would be permitted in the railroad overlay. The uses are primarily manufacturing and span a wide range of business sectors including: agriculture and forestry; construction; manufacturing; wholesale trade; and transportation and warehousing.

Washington ports

Washington is home to over 70 port districts, many of which own their own rail facilities. Each seaport in the state is unique, but most have plans to expand rail facilities at their terminals. For example, the Port of Everett is completing its South Terminal Modernization Project, which is strengthening a wharf to provide roll-on/roll-off cargo berthing while constructing additional rail sidings to increase on-terminal storage capacity. This project has received loans from the Freight Rail Investment Bank program administered by WSDOT.

Development plans for the Port of Longview on the Columbia River include realigning and expanding its rail corridor, adding new sidings, and building two new inbound and outbound tracks on the Barlow Point Terminal Railway. NWSA also is considering plans to align the North and South Intermodal Yards in Tacoma, which will increase the capacity of the rail yard and add additional train staging capacity to accommodate longer trains. Port of Bellingham is working with a private company that wants to build a new rail-served containerized freight facility that would require a new spur connecting to the BNSF mainline.

Inland ports also are making rail system investments. The Port of Moses Lake is working on the Northern Columbia Basin Railroad Project. The project restores rail service to the Port of Moses Lake/Grant County International Airport (GCIA) and provides new rail service to over 2,000 acres of industrial-zoned lands adjacent to the airport and along the Wheeler Industrial Corridor in Moses Lake.

Over the long-term, ports across the state likely will continue to pursue funding opportunities to increase rail capacity and improve the fluidity of cargo transfers between ships and rail.

First/last mile connectors

The City of Tukwila has been collaborating with BNSF to plan access improvements to the BNSF South Seattle intermodal facility. Tukwila is considering several different alternate routes to provide access to the facility.

Multimodal connectivity for passenger rail

Sound Transit is planning to add parking and improve access at Sumner, Puyallup, Auburn, and Kent. Sound Transit is also evaluating access improvements at Lakewood, South Tacoma, Edmonds, and Mukilteo. In addition, Sound Transit has a System Access Fund. The fund allocates \$100 million for projects that make it easier and more convenient for people to get to Sound Transit and partner transit services. These projects can include things like safe sidewalks, protected bike lanes, shared use paths, improved bus-rail integration, and new pick-up and drop-off areas. Sound Transit recently allocated approximately \$20 million of System Access Funds to projects. Projects in this initial allocation of funds that would improve access to Sounder stations are listed below in Exhibit 7-4. Stations at Edmonds, Everett, and Tukwila are shared with Amtrak Cascades and would benefit both services. Sound Transit plans to continue awarding System Access Funds through 2025.

Exhibit 7-4: Sound Transit System Access Fund projects for Sounder stations

Jurisdiction	Project	Amount	Phase
City of Everett	Everett Station Nonmotorized Access Improvements	\$1,900,000	Construction
City of Edmonds	Citywide Bicycle Improvements	\$1,850,000	Design, Construction
City of Auburn	Regional Growth Center Access Improvements	\$1,625,000	Design, Construction
City of Kent	W James Street at 2nd Avenue N Pedestrian Crossing	\$273,683	Design, Construction
City of Tukwila	Tukwila Station Nonmotorized Connectivity and Safety (for pedestrian signal on SR 181, improvements on Longacres Way, and Longacres Way/trail crossing)	\$2,064,000 ^a	Construction
City of Kent	W James Street at 2nd Avenue N Pedestrian Crossing	\$273,683	Design, Construction
City of Auburn	Regional Growth Center Access Improvements	\$1,625,000	Design, Construction
City of Puyallup	Bike Lane Expansions on W Stewart Avenue & 4th Street NW (for bike lanes on 4th Street NW)	\$155,995 ^a	Design, Construction
City of Sumner	Rivergrove Community Pedestrian Bridge	\$452,000	Design
City of Sumner	Sounder Safe Sidewalk/Bike Programmatic Enhancements (for bike lanes on Academy Street)	\$875,000 ^a	Design, Construction
City of Lakewood	111th Street SW/112th Street SW Improvements	\$1,040,000	Design, Construction

^a Indicates partial award in support of specific project elements

Rail system in communities

Technology and safety

Use of Positive Train Control will continue to be refined and monitored throughout the Pacific Northwest to help reduce the number of train-related incidents.

At-grade rail crossing safety and trespassing

The UTC leads and WSDOT, the Washington State Patrol, the Washington Traffic Safety Commission, and other stakeholders participate in Washington Operation Lifesaver. It is part of a national nonprofit program known as Operation Lifesaver, Inc. Washington Operation Lifesaver participates in community outreach events to spread awareness of railroad safety. It also provides volunteer speakers and trained instructors who offer free rail safety education programs. Its efforts are consistent with the Strategic Highway Safety Plan: Target Zero, which emphasizes education as one of five approaches to implementation (including engineering, enforcement, leadership/policy, and emergency medical services). WSDOT also created its own award-winning rail safety campaign – Stay Back from the Tracks – to educate Washington communities.

Upgrades to grade crossing warning devices can help reduce grade crossing incidents, and can include signage, signals, gates, and barriers. These improvements are identified by the agency responsible for the roadway. Projects at state-owned at-grade crossings are included in WSDOT’s Highway Safety Improvement Program. WSDOT

also selects a limited number of grade crossing protection improvement projects for funding through the Federal Highway Administration’s Section 130 program. The projects most recently funded by this program are listed in Exhibit 7-5. The UTC also funds grade crossing safety and trespass prevention projects through its Grade Crossing Protective Fund grant program.

Exhibit 7-5: Washington Rail Crossing Projects Funded by FHWA Section 130 Program (2017 Funding)

Project Location	Project Name	FHWA Funding
Arlington	67th Avenue NE	\$393,500
Bellingham	“F” Street	\$690,000
Bellingham	Harris Avenue	\$350,000
Centralia*	Locust	\$365,000
Centralia*	Maple	\$276,200
Franklin County	Hailey Road	\$95,000
Mount Vernon	4th Street N / Riverside Drive	\$1,447,947
Snohomish County	240th Street SE	\$417,619
Spokane County	Wellesley Avenue	\$1,009,598
Spokane County	Brooks	\$1,045,094
Spokane County	Espanola	\$666,317
Tacoma	6 th Avenue	\$1,106,752
Town of Garfield	2nd Street & 3rd Street	\$388,750
Walla Walla County	Port Kelly Road	\$586,300
Walla Walla County	Dodd Road	\$481,030
Wenatchee	9 th Street	\$1,321,165

*These projects have been withdrawn by the City of Centralia

Rail crossings in communities

Several grade separation projects will be constructed in communities around Washington in the near-term. The City of Seattle is completing a grade separation of South Lander Street over BNSF south of downtown. The \$100 million project is expected to be complete late in 2020. The City of Spokane Valley is completing design work for the Barker Road grade separation over a BNSF line, which will replace the current Barker Road crossing. The City of Spokane Valley plans also to petition to close the Flora Road at-grade crossing to the west. Construction is anticipated to begin in 2020 or 2021 and is estimated to cost \$25 million. The Port of Ridgefield is planning to complete the final phase of the Pioneer Street Rail Overpass late in 2020. The project will provide a grade separated route connecting downtown Ridgefield with the waterfront along the Columbia River. The final phase is

estimated to cost \$11.3 million and will replace at-grade crossings on Division Street and Mill Street. City of Kelso is planning to begin construction of the South Kelso Railroad Crossing project in 2021. The \$29 million project will create a grade separation at Hazel Street and close two existing at grade crossings. In Longview, WSDOT is leading the Industrial Way / Oregon Way Intersection Project that will elevate the highways, separating vehicle traffic from rail traffic. The Legislature has allocated \$85 million for the project and construction is expected to begin in 2023. Additional grade separation projects anticipated to be completed in the near-term are listed in Exhibit 7-6.

Exhibit 7-6: Funded grade separation projects¹

Project	Lead Agency	Location	Cost
I-5 @ SR 529 Interchange Improvements	WSDOT	Marysville	\$84,400,000
South Lander Street Grade Separation	City of Seattle	Seattle	\$100,000,000
I-5/Mounts Rd to Thorne Lane Corridor Improvements	WSDOT	Lakewood and Dupont	\$482,430,000
River S Bridge Replacement	U.S. Fish & Wildlife Service	Ridgefield	\$8,759,600
Pioneer St Rail Overpass	Port of Ridgefield	Ridgefield	\$14,923,000
SR 14 / Bingen Point Access Improvements	Port of Klickitat	Klickitat	\$22,900,000
Barker Road / BNSF Grade Separation	City of Spokane Valley	Spokane Valley	\$18,738,000

Numerous other grade separation projects have been proposed in communities around the state. Only a few are in design and awaiting construction funding. These projects are the most likely to be completed in the long-term. Exhibit 7-7 lists these projects.

Exhibit 7-7: Unfunded grade separation projects in design phase²

Project	Lead Agency	Location	Cost
McKittrick Street Grade Separation	City of Wenatchee	Wenatchee	\$25,000,000
South 228th Union Pacific Grade Separation	City of Kent	Kent	\$40,100,000
Canyon Road Improvements, Pioneer Way E to 52nd St E / 62nd Ave E	Pierce County	Fife	\$62,720,190
Regional Beltway Phase II	City of Union Gap	Union Gap	\$17,950,000

Energy products transportation

The Department of Ecology adopted amendments to Chapter 173-186 WAC, Oil Spill Contingency Plan – Railroad on December 12th, 2019 that:

¹ FMSIB, Road-Rail Conflicts Study fmsib.wa.gov/roadRail.cfm

² *ibid*

- Established three types of railroads for planning and scaled requirements according to the type of volume of oil moved. (Exhibit 7-8)
- Established requirements for citing Spill Management Teams in contingency plans, including entities providing wildlife rehabilitation and recovery services.
- Enhanced requirements for readiness for spills of oils that may weather and sink.
- Updated drill requirements to reflect legislative direction.

The rule went into effect on January 18th, 2020.

Exhibit 7-8: Proposed planning requirements for railroads moving oil in Washington state ³

Railroad Type	Contingency Plan Requirements	Washington Railroads
<u>Type A:</u> Crude oil railroads	A comprehensive oil spill plan and three drills per year	<ul style="list-style-type: none"> • BNSF • Union Pacific • Tacoma Rail
<u>Type B:</u> Railroads moving 49 or more tank cars per year of oil that is not crude oil	A comprehensive oil spill plan and one drill every three years	<ul style="list-style-type: none"> • Puget Sound & Pacific • Columbia Basin
<u>Type C:</u> Railroads moving less than 49 tank cars per year of oil that is not crude oil	A basic oil spill plan and no required drills	<ul style="list-style-type: none"> • Central Washington • Great Northwest • Portland Vancouver Junction

Ecology is currently undertaking a rulemaking to amend Chapter 173-185 WAC, Oil Movement by Rail and Pipeline Notification. This chapter establishes reporting standards for facilities that receive crude oil by rail and pipelines that transport crude oil through the state. The rule also describes reporting standards for Ecology to share information with tribes, emergency responders, local governments, and the public. The rulemaking will implement Engrossed Substitute House Bill (ESHB) 1578 and Engrossed Substitute Senate Bill (ESSB) 5579, both passed in 2019 and codified in RCW 90.56.565 and 90.56.580.

This rulemaking will:

- Expand advance notice reporting requirements for facilities that receive crude oil by rail to include type and vapor pressure of crude oil
- Expand biannual notice requirements for pipelines that transport crude oil through the state to include gravity and type of crude oil
- Describe how required information will be provided to the Utilities and Transportation Commission (UTC)
- Make other changes to clarify language and make any corrections needed

³ Department of Ecology fortress.wa.gov/ecy/publications/documents/1908014.pdf

Corridor preservation

In the near-term, WSDOT expects to complete its Active Transportation Plan that will identify gaps in the state network of pedestrian and bicycle trails. This network analysis could help local communities determine whether a rail line entering the abandonment process can address an identified statewide need for a trail.

Resiliency

WSDOT is working with BNSF to make the route used by Amtrak Cascades more resilient to landslides. These improvements will benefit the movement of freight as well. Continuing work started in 2014, WSDOT was awarded a \$2,035,000 CRISI grant from FRA in 2019 for a project to construct landslide mitigation measures at two locations in Mukilteo.

WSDOT plans to continue working with BNSF to make Amtrak Cascades service more resilient by addressing landslide prone locations as funding allows.

CHAPTER 8

RAIL FUNDING SOURCES

8.1 Federal

Federal Railroad Administration

The Federal Rail Administration manages grant and loan programs. The goals of the programs are to develop safety improvements and encourage the expansion and upgrade of passenger and freight rail infrastructure and services.

The FAST Act is a long-term surface transportation authorization enacted by Congress in 2015. Surface transportation acts have traditionally included only funding for federal-aid highways and transit (such as ferry, bus, and light rail). The FAST Act was the first surface transportation act that included heavy rail programs by including more than \$10 billion for intercity passenger and freight rail grants over five years. A total of \$2.2 billion has been authorized to be appropriated for the fiscal years 2016-2020 for three competitive rail development grant programs administered by FRA:

Consolidated Rail Infrastructure and Safety Improvements

Program (CRISI). The purpose of this grant program is to improve the safety, efficiency, and reliability of passenger and freight rail systems. Eligible activities include a wide range of capital, regional and corridor planning, environmental analyses, research, workforce development, and training projects. In February 2019, FRA announced \$56,933,567 in grant funding for 18 projects in 16 states under the CRISI program. Washington was awarded grants for two projects on the Pacific Northwest Rail Corridor. A \$2,035,000 WSDOT project will construct landslide mitigation measures at two locations in the city of Mukilteo. A second grant for \$500,000 will allow WSDOT to conduct service planning to develop a range of reasonable alternatives for potential infrastructure investments to improve Amtrak Cascades service.

Federal-State Partnership for State of Good Repair. The purpose of this grant program is to reduce the state of good repair backlog on publically owned or Amtrak-owned infrastructure, equipment, and facilities. Eligible activities include capital projects to (1) replace existing assets in-kind or with assets that increase capacity or service levels; (2) ensure that service can be maintained while existing assets are brought into a state of good repair; and (3) bring existing assets into a state of good repair. In August 2019, FRA awarded a \$37.5 million Federal-State Partnership for State of Good Repair grant to WSDOT for procurement of at least three sets of passenger rail cars for the Amtrak Cascades service.

Restoration and Enhancement Grants. The purpose of this grant program is to provide operating assistance to initiate, restore, or enhance intercity passenger rail transportation. Grants are limited to three years of operating assistance per route and may not be renewed.

In August 2019, FRA awarded a \$37.5 million Federal-State Partnership for State of Good Repair grant to WSDOT to procure at least three sets of passenger rail cars for the Amtrak Cascades service.

The FRA also established the Railroad Trespassing Enforcement Grant Program to pay for extra law enforcement presence in areas at high risk for incidents and fatalities. The program has a total of \$150,000 in funding available to state, county, and municipal law enforcement agencies to pay officer wages related to additional trespassing enforcement activities.

Federal Transit Administration

The FAST Act reauthorized funding of FTA formula grants through 2020, therefore providing more stability and predictability in funding for transit agencies. In addition to competitive grant programs, the FTA formula funds can be used for commuter rail projects and operations that include:

- Rural Areas – 5311
- Tribal Transit Formula Grants – 5311(c)(2)(B)
- Urbanized Area Formula Grants – 5307
- State of Good Repair – 5337
- Rural Transportation Assistance Program – 5311(b)(3)

Sound Transit has used FTA funds for some Sounder commuter rail projects in the past.

Federal Highway Administration

The Railway-Highway Crossings (Section 130) program provides funds to eliminate hazards at railway-highway crossings. (23 USC 130). The funds are set-aside from the FHWA Highway Safety Improvement Program (HSIP) apportionment for each state. WSDOT allocates the funding from this program for Washington projects such as: the installation of new crossing protective devices, upgrade of existing crossing signal devices, railroad crossing closures and bicycle/pedestrian crossing improvements. Fifty percent of a state's apportionment is dedicated for the installation of protective devices at crossings. The remainder of the funds can be used for any hazard elimination project, including protective devices. In 2017, 16 projects were funded through this program for a total of \$10,640,272. (Exhibit 7-5 has a list of these projects.)

In 2017, 16 projects in Washington state were funded through the Railway-Highway Crossings (Section 130) program for a total of \$10,640,272.

US Department of Transportation

USDOT administers competitive funding programs that are not mode-specific.

Build America Bureau

Established by the FAST Act, the Fostering Advancements in Shipping and Transportation for the Long-term Achievement of National Efficiencies (FASTLANE) grant program was a competitive and nationwide program specific to freight projects. It provided dedicated, discretionary funding for projects that address critical freight issues. Funding was authorized from 2016 to 2020, averaging \$900 million annually. In 2016, FASTLANE was administered by FHWA. The program now is being administered by the Build America Bureau as the Infrastructure for Rebuilding America (INFRA) program. INFRA advances the pre-existing grant program, by updating project criteria, leveraging capital and allowing innovation in project delivery. Projects in Washington that received funding to date from this program are shown in Exhibit 8-1.

Exhibit 8-1: FASTLANE/INFRA awards for rail projects in Washington state

Year	Project	Owner	FASTLANE Funding	Total Project Cost
2016	South Lander Street Grade Separation and Railroad Safety	City of Seattle	\$45 million	\$140 million
2016	Strander Boulevard Extension and Grade Separation Phase 3	City of Tukwila	\$5 million	\$38 million
2017	Northern Columbia Basin Railroad	Port of Moses Lake	\$9.9 million	\$32 million

The Better Utilizing Investments to Leverage Development (BUILD) Transportation Discretionary Grants Program was created in 2018. It is a continuation of the Transportation Investment Generating Economic Recovery (TIGER) grant program. The program is a competitive and nationwide program, which leverages matching funding from private sector partners, states, local governments, metropolitan planning organizations and transit agencies. Projects in Washington that received funding to date from this program are shown in Exhibit 8-2.

Exhibit 8-2: TIGER and BUILD awards for rail projects in Washington state

Fiscal Year	Amount	Sponsor	Purpose
2019	\$11,300,000	Spokane International Airport	Construct a rail-truck transload facility at the airport.
2018	\$5,677,000	WSDOT	Make improvements to all three branches of the Palouse River and Coulee City short line rail system
2017	\$9,020,149	City of Spokane Valley	Eliminated two at grade crossings (removed 1 and separated the other)
2016	\$10,000,000	Port of Everett	Modernized port and converted some truck trips to rail
2013	\$10,000,000	Sound Transit	Replaced single track wooden trestle and bridge over Tacoma tidelands to add four round trips for Sounder Seattle-Lakewood service and to assist Amtrak Cascades in adding two round trips between Seattle-Portland
2012	\$10,000,000	WSDOT	Relocated 7.5 miles of railroad for the US 395 North Spokane Corridor project

Surface Transportation and Innovative Finance Bureau

The FAST Act reorganized Federal loan and discretionary programs under the new Surface Transportation and Innovative Finance Bureau within USDOT. The Bureau houses the following programs:

Transportation Infrastructure Finance and Innovation Act. The act provides Federal credit and financing assistance with flexible repayment terms to projects of national and regional significance, including rail transit programs. The FAST Act reauthorized TIFIA, but with funding levels significantly lower than Moving Ahead for Progress in the 21st Century Act (MAP 21).

Railroad Infrastructure Financing and Improvement Act. The FAST Act expanded eligible projects for Railroad Rehabilitation and Improvement Financing to include transit-oriented and station development. The FAST Act also shortens review time and allows joint public-private ventures to encourage more applications to apply. As of May 31, 2015, the program has executed 35 loans for approximately \$2.7 billion nationally.

National Highway Freight Program. Section 1116 of the FAST Act created the formula-funded National Highway Freight Program, which funds projects that support the movement of goods on the National Highway Freight Network, including rail crossings, with \$1.2 billion annually in funding. The National Highway Freight Program provides Washington an estimated \$89 million from federal fiscal years 2016 to 2020. WSDOT identifies freight projects eligible for NHFP funds using requirements set forth by the Washington State Legislature. Up to 10% of these funds may be put toward improvements to freight rail or ports.

8.2 State

The Washington State Legislature appropriates biennial budgets to these three state agencies that implement rail programs – WSDOT, Freight Mobility Strategic Investment Board, and the UTC. The sources of the funds is primarily fees, permits, and licenses. State gas taxes cannot be used for rail programs.

Washington State Department of Transportation

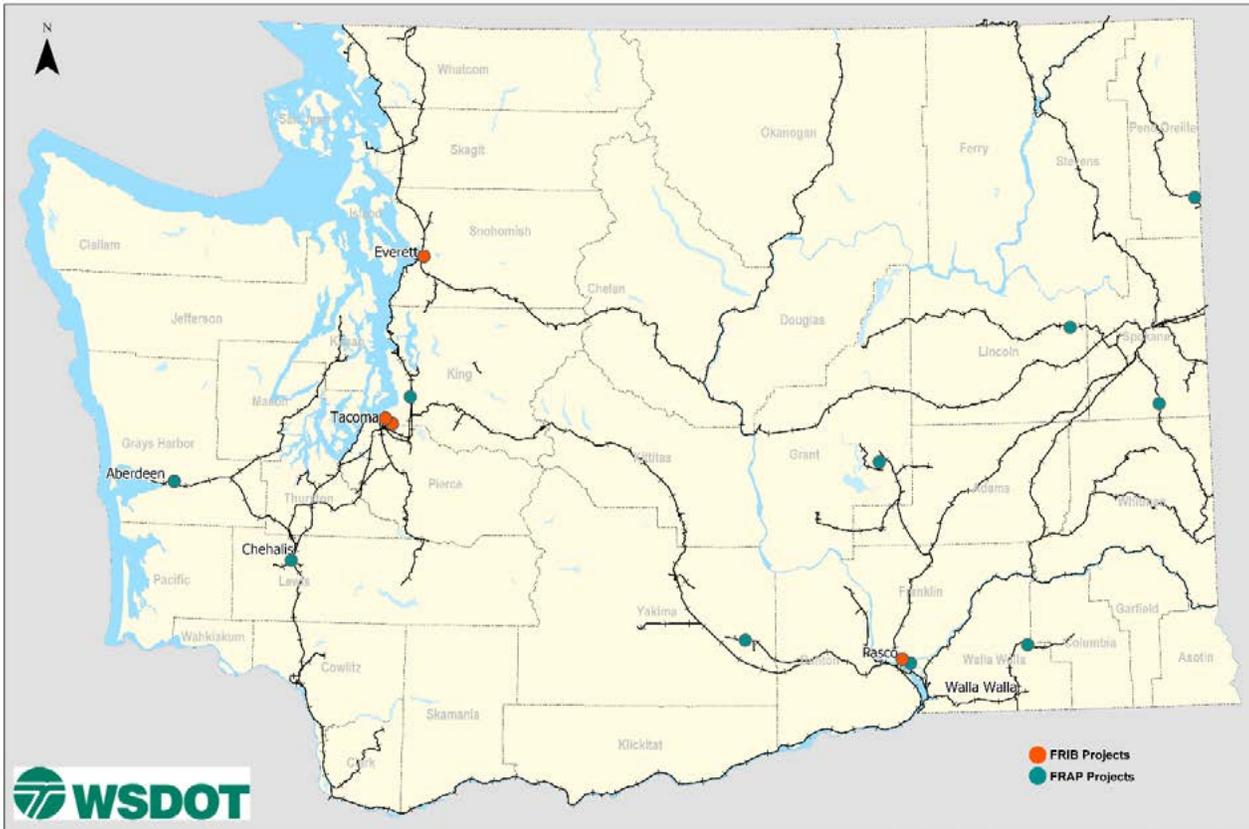
WSDOT's rail operations program is responsible for implementing rail passenger service, funding state-sponsored Amtrak service between Vancouver, British Columbia and Portland, Oregon, and maintaining state-owned passenger rail equipment. The state's freight rail program analyzes trends, issues, and potential needs of Washington's freight rail system and oversees operation of state-owned rail lines in eastern Washington.

WSDOT's rail capital program provides support, administration, coordination, and planning for both passenger rail and freight rail improvements. This program receives state funding; as well as federal grants. The program is responsible for implementing capital projects that support intercity passenger rail service growth, travel time savings, and schedule reliability. These include track improvements, acquisition of passenger rail equipment, and other investments. It is also the program that manages infrastructure investments on the state-owned short line rail system. The rail capital program also funds both a grant and loan program for railroad infrastructure projects across the state. These grant and loan programs support investment in the rest of the rail system through the Freight Rail Investment Bank (loan program) and the Freight Rail Assistance Program (grant program). The loan program is available for publicly owned railroads, port districts, rail districts, and local governments. The grant program is available to those in the public and private sectors.

Grant and loan applications to WSDOT fall into three broad categories: Critical infrastructure including bridges/tunnels, improvement and maintenance of existing infrastructure, and business development. The WSDOT Rail, Freight, and Ports division ranked and evaluated proposed projects through a benefit-cost analysis process. Funding was directed to projects expected to be most beneficial to Washington and those showing the greatest potential to be successful. Projects that directly increased existing rail transportation were ranked higher than those that were

forecasted as being primarily beneficial to the applicant, such as repairing rail equipment or storing cars. During the 2019-2021 biennium, ten short line railroad projects are receiving Freight Rail Assistance Program (FRAP) grants. Projects funded during this biennium are listed in Chapter 7 and shown below in Exhibit 8-3. They include repairs to a historic swing bridge, replacement of worn ties, purchases of equipment, as well as rail and tie upgrades to accommodate 286,000 pound rail cars.

Exhibit 8-3: FRIB/FRAP 2019-2021 project locations



Note: Projects awarded funds as of December 2019

Freight Mobility Strategic Investment Board (FMSIB)

The Freight Mobility Strategic Investment Program is a competitive grant program administered by FMSIB. FMSIB issues a call for projects every two years to maintain a 6-year list of active projects. These freight corridor projects are cross-jurisdictional and often serve cities, counties, port districts, and freight carriers, including railroads and trucking companies. FMSIB's grant program also can help fund WSDOT projects. There are six active projects that were awarded a total of \$29,650,000. Four are grade separation projects and two are rail-only projects.

Utilities and Transportation Commission (UTC)

The UTC administers the Grade Crossing Protective Fund (GCPF). The fund provides grants to railroad companies, local governments, and other agencies for safety improvements at railroad crossings or along a railroad right-of-way. Funding also is available for safety improvements at passive (no lights and gates) public railroad crossings and for implementing other rail safety projects. The selection process includes evaluating the severity of the hazard, the safety benefits resulting from the project, the total costs to implement a project, geographic diversity and funds available for the program.

From 2017 to 2019, UTC awarded nearly \$1,140,000 to install or improve active warning devices at three crossings along oil routes:

- \$295,311 to the City of Millwood to install active warning devices at the Marguerite Street crossing in Millwood;
- \$406,060 to Skamania County to upgrade active warning devices at the Butler Road crossing near Stevenson; and
- \$438,174 to Snohomish County to install active warning devices at the 48th Avenue NW crossing near Stanwood.

The commission also awarded nearly \$344,000 to improve safety for pedestrians and drivers around railroad tracks:

- \$990 to the Port of Chehalis to complete signage upgrades at 21 crossings on its rail line in Chehalis;
- \$8,520 to Yakima County to upgrade to LED lighting at the Barkes Road, Lateral A Road, and Wesley Road crossings in Yakima County;
- \$19,084 to the City of Bingen to upgrade the active warning devices at the Walnut Street crossing in Bingen;
- \$20,000 to the City of Kent to install fencing near S. Willis Street and E. James Street in Kent to prevent pedestrian access to tracks;
- \$36,784 to the City of Auburn to install mountable median barriers with delineators, upgrade existing street lighting to LEDs, and install new street lights at the C Street SW crossing in Auburn;
- \$40,597 to Cascade & Columbia River Railroad Company for upgrades to the train detection system at the 4th Street crossing in Tonasket;
- \$50,000 to the City of Tacoma to assist in paying for installation of pedestrian signals and gates at the McCarver Street crossing;
- \$77,096 to Central Washington Railroad to upgrade train detection at the W. Second Street and Grandridge Road crossings in Grandview and Division Street and Sunnyside Avenue crossings in Granger; and
- \$90,840 to Puget Sound & Pacific Railroad to upgrade train detection, replace batteries and battery chargers, and update signal plans and software at the E. Heron Street, Chehalis Street, Newell Street, and Tyler Road crossings in Aberdeen.

CHAPTER 9

CONCLUSION

The State Rail Plan is not an end point. Instead, the plan is meant to guide and inform public investment and action on the rail system. It highlights critical needs facing the system and outlines a series of recommendations to address them.

Next steps include:

- Delivering funded capital projects to improve rail service
- Incorporating results of the State Rail Plan into other state and regional plans
- Collaborating with stakeholders and partners to refine and focus investment priorities
- Initiating scoping and project development to prepare for future funding opportunities

Also, WSDOT maintains the ability to issue a technical update to this plan as appropriate prior to developing the next State Rail Plan.

The State Rail Plan is meant to guide and inform public investment and action on the rail system, highlighting critical needs facing the system and outlining recommendations to address them.