Washington State Department of Transportation

Washington Transportation Plan Update

Freight Movement

Draft as of December 23, 2005

Washington State Department of Transportation

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Table of Contents

Table of Contents 2
List of Exhibits 5
The Role of the Washington Transportation Plan (WTP) 7
Executive Summary 8
Introduction 18
Global Gateways 20
- **Trade in Washington's Economy** 21
- **Washington's Role in International Trade** 22
  - Major U.S. Trading Partners 22
  - Discretionary Cargo 23
  - Trade is Growing 24
- **East – West Trade** 26
  - Containerized Imports 26
    - Container Ports 28
    - Rail Corridors 30
    - Highways 33
    - Emerging Directions for East- West Trade 35
  - Agricultural Exports 36
    - Columbia River Ports 37
    - Rail and Barge 40
  - U.S. Military's Readiness and Operations 43
  - Emerging Directions for West- East Trade 44
- **North- South Corridors** 45
  - U.S.- Canadian Border 45
    - Rail Crossings 46
    - Truck Traffic 46
    - Border Delays, Congestion, and Security Issues 49
  - North- South Highway Corridors 51
    - Interstate 5 51
    - Emerging Directions for North- South Corridors 54
  - Alaska 55
    - Major Issues for Alaskan Shipping Lines 57
- **Air Cargo** 57
  - Seattle-Tacoma International Airport 58
  - Emerging Directions in Air Cargo 60
- **Summary and Outlook for the Future** 62

Made in Washington 63
- **Overview** 64

Southeast Washington **65**
The Columbia Basin and North Central Washington **69**
Central Puget Sound **72**
Spokane Region **80**
Vancouver: Southwest Washington **82**
Northwest Washington **84**
Coastal Counties **85**
Summary and Conclusion **87**
Delivering Goods to You **88**
Overview **88**
Final Distribution by Truck. 88
Distribution Centers (DCs) 90
Emerging Issues 92
Groceries and Restaurants **94**
Grocery Stores. 94
Emerging Issues 97
Restaurants. 98
Retail Goods **99**
High Value, Precision Timing Shipping **101**
Express Package Delivery 102
Health Care 104
Waste Removal System **105**
Emerging Issues. 109
Fuel **109**
Refineries. 110
Pipelines 111
Barges and Tankers. 112
Regional Distribution Centers 114
Jet Fuel Distribution System 115
Major issues 116
Capacity 116
Pipeline 116
Pricing and Consumption 116
Sea-Tac Airport Fueling 117
Summary and Conclusion **117**
Conclusion (To Come) **118**
Appendix **119**
Appendix A- Map: Washington State Marine Ports **119**

Appendix B- Map: Washington State Freight Rail System.....119
Appendix C- Map: Washington State Highway Freight Routes 121
Appendix D- Map: U.S./ Canadian Border Crossings 122
Appendix E- Map: Intermodal Facilities and Highway Network.....122
Appendix F- Map: Airports Handling Cargo in Washington State.....124
Appendix G- Map: Agriculture Production by County.....125
Appendix H- Map: Manufacturing Activity and Truck Traffic.....126
Appendix I- Map: Marine Related Business Locations Seattle.....127
Appendix J- Map: Highway Features and Truck Movement.....128
Appendix K- Map: Pacific Northwest Energy Corridors.....128
Appendix L- Map: Western U.S. Petroleum Pipelines.....129
Appendix M- Washington State Ferries and Freight.....130
Appendix N- Washington State Railroads 132
Appendix O- Tribal Freight Needs.....133
Appendix P- Light Trucks for Local Delivery 133
Appendix Q- WSDOT Freight Office Research Methodology.....134
Glossary of Terms 139
Bibliography.....141

List of Exhibits

Exhibit 1: Washington State Value of Freight Shipments (Chart).....
Exhibit 2: Trade Through Washington by Volume (Map) .....
Exhibit 3: Washington State Regional Economies (Map).....
Exhibit 4: Commercial Trucks Licensed in Washington State (Chart).....
Exhibit 5: Washington State Value of Freight Shipments (Chart).....
Exhibit 6: Trade Through Washington by Volume (Map) .....
Exhibit 7: Washington's Rank in the Top U.S. Freight Gateways (Table) .....
Exhibit 8: Value of International Trade of Goods through Washington (Table) .....
Exhibit 9: International Trade Trends for the U.S. and Washington (Graph).....
Exhibit 10: Containership at Puget Sound (Picture).....
Exhibit 11: Goods Entering Washington by Water (Chart).....
Exhibit 12: International Imports Entering Washington's Seaports (Chart) .....
Exhibit 13: Intermodal Train on Puget Sound (Picture).....
Exhibit 14: Mainline Rail Capacity and Projected Operations (Table).....
Exhibit 15: Washington International Truck Flows (Map).....
Exhibit 16: Goods Leaving Washington by Water (Chart).....
Exhibit 17: International Exports Leaving Washington's Seaports (Chart).....
Exhibit 18: Goods Bound for Washington By Rail (Chart).....
Exhibit 19: Barge Traffic on the Columbia- Snake River System (Table).....
Exhibit 20: Trucks Entering Washington State From Canada (Chart).....
Exhibit 21: Rank of Land Ports on U.S.- Canadian Border (Table) .....
Exhibit 22: Origins and Destinations of Trucks at I-5 Border (Chart).....
Exhibit 23: Commodities Transported Cross- Border by Truck (Chart).....
Exhibit 24: Weigh-in-Motion (WIM) Scales Deployment in Washington.....
Exhibit 25: Estimated Average Annual Daily Truck Traffic (Map).....
Exhibit 26: Total Daily Vehicle Hours of Delay per Lane Mile (Map).....
Exhibit 27: Daily Truck Trips (Table).....
Exhibit 28: TOTE Alaskan Vessel (Picture).....
Exhibit 29: Air Cargo Through Sea- Tac International Airport (Graph).....
Exhibit 30: Seattle- Tacoma International Airport Air Freight (Chart) .....
Exhibit 31: Washington State Regional Economies (Map).....
Exhibit 32: Grain Elevator on Columbia River (Picture) .....

Exhibit 33: Columbia- Snake River Transportation System (Map) .....
Exhibit 34: Apple Farming in Washington (Picture).....
Exhibit 35: Washington Tribal Lands (Map) .....
Exhibit 36: Boeing's Western Washington Facilities and Routes (Map).....
Exhibit 37: Boeing's Washington Supply Base (Map) .....
Exhibit 38: Boeing's United States Supply Base Overview (Map).....
Exhibit 39: Boeing's Supply Chain Moves on Rail as Well as Road (Map) .....
Exhibit 40: Central Puget Sound Maritime Sector (Map).....
Exhibit 41: Total Logistics Costs (Table) .....
Exhibit 42: I-5 Columbia River Bridge (Picture).....
Exhibit 43: Central Puget Sound Average Daily Truck Trips by Type (Chart) .....
Exhibit 44: Most Commercial Trucks Licensed in Washington are Light (Chart)....
Exhibit 45: Distribution Centers in Washington (Map).....
Exhibit 46: Weekly Deliveries to Metropolitan Market (Chart) .....
Exhibit 47: Total Vehicles by Time of Day on North- South Highways (Chart).....
Exhibit 48: Food Service and Drink Place Establishments in Washington (Chart).
Exhibit 49: Municipal Waste to Roosevelt Regional Landfill (Map) .....
Exhibit 50: Petroleum Consumption is Increasing in Washington (Graph).....
Exhibit 51: Washington Refinery Capacity (Table).....
Exhibit 52: Olympic Pipe Line (Map) .....
Exhibit 53: IntraState Waterborne Cargo Movements in Washington (Chart) .....

The Role of the Washington Transportation Plan (WTP)

Washington's Transportation Plan (WTP) is a blueprint for transportation programs and spending. This update of the WTP, which covers 2007-2026, will include a 10-year investment proposal for statewide program and state projects, in addition to proposals for statewide policies that deal with all aspects of transportation.

The WTP addresses nine strategic issues including the issue of freight movement. It addresses all modes of the transportation system including roadways, ferries, public transportation, aviation, freight rail, passenger rail, marine ports and navigation, bicycles and pedestrians.

The development of the WTP is a data-driven process that leads to Commission prioritization of investments into high, medium, and low priority. Examples of freight specific projects include international trade, wholesale and retail distribution, and distributing locally produced goods. The WTP looks at the transportation system as a whole to determine strategic future investments based on the data analysis from each sector of the system. This analysis is then compared to realistic levels of transportation funding in Washington and plausible projects are set for implementation over the next 10 years.

Washington Transportation Plan Freight Report: Executive Summary (Draft January 20, 2005)

Overview

The three components of Washington State's freight system:

- Global Gateways – International and National Trade Flows Through Washington
- Made in Washington – Regional Economies Rely on the Freight System
- Delivering Goods to You – The Retail and Wholesale Distribution System

underpin our national and state economies, support national defense, directly sustain hundreds of thousands of jobs, and distribute the necessities of life to every resident of the state everyday.

First, Washington is a gateway state, connecting Asian trade flows to the U.S. economy, Alaska to the Lower 48, and Canada to the U.S. West Coast. About 70 percent of international goods entering Washington gateways continue on to the larger U.S. market.[1] Thirty percent become part of Washington's manufactured output or are distributed in our retail system.

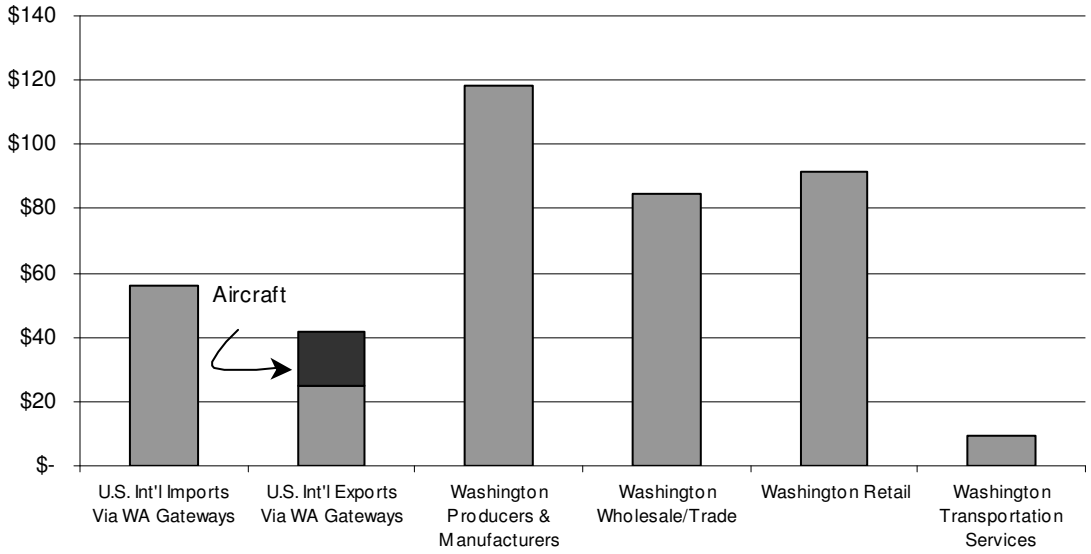
Second, our own state's manufacturers and farmers rely on the freight system to ship Washington-made products to local customers, to the big U.S. markets in California and on the east coast, and worldwide. Washington's producers generate wealth and jobs in every region in the state.

Finally, Washington's distribution system is a fundamental local utility, since without it our citizens would have nothing to eat, nothing to wear, nothing to read, no spare parts, no fuel for their cars and no heat for their homes. In other words, the economy of the region would no longer function.

The value and volume of goods moving in these freight systems is huge and growing.

[1] Chase, Robert A. and Glenn Pascall. *Foreign Imports and Washington State Economy*: (1999).

Exhibit 1: Washington State Value of Freight Shipments
2003: Billions of Dollars



Washington State Department of Community, Trade & Economic Development. *2003 Washington State Exports and 2003 Washington State Imports*: 2004. Prepared by JTS Associates (215/794/7684) from Department of Commerce Foreign Trade Statistics. All data based on goods laded or unladed in Washington State (regardless of initial origin or final destination).

Washington State Department of Revenue. *Quarterly Business Review Calendar Year, 2003. Table 1: Total Gross Business Income Statewide by Industry (SIC).* As of November 2004: <http://dor.wa.gov/content/statistics/2003/qbrcal03/default.aspx>.

What is the purpose of the WTP freight report?

The report will be presented to decision-makers to support Washington State's strategic investment plan in the freight transportation system. It is organized in three chapters that explain Washington's role as a gateway state, how freight transport supports Washington's regional economies, and the role of the local distribution system.

The report analyzes original research and existent information about Washington State freight customers, to inform decision-makers:

- Who are the customers of the state's freight system
- Why freight customers matter in terms of jobs and contribution to Gross State Revenues
- What performance the customers expect from the freight system
- Where key performance gaps are located
- How decision-makers may make the most productive strategic investments in Washington State's freight system.

The report provides context for the system's assessment by featuring more than a dozen case studies of Washington State freight carriers, producers and

distributors. It defines terms to create a common vocabulary, and summarizes data from state and federal freight studies relevant to Washington.

What are the findings?

Globalization, competitive industry trends, and new technologies are pushing freight volumes up twice as fast as Washington's overall population and traffic growth. Without strategic investment by the public sector, our natural population growth, intensified by these three trends, will choke international trade flows through the state, undermine regional economies, and spill over into competition for road capacity in congested metro centers. With strategic investment, Washington will continue to compete.

While Washington State's population grew from 4.1 million to 6.1 million from 1980 to 2003 (the 45 percent increase includes substantial in-migration), and is projected to grow to 8.3 million (a 34 percent increase) by 2030, growth in the freight system is increasing at a much higher rate.[2] Truck trips increased by 94 percent on the Interstate 5 corridor, and by 72 percent on the Interstate 90 corridor, in the ten years between 1993 and 2003.[3] From 1998 to 2020, freight volumes in Washington State are expected to increase by 80 percent.[4]

Global Gateways – International and National Trade Flows Through Washington

As shown in the following map, Washington State's strategic location positions it as an important and growing gateway for trade access to the Pacific Rim, Canada, and U.S. states. Focusing on markets and supply chains, this section is organized by East - West trade (including containers traveling from Asia to Chicago, agriculture from the Midwest to Asia and military transport) and North - South trade (including Canadian trade, freight along the West Coast and Alaskan trade).

Exhibit 2: Trade Through Washington by Volume

Developed by the Washington State Department of Transportation, Geographic Services and Strategic Analysis & Program Development: July 2004.

[2] Washington State Office of Financial Management. *Forecast of the State Population by Age and Sex: 1990 to 2030 November 2004 Forecast (History 1970 to 1990 Included)*: November 2004. As of January 2005: <http://www.ofm.wa.gov/pop/stfc/index.htm>.
[3] Washington State University, Strategic Freight Transportation Analysis (SFTA). *SFTA Origin- Destination Freight Data 1993/ 1994- 2002 Spring/ Summer Preliminary Comparisons: Presentation to SFTA Advisory Committee Meeting Walla Walla, WA*. As of November 2004: <http://www.sfta.wsu.edu/presentation/pdf/7_Steering_Origin_Destination.pdf>
[4] U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations. *Freight Analysis Framework - State Freight Profile*. As of November 2004: <http://ops.fhwa.dot.gov/freight/freight_analysis/state_info/washington/profile_wa.htm >

Globalization, in particular the emergence of China and Asia as an important part of the factory floor for the United States, will double the volume of imported container freight entering the Ports of Seattle and Tacoma by 2025.[5] Midwest and East Coast consumers, at the far end of the Asia-to-United States supply chain, purchased about three-fourths of the international goods entering Washington ports in 2003. Most of these goods are shipped to the Midwest in containers via rail, but there isn't enough east-west rail capacity to handle a doubling of current volume.

Global security needs and our national defense depends on the United States ability to rapidly project force when needed. Fort Lewis is the only Power Projection Platform on the West Coast. In the event of a major conflict, essential equipment and supplies will rush to Fort Lewis from all over the United States by rail and road, then ship through the Ports of Tacoma, Olympia and Seattle to support the troops. The military traffic will attempt to surge through two freight systems that have already reached their capacity limits: east-west rail road lines, and on Interstate 5 in Central Puget Sound.[6]

Washington's own largest waterborne export is food, mostly grain. Eighty-five percent of eastern Washington wheat is shipped to Asia via Columbia River ports, but farmers struggle to get product through the state's freight system.[7] Growers can't get produce off the farm up to two months a year due to weight-restrictions on county roads, and the Columbia-Snake River system is at risk due to federal restrictions on dredging and lock maintenance. The Port of Vancouver rail yard is severely congested, slowing wheat exports and creating a bottleneck in the Pacific Northwest's rail system.

By far, Washington's largest waterborne import is crude oil from Alaska, shipped to the state's refineries.[8] Refined product: gas, diesel and jet fuel, then moves by pipeline or barge to distribution centers and is trucked to gas stations. Although Washington's citizens and industries consume 17.6 million gallons of petroleum per day, making the state's consumption 17th in the United States, and consumption is growing, the Olympic Pipe Line, currently operating at close to 100 percent capacity, has no plans to add pipeline capacity in the state.[9]

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[5] BST Associates. *2004 Marine Cargo Forecast: Technical Report Final*: May 19, 2004. Prepared for the Washington Public Ports Association and the Washington State Department of Transportation. As of November 2004: <http://www.washingtonports.org/Trade/tradecover.htm>

[6] This information is provided to the state for planning purposes from the Surface Deployment and Distribution Command - Transportation Engineering Agency: 2004.

[7] Washington Wheat Commission: 2004. <http://wawheat.com/>

[8] U.S. Army Corps of Engineers Navigation Data Center- Waterborne Commerce Statistics *Center. CY 2002 Waterborne Tonnage by State (In Units of 1000 Tons)*. As of November 2004: <http://www.iwr.usace.army.mil/ndc/wcsc/statenm02.htm>.

[9] Energy Information Administration. *Total Energy Consumption Estimates by Source, 1960- 2001, Washington*: (Last Updated: 12/15/2004). As of November 2004: <http://www.eia.doe.gov/emeu/states/sep_use/total/use_tot_wa.html>

Cross-border truck volumes have nearly doubled at western Washington crossings over the past 11 years.[10] This growth has strained border crossing facilities and enforcement agencies processes, resulting in queues of trucks north and southbound.

Made in Washington – Regional Economies Rely on the Freight System
This chapter is organized by the state's regional economies, as shown in the following map. The seven regions profiled include Southeast Washington, Columbia Basin and North Central Washington, Central Puget Sound, Spokane Region, Vancouver and Southwest Washington, Northwest Washington, and Coastal Counties.

Exhibit 3: Washington State Regional Economies

Our state's regions have built strong and distinct economies based on industry and agriculture. Over 450,000 jobs in regional manufacturing, agriculture, construction and forestry depend on Washington's freight system, and accounted for $118.5 billion, or 29 percent of all state gross business revenues in 2003.[11] Transportation is especially important for Washington agriculture because the state produces about three times as much food – and for some commodities up to twenty times as much on a tonnage basis – as it consumes, and it is separated by long distances from the majority of the nation's consumers.[12] More efficient freight systems will help Washington manufacturers compete in the larger West Coast market.

Competitive pressure to cut inventories from every step in the manufacturing process is reshaping industrial supply chains, and causing more frequent freight shipments. The Boeing Company, employing 53,000 in Central Puget Sound, is Washington's largest manufacturer with $22.4 billion in airplane revenues in 2003.[13] Boeing's dependence on the state's freight system will become even greater as it sets new levels of efficiency in the manufacture of the new 7E7

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[10] Whatcom Council of Governments. *1993- 2003 Cascade Gateway Cross- Border Auto and Truck Volumes.* As of January 2005: < http://www.wcog.org/library/imtc/2003Data.pdf>. Data compiled by the Whatcom Council of Governments from U.S. Customs Service and Statistics Canada

[11] Washington State Office of Financial Management. *2003 Washington State Data Book*: January 9, 2004. *Table CT06: Nonagricultural Wage and Salary Employment by Major Industry. A*s of January 2005: <http://www.ofm.wa.gov/databook/economy/ct06.htm>.
Washington State Department of Revenue. *Quarterly Business Review Calendar Year, 2003. Table 1: Total Gross Business Income Statewide by Industry (SIC).* As of November 2004: <http://dor.wa.gov/content/statistics/2003/qbrcal03/default.aspx>.

[12] Washington State University, *Strategic Freight Transportation Analysis (SFTA).*

[13] Boeing Company *2003 Annual Report.*

Dreamliner. Although Boeing has historically made planes from up to a million smaller pieces and shipped them by truck, train and boat, its new strategy to gain efficiency is based on major component assembly. Fewer parts, with more frequent deliveries, will support their just-in-time inventory reduction strategy.

Cost-cutting inventory reduction strategies are also underway at thousands of other mid-market manufacturers and producers around the state. For example, the Vancouver Frito-Lay plant receives up to 50 truckloads of fresh potatoes each week from growers in the Columbia Basin. The plant keeps just enough potatoes on hand for one eight-hour shift; if the potatoes do not arrive on time, the plant cannot run. WaferTech's one-million-square-foot semiconductor foundry in East Clark County can't function without fast and reliable air cargo; if a tool is delayed overnight in the supply chain from Taiwan, the plant will shut down and idle 1,000 employees. Farmers ship vegetable produce over 200 miles from Prosser to Costco in Central Puget Sound, and are required to deliver within 15 minutes of their scheduled appointment.[14]

These competitive trends are repeated in thousands of manufacturing plants, construction sites, agricultural growers and processors, and distributors facilities in Spokane, Bellingham, TriCities and across the state - driving logistics practices toward perfect flow that puts more trucks on the road, more frequently, with ever-shorter delivery windows.

Spokane regional manufacturers and health care system practitioners, and Eastern Washington agricultural growers and processors, all cite severe winter weather closures on Interstate 90 at Snoqualmie Pass as Eastern Washington's top freight priority. They ship to customers in Central Puget Sound, so fixing delays on Interstate 5 from Everett to Olympia comes in a close second.

Northwest and Southwest Washington manufacturers and trucking firms are also shipping to the Central Puget Sound region, so they put fixing the Interstate 5 corridor at the top of the list.

The Columbia Basin/North Central Washington agricultural center leads the nation in apple and potato production. Apples and potatoes must be shipped in refrigerated truck or rail cars; 90 percent are trucked to market. Continued refrigerated truck shortages are likely due to seasonal peak demand and an ongoing pull from other U.S. regions for refrigerated capacity.

Delivering Goods to You – The Retail and Wholesale Distribution System

Distribution is a critical component of the freight system, as it produces up to 80 percent of all truck trips in metropolitan areas, and serves the retail, wholesale and business services sectors.[15] These sectors supported 1,690,000 jobs and

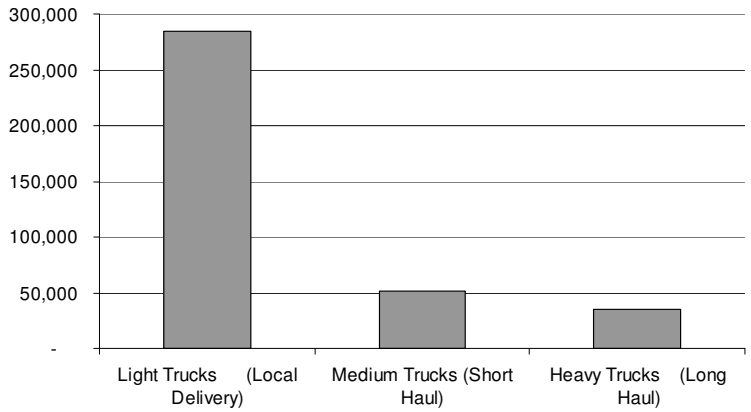
[14] Washington State Department of Transportation, Freight Strategy and Policy Office. One- on- one interviews with high-volume shippers and carriers conducted in 2004.

[15] Cambridge Systematics, with TranSystems Corporation, Heffron Transportation, and the University of Washington. *FASTrucks Corridor Needs Study, Truck Model Documentation*: December 2000. Prepared for the Washington State Department of Transportation.

accounted for $240.3 billion in 2003 gross business revenues, equal to 58 percent of total state revenues.[16] An enormous variety of goods are handled on this system; food and groceries, fuel, pharmaceuticals and medical supplies, retail stock, office supplies and documents, trash and garbage, construction materials and equipment.

Distribution companies must provide fast and ubiquitous service that is reliable under all conditions. FedEx and UPS drivers do not go home until every package is delivered. Hospital patients cannot wait for drug deliveries. Washington's modern service economy depends on speed of delivery through the freight system.

Exhibit 4: Most Commercial Trucks Licensed in Washington State Are Light



Washington State Department of Licensing, Agency Computer Services. Vehicle records inquiry made by the Washington State Department of Transportation, Freight Strategy and Policy Office: September 2004.

The most common method of distributing goods is by truck from large Distribution Centers (DCs) to stores and businesses. When those trucks run into congestion, companies compensate for delays by sending more trucks out on the road, causing even more congestion. Land use costs are also causing higher truck volumes. For example, in response to increased consumer demand for a wider variety of food products, grocers are increasing overall store size and shelf space. But back-storage space doesn't generate sales, so modern grocery stores are reducing expensive, non-productive storage space. This requires more frequent deliveries in smaller quantities; one Seattle specialty grocery store, for example, receives 375 truck deliveries per week.[17]

New technologies enable companies to track more and more trucks, balance their inventories and capital usage, while managing very tight delivery windows. For example, UPS and FedEx's high-tech logistics services allow companies to

[16] Washington State Office of Financial Management. *2003 Washington State Data Book: January 9, 2004. Table CT06: Nonagricultural Wage and Salary Employment by Major Industry.* As of January 2005: <http://www.ofm.wa.gov/databook/economy/ct06.htm>.
Washington State Department of Revenue. *Quarterly Business Review Calendar Year, 2003. Table 1: Total Gross Business Income Statewide by Industry (SIC).* As of November 2004: <http://dor.wa.gov/content/statistics/2003/qbrcal03/default.aspx>.
[17] Heffron Transportation, Inc. *Howe Street Mixed-Use Project Traffic and Parking Impact Analysis:* November 2001. Case study: Metropolitan Market on Seattle's Queen Anne Hill.

track inventory on the Internet no matter which warehouse, truck, or other location holds their products. By implication, the greatest increase in overall truck volumes will be seen in many more, smaller trucks on the roads.

What alternatives are available?

Manufacturers, agricultural growers and processors, and distributors state that there is no practical alternative to Washington's major highway system, and use Interstate 5 and Interstate 90 as primary freight routes.

In the north-south freight corridor, significant congestion is found on Interstate 5 from Everett to Olympia and over the Columbia River Bridge, and the full length of I-405 and Highway 167. If the Alaskan Way Viaduct fails, up to 110,000 trucks and cars (enough to fill two freeway lanes in each direction) will try to move to Interstate 5, everyday, increasing congestion by nearly 40 percent.[18] In addition, the north-south freight corridor system is incomplete between Interstate 5 and Highway 509 and Highway 167.

The majority of Washington State air cargo moves through Seattle-Tacoma International and King County Airports, therefore congestion on Interstate 5 in Central Puget Sound, and eastbound on Highway 518 from Sea-Tac to Interstate 5, directly impacts reliability and on-time performance of the state's air cargo system. Trucking companies may try to schedule around congestion patterns, but must meet customer demands for on-time service in preferred time windows.

In the east-west freight corridor, severe weather closures on Interstate 90 at Snoqualmie Pass cut off Eastern Washington producers from their major markets in Central Puget Sound and points south.

What are the recommendations?

The WTP Freight Strategy identifies twelve highly productive investments Washington State can make to generate overall economic prosperity and wealth to citizens in the state. These improvements are necessary to support Washington's role as a global gateway, our own state's manufacturers and agricultural growers, and the state's retail and wholesale distribution systems.

- Address freight constraints in the Interstate 5 corridor from Everett to Olympia. Analyze the benefits of a public-private truck-toll highway from Central Puget Sound to the Oregon border. This highway could be an extension of Interstate 5, or follow the Interstate 405/Highway 167/Highway 512/ Interstate 5 route, or be a separate facility.

- Improve Interstate 90, east of and over Snoqualmie Pass, to prevent severe weather closures.

[18] U.S Department of Transportation, Washington State Department of Transportation, and City of Seattle. *SR 99: Alaskan Way Viaduct & Seawall Replacement Project. Draft Environmental Impact Statement*: March 2004.

- Identify, establish and fund a statewide core all-weather county road system.

- Support growth in east-west mainline rail capacity and port-rail connections, and preserve rail yards in metro areas.

    - The Burlington Northern and Santa Fe Railway's (in track miles and volume the state's largest railroad) top priorities include adding siding along the Columbia River Gorge, enlarging 'crown-cutting' Stampede Pass to accommodate double-stacked trains, and completing the Swift siding improvement at the Canadian border and the Vancouver bypass route.

    - Review the relationship between freight and passenger rail service on the Interstate 5 rail corridor, and ensure that growth of passenger rail does not encumber freight service.

- Maintain the Columbia-Snake River barge system by implementing a strategic dredging and lock maintenance plan.

- Complete the statewide Commercial Vehicle Information System Network (CVISN)/ Weigh-In-Motion system.

- Preserve and enhance freight access to hub airports in metro areas. Add a third eastbound lane on Highway 518 from Seattle-Tacoma International Airport to Interstate 5, to support the statewide air cargo system.

- Create an ongoing, appropriate level of funding for regional economic development freight projects, port and intermodal access improvements, grade separations, shortline rail improvements, and truck route program to optimize truck movements in metro areas.

- Replace the Interstate 5 Columbia River Bridge.

- Create fuel pipeline capacity and distribution alternatives to meet long-term demand by analyzing constraints, and removing obstructions so that the market may respond to increasing demand.

- Replace the Alaskan Way Viaduct.

- Complete the major north-south freight corridor system by adding links from Highway 167 to Interstate 5, from Highway 509 to Interstate 5, and by completing Highway 18 to Interstate 90.

In Summary

The three components of Washington's freight system are integrated and support our state's economy:

- International goods enter Washington State gateways and become part of Washington's manufactured output, or are distributed in our retail system. Washington's global gateways also carry national and international goods to and from the larger U.S. market.

- Washington manufacturers and farmers ship products directly to customers and to wholesalers in national and international markets. These industries support hundreds of thousands of jobs and contribute billions of dollars to the gross state product.

- Washington wholesalers and retailers supply consumers with goods from all over the U.S. and the world. They sustain our modern economy.

Freight related issues such as security, safety and the environment are being considered in other parts of the update of the Washington Transportation Plan.

What ideas did we miss?

We want the conversation about freight strategy to involve all parties. We need your help to make good investment choices that will address the needs of freight movement on our state's transportation systems and facilities. Especially when there isn't nearly enough money to do everything that clearly needs to be done.

Introduction

How are the special needs of freight movement to be incorporated into the state's transportation plan?

The three components of Washington's freight system – international gateways, transportation serving Washington's producers and manufacturers, and the retail and wholesale distribution systems – underpin our national and state economies, support national defense, directly sustain hundreds of thousands of jobs, and distribute the necessities of life to every resident of the state everyday.

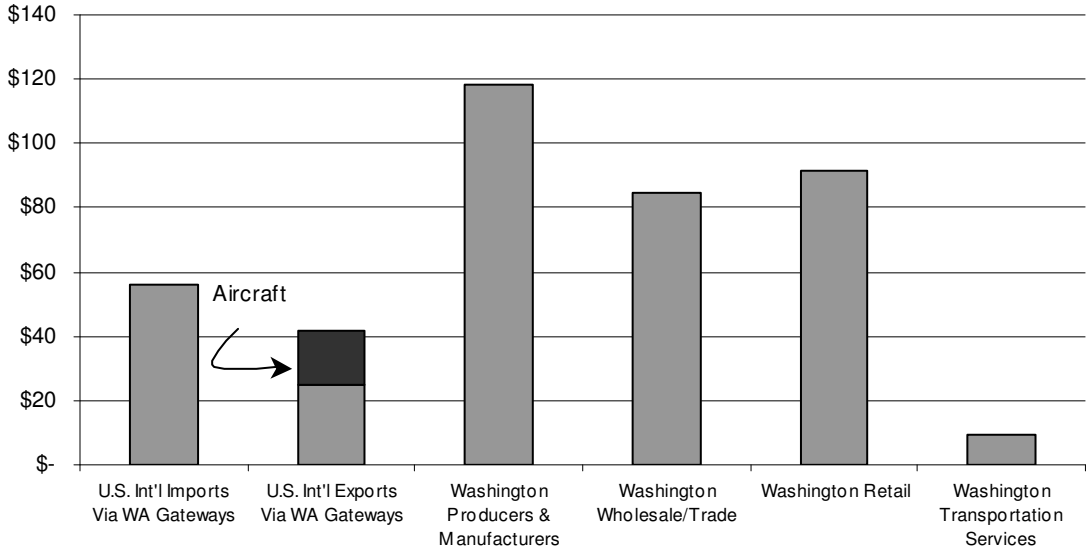
First, Washington is a gateway state, connecting Asian trade flows to the U.S. economy, Alaska to the Lower 48, and Canada to the U.S. West Coast. About 70 percent of international goods entering Washington gateways continue on to the larger U.S. market. Thirty percent become part of Washington's manufactured output or are distributed in our retail system.

Second, our own state's manufacturers and farmers rely on the freight system to ship Washington-made products to local customers, to the big U.S. markets in California and on the east coast, and worldwide. Washington producers generate wealth and jobs in every region of the state.

Last, Washington's distribution system is a fundamental local utility, since without it our citizens would have nothing to eat, nothing to wear, nothing to read, no spare parts, no fuel for their cars, and no heat for their homes. In other words, the economy of the region would no longer function.

The value and volume of goods moving in these freight systems is huge and growing.[19]

Exhibit 5: Washington State Value of Freight Shipments
2003: Billions of Dollars



Washington State Department of Community, Trade & Economic Development. *2003 Washington State Exports and 2003 Washington State Imports*: 2004. Prepared by JTS Associates (215/794/7684) from Department of Commerce Foreign Trade Statistics. All data based on goods laded or unladed in Washington State (regardless of initial origin or final destination).

Washington State Department of Revenue. *Quarterly Business Review Calendar Year, 2003. Table 1: Total Gross Business Income Statewide by Industry (SIC).* As of November 2004: <http://dor.wa.gov/content/statistics/2003/qbrcal03/default.aspx>.

[19] Washington State Department of Community, Trade & Economic Development . *2003 Washington State Exports and 2003 Washington State Imports:* 2004. Prepared by JTS Associates (215/794/7684) from Department of Commerce Foreign Trade Statistics. All data is based on goods laded or unladed in Washington State (regardless of initial origin or final destination).
Washington State Department of Revenue. *Quarterly Business Review Calendar Year, 2003. Table 1: Total Gross Business Income Statewide by Industry (SIC).* Retrieved as of November 2004 from: <http://dor.wa.gov/content/statistics/2003/qbrcal03/default.aspx>.

Global Gateways: International and National Trade Flows Through Washington

Washington State is a global gateway to the Pacific Rim, Canada and Alaska. The state's strategic location positions it as an important and growing gateway for trade access to Alaska; producers, suppliers and markets in Washington, Oregon and California; and as a key transportation hub for Asian and Canadian trade. Washington's transportation system functions as an interconnected network of gateways and transportation corridors – inland barge, seaports, airports, borders, rail and highway systems -- that provide access to markets, create jobs and economic growth, and link business, government and economic activities together locally, nationally and internationally.

This chapter of the freight discussion focuses on markets and supply chains, including the gateways and corridors that support freight moving through Washington State. The issues and economic impacts of this system are integrally related to exports produced in Washington and imports that become part of Washington's retail and wholesale distribution system.

Exhibit 6: Trade Through Washington State by Volume

Developed by the Washington State Department of Transportation, Geographic Services and Strategic Analysis & Program Development. Goss, Elizabeth. Developed July 2004.

This section is organized into three major parts:

- **The importance of trade in Washington's economy**
- **East - West trade**, including containers traveling from Asia to Chicago; agriculture from the Midwest to Asia and military transport
- **North - South trade**, including Canadian and North American Free Trade Agreement (NAFTA) related trade; freight along the West Coast, Alaskan freight movement.

The Importance of Trade in Washington's Economy

International and national freight movements in Washington State create and support thousands of state jobs. The business and employment benefits derived from the state's freight system have been documented through numerous sources:

International Trade Increases the Number of State Jobs

A significant amount of Washington State jobs are linked to international trade. According to the most recent economic impact studies, at least 4 percent of Washington State jobs in 1995 were directly related to international exports.[20] An additional 2 percent of Washington State jobs in 1997 were directly related to international imports.[21] Using an indirect and induced job multiplier of 3.2 (as used in these studies), almost one in every five jobs in Washington State is directly or indirectly related to international trade.

Jobs Created by Local Seaports

Economic impact studies prepared by the Port of Seattle show 9,681 direct Seaport-related jobs in 2003;[22] the Port of Tacoma's economic impact analysis reports 9,370 direct jobs in 2004;[23] the Port of Vancouver's economic impact report shows about 930 direct jobs in 1999;[24] and other seaports in the state support a significant number of direct jobs, as well as indirect and induced jobs created by seaport activities.

Railroads and Interstate Trucking Employment

The Burlington Northern Santa Fe (BNSF) Corporation employed 3,400 people and the Union Pacific (UP) Railroad employed more than 330 in Washington in 2003, generating in excess of $180 million in wages.[25]

Interstate trucking companies are also a source of employment in Washington. In 2002, there were 642 long- distance freight trucking firms in the State, generating $366 million in wages.[26]

National Employment

International and national freight movements in Washington State not only create state jobs, they also support a significant amount of employment at the national level. According to a 1999 economic impact study, the waterborne trade at the ports of Seattle, Tacoma and Everett alone created 186,000 jobs in the United States. Accounting for indirect employment, the figure rises to 473,000 jobs in

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[20] Conway, Richard S. Jr. *Foreign Exports and the Washington State Economy*. March 1997 (pages 13- 15)
[21] Chase, Robert A. and Glenn Pascall. *Foreign Imports and Washington State Economy*. (1999).
[22] Martin Associates. *Economic Impacts of the Port of Seattle.* (September 2004). Prepared for the Port of Seattle
[23] Martin Associates. *2004 Economic Impacts of the Port of Tacoma*. (July 2005). Prepared for the Port of Tacoma.
[24] Port of Vancouver, USA (needed from Lawrence J. Paulson).
[25] State of Washington Freight Mobility Strategic Investment Board (FMSIB). *2003 Activities and Recommendations Report (pages 18-19).* Retrieved as of November 2004 from: <http://www.fmsib.wa.gov/documents/fmsib2003report.pdf>
[26] U.S. Census Bureau. 2002 County Business Patterns (NAICS): *Washington State by Industry Code*. Retrieved as of November 2004 from: <http://censtats.census.gov/cgi-bin/cbpnaic/cbpdetl.pl>. Industry code 48412, "General freight trucking, long-distance".

the United States. Overland (Canadian) trade created 125,000 direct jobs in the U.S.- with a total impact of 316,000 jobs.[27]

"Soft" Trade Jobs

Washington has built on its natural advantages: deep- water ports, proximity to fast- growing Asian and Canadian economies, and a short all- water route to Alaska, to create an enormously valuable multi- modal freight infrastructure. As a result, Washington also gains advantage from the region's "soft" trade infrastructure: human capital that facilitates financial, legal, and other international business issues.

Washington's Role in International Trade

International merchandise trade through our state is not just important for generating Washington jobs, it also supports the larger U.S. economy. Imports support U.S. manufacturers and provide goods to consumers. Agricultural exports support family farms throughout the Pacific Northwest and Midwest.

In 2003, approximately five percent of U.S. international trade entered or left the country through Washington State: 5.8 percent of total U.S. exports and 4.4 percent of total U.S. imports transited through Washington's gateways.[28] As shown in Exhibit 7, Washington gateways rank high in the U.S. by value.

Movement of international trade through and within Washington State uses every transportation mode in the system: seaports, airports, rail, and roadway border crossings are the entry and exit gates for international freight movement. Highways and airfreight are also used to transport time-sensitive goods to and from the U.S.

Washington and Major U.S. Trading Partners

Exhibit 7: Washington's Rank in the Top U.S. International Freight Gateways in 2002

By Value in Billion $

Gateway	Mode	Rank	Total Billion $
Seattle, WA	Waterborne	17	$ 23.80
Tacoma, WA	Waterborne	19	$ 22.90
Blaine, WA	Land	32	$ 11.40

United States Department of Transportation, Bureau of Transportation Statistics. *National Transportation Statistics, 2003.* "Table 1-47"

* In 2001, Seattle- Tacoma International Airport ranked 44th with $8.85 billion in foreign trade.

[27] BST Associates. *FAST Corridor Freight Impact Study*. (January 7, 1999). Prepared for the Ports of Seattle & Tacoma and the Washington State Department of Transportation: page 12.

[28] Includes aircraft exported on own power, which does not use a transportation gateway. Excluding these commodities ($16.6 billion), Washington's share of trade in 2003 was equal to 4.1 percent of total U.S. trade and 3.5 percent of total U.S. exports.

United States Census Bureau, Foreign Trade Division. *U.S. International Trade in Goods and Services - Annual Revision for 2003. Exhibit 4. U.S. Trade in Goods*. (June 14, 2004). Retrieved as of November 2004 from: <http://www.census.gov/foreign-trade/Press-Release/2003pr/final_revisions/exh4.pdf>.

Washington State Department of Community, Trade & Economic Development. *2003 Washington State Exports and 2003 Washington State Imports*. All data is based on goods laded or unladed in Washington State (regardless of initial origin or final destination).

In 2003, $97.6 billion in U.S. international trade entered or exited through Washington- $41.8 billion in exports, of which 16.6 billion was aircraft, and $55.8 billion in imports.[29] As shown in Exhibit 8, important U.S. trading partners are linked to the U.S. economy through Washington. Japan and China were the number one and three international trading partners in 2002; trade with these two countries together constitutes about 40 percent of Washington's total trade activity. Canada, the second largest trade partner, comprises 17.5 percent of the state's international trade. Other key trade partners include Korea, Taiwan, Australia, Singapore, France and the United Kingdom, which together comprise an additional 22 percent of trade value. An anomaly in Washington is the high value of trade from the sale of airplanes, which are not exported through a gateway. This category accounts for the majority of European trade through Washington State.

Exhibit 8: Value of International Trade of Goods by Country through Washington
2002 by Value

Country	Billion $	Share of WA Total Trade	Share of U.S. Trade with Country	Aircraft Exported on Own Power	Net Trade Billion $
Japan	$ 22.52	23.5%	13.2%	$ 1.42	**$ 21.10**
Canada	$ 16.80	17.5%	4.5%	$ 0.34	**$ 16.47**
China (Mainland)	$ 15.19	15.9%	10.3%	$ 1.57	**$ 13.61**
Rep. of Korea	$ 6.35	6.6%	11.1%	$ 1.43	**$ 4.92**
Taiwan	$ 3.85	4.0%	7.7%	$ 0.20	**$ 3.65**
Australia	$ 2.86	3.0%	14.9%	$ 1.90	**$ 0.96**
Singapore	$ 2.82	2.9%	9.2%	$ 2.06	**$ 0.75**
France	$ 2.63	2.7%	5.6%	$ 1.64	**$ 0.99**
United Kingdom	$ 2.42	2.5%	3.3%	$ 0.55	**$ 1.87**
Malaysia	$ 1.66	1.7%	4.8%	$ 0.69	**$ 0.97**
Hong Kong	$ 1.56	1.6%	7.2%	$ -	**$ 1.56**
Italy	$ 1.15	1.2%	3.4%	$ 0.92	**$ 0.22**
Indonesia	$ 1.11	1.2%	11.2%	$ 0.02	**$ 1.09**
Thailand	$ 1.06	1.1%	5.4%	$ -	**$ 1.06**
All Other Countries	$ 13.81	14.4%	1.8%	$ 6.72	**$ 7.09**
Total	$ 95.79	100.0%	5.2%	$ 19.45	**$ 76.34**

Washington State Department of Community, Trade & Economic Development. 2002 Washington State Exports and 2002 Washington State Imports. (2003). Prepared for the by JTS Associates (215/794/7684) from Department of Commerce Foreign Trade Statistics. All data is based on goods laded or unladed in Washington State (regardless of initial origin or final destination).

Majority of International Freight Is Discretionary Cargo

[29] $81 billion of U.S. trade entered or exited through a Washington State gateway in 2003 (excludes aircraft exported on own power). Washington State Department of Community, Trade & Economic Development. *2003 Washington State Exports and 2003 Washington State Imports*.

As an approximation, the majority of inbound trade – 70 to 80 percent – and at least 32 percent of outbound trade (excluding Boeing aircraft) has an origin or destination outside Washington State. [30] In 1998, 75 percent of the goods imported into Washington State had final destinations outside of the state.[31] Relatively high value, low weight goods comprise the majority of imports (such as machinery and apparel), while relatively low value, heavy goods make up the majority of exports (such as grain and corn).

Trade Continues to Grow -- Worldwide and in Washington

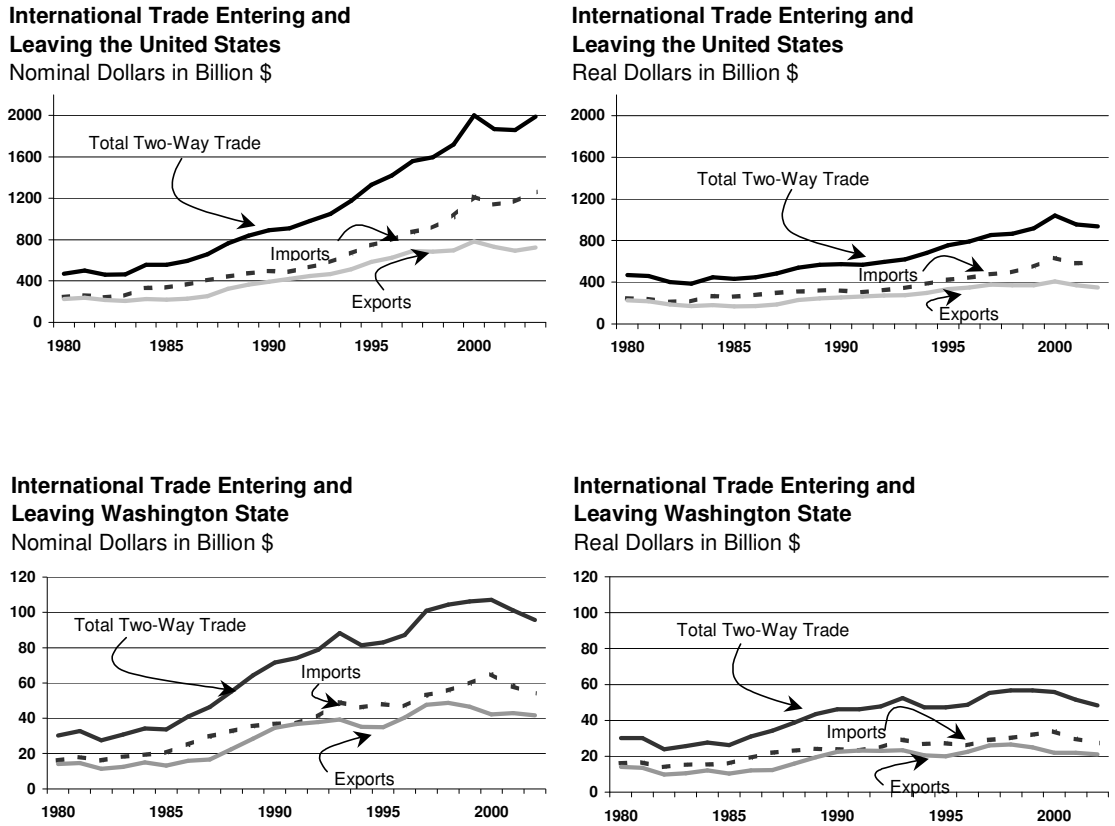
Since 1950, world trade has been growing faster than the average annual world Gross Domestic Product (GDP)- in the last 20 years, it has grown at an even faster pace.[32] As shown in Exhibit 9, the value of total U.S. international trade doubled from 1980 to 2002 while the value of total international trade for Washington State grew 60 percent.

[30] United States Census Bureau, Foreign Trade Division. *Total U.S. Exports (Origin of Movement) via Washington, Top 25 Commodities Based on 2003 Dollar Value*. Retrieved as of November 2004 from: <http://www.census.gov/foreign-trade/statistics/state/hs/2003/wa.txt.>

[31] Chase, Robert A. and Glenn Pascall. *Foreign Imports and Washington State Economy*. (1999)

[32] United States Department of Transportation, Bureau of Transportation Statistics. *U.S. International Trade and Freight Transportation Trends*. (February 2003). Publication Number: BTS03-02.

Exhibit 9: International Trade Trends for the U.S. and Washington State
Value 1980 to 2002



U.S. Department of Commerce: International Trade Administration. U.S. Aggregate Foreign Trade Data. Table 3: *U.S. Trade in Goods, 1979-2003: Census Basis (Domestic and Foreign Exports, F.a.s.; General Imports, Customs; Billions of Dollars). Retrieved as of November 2004 from: <http://www.ita.doc.gov/td/industry/otea/usfth/tabcon.html>*

Washington State Office of Financial Management. 2003 Washington State Data Book. 2004. (January 9, 2004). Table CT14: International Trade. Retrieved as of November 2004 from: <http://www.ofm.wa.gov/databook/index.htm>

Washington State Office of Financial Management. *State of Washington 1995 Data Book*. (Revised December 1996). Table CT20: International Trade (page 28).

Adjusted for inflation based on the U.S. Department of Labor Bureau of Labor Statistics CPI Index <http://www.bls.gov/cpi/home.htm>

Growth in international trade is expected to continue in the U.S. and Washington State. By 2025, the value of international trade moving into and out of the U.S. is expected to reach 37 percent of U.S. GDP, up from 25 percent in 1997.

Trade with Asia and NAFTA is leading this growth, which will have a high impact on Washington's transportation system. Perhaps the USDOT said it best in a 2003 report: "The U.S. trades with nearly 200 countries worldwide. Due to strong growth in NAFTA and Asian Pacific trade, in comparison to trade with Europe, the relative share of trade passing through border crossings and freight corridors with Canada, Mexico and West Coast ports has increased, as has related container and intermodal traffic."[33]

[33] United States Department of Transportation, Bureau of Transportation Statistics. *U.S. International Trade and Freight Transportation Trends.* (February 2003). Publication Number: BTS03-02: Page 2.

By value, Asia is already the largest importer and exporter of merchandise to and from the U.S., comprising 42 percent of U.S. imports and 33 percent of U.S. exports in 2003.[34] In contrast, 30 years ago Asia's share of U.S. imports and exports constituted less than 10 percent of total U.S. trade.

Continued trade growth with China is an important factor for future trade growth in the U.S. and Washington State. China has increased its rank among trading partners from 24th in 1980 to the fourth largest by 2001. In 2002 about 16 percent of U.S. trade with China moved through Washington State, compared with 10 percent in 1994.[35]

Globalization and Domestic Economy

The shift away from production-based economy and to a service-based economy is a long-term trend impacting the growth of international trade in our state and country.

The impact of globalization can be shown by the ratio of U.S. merchandise exports to the production of tradable goods. In 2000, the ratio of goods exports to goods GDP was 42 percent, up from 15 percent in 1970. The share of goods exports to overall GDP only grew from 5 percent in 1970 to 8 percent in 2000. Economists view this trend as evidence that U.S. exports have become more important to domestic production.

Consumers who look at the origination of their purchased goods will also notice that most originate from outside the U.S. Today's global economy cannot function without a strong transportation infrastructure to support imports and exports.

United States Department of Transportation, Bureau of Transportation Statistics. *U.S. International Trade and Freight Transportation Trends.* (February 2003). Publication Number: BTS03-02: Pages 12- 14.

Note: Goods GDP is a measure of the production of tradable goods, the higher ratio of export goods to this value shows that more U.S. production is interlinked with exports.

East – West Trade: Washington is a Gateway for Asian Trade to and from the Midwest and the East Coast

Ocean freight vessels that transport goods to and from the West Coast are the most common means of moving U.S. trade with Pacific Rim economies.

Washington's Seaports Are Global Gateways for Containerized Asian Imports

More than half, 56 percent, of the value of international trade entering and leaving Washington in 2003 moved by water.[36] International trade moving through Washington's seaports was valued at more than $54 billion that year.

[34] U.S. Department of Commerce, Bureau of Economic Analysis. *U.S. International Transactions Accounts Data, Table 2: U.S. Trade in Goods*. (September 14, 2004). Retrieved as of November 2004 from: <http://www.bea.gov/bea/di1.htm>
[35] Washington State Office of Financial Management. *2003 Washington State Data Book and State of Washington 1995 Data Book.* U.S. Department of Commerce, *International Trade Administration.*
[36] Washington State Department of Trade and Economic Development, *Washington State Imports and Exports* (2004

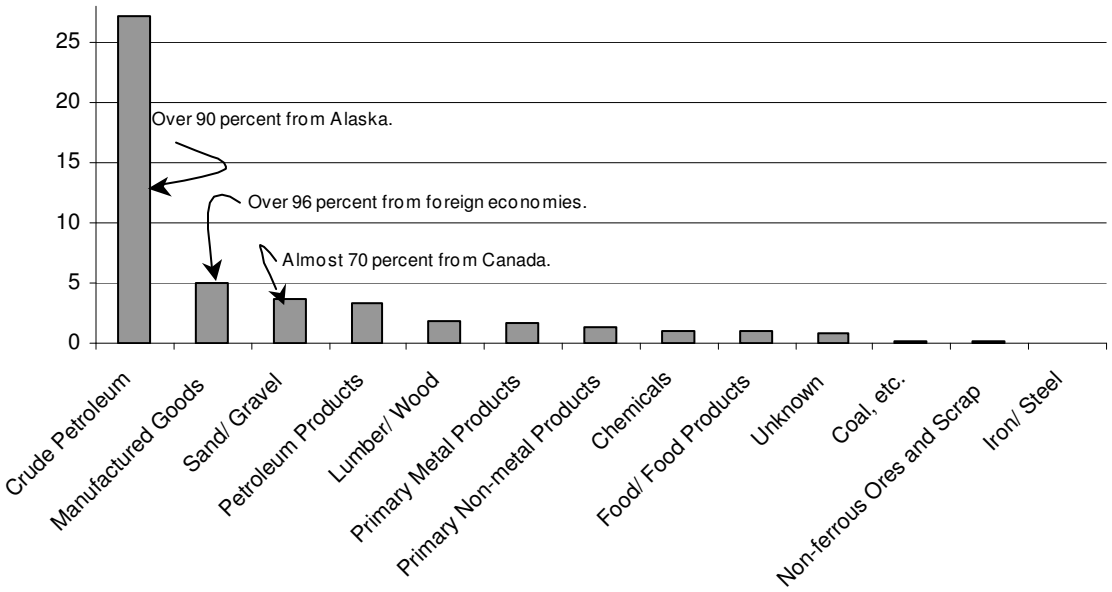
This constituted 73 percent of the value of international imports entering through Washington, and 33 percent of international exports.[37]

Exhibit 10: Containership at Puget Sound

Using weight as a distinguishing measure, in 2002 Washington State ranked as the sixth largest mover of international waterborne trade, handling 47 million tons or slightly less than 4 percent of the U.S. total.[38] As shown in Exhibit 11, crude petroleum was by far the largest volume waterborne commodity import into Washington in 2002. Manufactured goods were the second largest commodities entering Washington State by water, most arriving in containers that originated from the Pacific Rim.

In 2003, Washington's seaports handled more than eight percent of all U.S. foreign containerized cargo (9 percent of exports and almost 8 percent of

Exhibit 11: Goods Entering Washington State by Water 2002, Million Tons



U.S. Army Corps of Engineers Navigation Data Center- Waterborne Commerce Statistics Center. *2002 Commodity Movements from the Public Domain Database. State to State by Destination and Origin.* (Revised March 31, 2004). Retrieved as of November 2004 from: <http://www.iwr.usace.army.mil/ndc/wcsc/wcsc.htm#Public%20Domain%20Databases>.

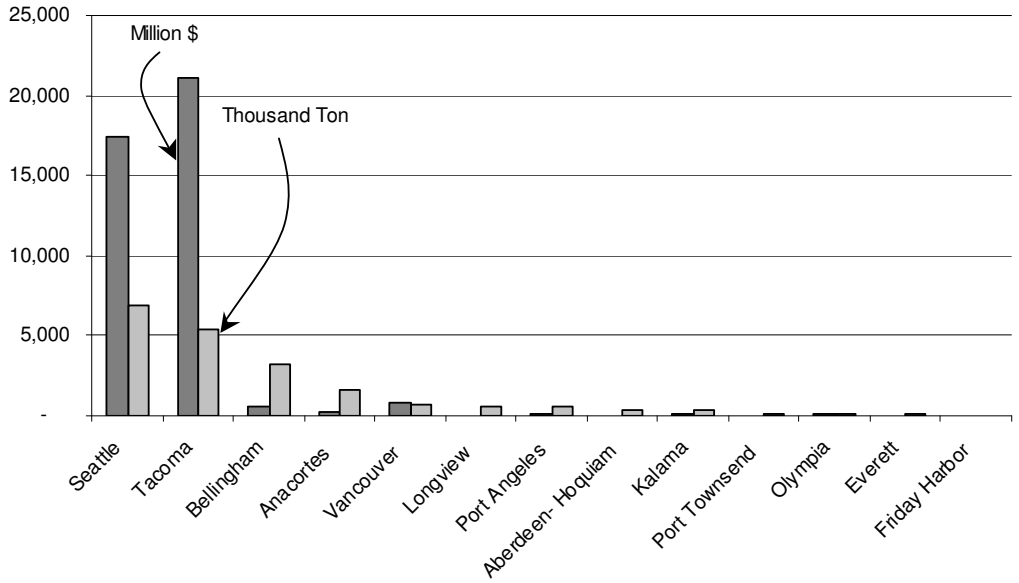
[37] Washington State Department of Trade and Economic Development, *Washington State Imports and Exports* (2004)
[38] U.S. Army Corps of Engineers Navigation Data Center- Waterborne Commerce Statistics *Center. CY 2002 Waterborne Tonnage by State (In Units of 1000 Tons).* Retrieved as of November 2004 from: <http://www.iwr.usace.army.mil/ndc/wcsc/statenm02.htm>

imports).[39] Yet, the State only has 2.1 percent of the U.S. population.[40]

Seattle and Tacoma are Washington's Major Container Ports

As shown in Exhibit 12, the Port of Seattle and Port of Tacoma handle the majority of Washington's international waterborne imports.

Exhibit 12: International Imports Entering Washington's Seaports in 2003



U.S. Department of Transportation Maritime Administration (MARAD). Official U.S. Waterborne Transportation Statistics*: U.S. Imports by U.S. Customs District and Port – 2003*.

In 2003, Washington's two largest seaports, the Port of Seattle and the Port of Tacoma, ranked as the third largest container port complex behind Los Angeles/Long Beach and New York/New Jersey.[41] The two ports combined handled more than three million twenty- foot equivalent units (TEUs), which is equal to nine percent of all U.S. containerized exports and almost eight percent of U.S. containerized imports.[42] By value, primary imports are manufactured goods such as motor vehicles and parts, apparel, and sports equipment.[43] Reflecting these ports' status as an import gateway, the value of imports

[39] Port Import/ Export Reporting Services (PIERS). *U.S. Waterborne Foreign Trade Containerized Cargo Top 30 U.S. Ports Calendar Year 2003 in Thousand TEU's.* Fax sent to WSDOT from the Port of Seattle on November 16, 2004.
[40] U.S. Census Bureau. *Resident Population of States and DC*. (2003). Retrieved as of November 2004 from: <http://www.census.gov/statab/www/part6.html>.
[41] U.S. Department of Transportation Maritime Administration (MARAD). *U.S. Waterborne Foreign Trade: Containerized Cargo, Total Top 25 U.S. Ports Calendar Years 1998 through 2003.*
[42] U.S. Department of Transportation Maritime Administration (MARAD). *U.S. Waterborne Foreign Trade: Containerized Exports, Total Top 25 U.S. Ports Calendar Years 1998 through 2003.* and *U.S. Waterborne Foreign Trade: Containerized Imports, Total Top 25 U.S. Ports Calendar Years 1998 through 2003.*
[43] Port of Seattle. Seattle's Major Waterborne Imports from All Countries: 2003 (Ranked by Dollar Value). Port of Tacoma. *Waterborne Trade Atlas * U.S. Imports via Tacoma, Washington JANUARY – DECEMBER 2002.*

exceeded exports by a ratio of almost four to one: $38.5 billion to $10.9 billion in 2003.[44]

Containerized cargo has been a growing business in the Puget Sound region, with container trade increases of 241 percent since 1982.[45] The container cargo business is the most promising market segment for the two ports. Conservative forecasts for Washington State international container traffic indicated a tripling of volumes from 2.8 million units in 2002 to 6.9 million units in 2025.[46]

Washington's Two Major Ports are Investing

The ports are preparing for and supporting business growth by making significant and long-term capital investments in intermodal container terminals with on-dock rail facilities, container cranes, pier improvements, dredging and terminal support facilities and equipment designed to increase throughput and the efficiency of truck and rail movements at the terminals. In 2002, the Port of Tacoma Commission authorized a five-year, $341 million capital improvement plan, with a focus on adding container terminal space. The Port of Seattle has invested $600 million in container terminal expansions in the last decade and has additional improvement projects underway.

Port of Seattle: Critical Street Projects Create More Efficient Access to Rail Yards and Freeways

West Marginal Way, Spokane Street, and East Marginal Way are critical street corridors for access to the Port of Seattle's container terminals T-5, T-18, T-46, and T-115. To isolate areas where lengthy and unpredictable delays would cause truck delivery delays in the future, the Port analyzed truck traffic forecasts through 2015.

The most critical local street projects designed to reduce delay and increase access to the Port of Seattle's container terminals are:

- Construction of the East Marginal Way grade separation;
- Completion of the Duwamish ITS project (including advance notification of swing bridge opening on Spokane Street);
- Alaskan Way surface street improvements;
- Improvements to both the Spokane Street Viaduct and the surface street; and
- Off street access to the Argo rail yard on East Marginal Way.

The Port has also identified priorities such as the replacement of the Alaskan Way Viaduct, and improvements to east- west freeway connections (SR-519 Phase 2), north- south connections (SR-509) and the I-5/ Spokane Street on-ramps.

Forecast growth in container movement to three million TEUs by 2015- 2020 may also require improvements in rail capacity.

Port of Seattle. Interviews and correspondence with Washington State Department of Transportation, Freight Strategy and Policy Office. Final approval- November 2004.

Heffron Transportation, Inc. *Port of Seattle Container Terminal Access Study, Year 2003 Update: Executive Summary*. (October 27, 2003).

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[44] U.S. Department of Transportation Maritime Administration (MARAD). *Official U.S. Waterborne Transportation Statistics: U.S. Imports by U.S. Customs District and Port – 2003*. and- *U.S. Waterborne Foreign Trade: U.S. Exports by U.S. Customs District and Port – 2003*.
[45] BST Associaes. *2004 Marine Cargo Forecast: Technical Report Final.* (May 19, 2004).
[46] BST Associates. *2004 Marine Cargo Forecast: Technical Report Final.* (May 19, 2004). Prepared for the Washington Public Ports Association and the Washington State Department of Transportation. Retrieved as of November 2004 from: <http://www.washingtonports.org/Trade/tradecover.htm>

Port of Tacoma: Critical Transportation Projects For Seamless Intermodal Transfer of Cargo

The Port of Tacoma is expecting to more than double cargo throughput to 3.4 million TEU's by 2012. For the Port, the key to handling this increased cargo lies in needed railroad and highway improvements. The port has identified these as:

- New access routes and bridge to mainline railroads across the Puyallup River;
- Additional trackage through "Bullfrog Junction";
- "D" Street and Lincoln Avenue grade separations;
- Increased yard storage on and near the Tideflats;
- Increased storage and tracks for the Pierce County Terminal Intermodal Facility;
- Improvements to "Chilcote Junction" and additional tracks for Tacoma Rail; and
- Co-production between the BNSF and the UP for direct dispatch of intermodal trains.

Regional freight mobility projects important to the Port include SR 167, the Cross- Base Highway, and an improved interchange at the Port of Tacoma Road on I-5.

The port also supports rail infrastructure recommendations to increase the total freight rail capacity within the state while allowing for increase rail passenger service between Vancouver, British Columbia and Portland, Oregon (see next section). The Port has identified these as Stampede Pass clearance for double-stack rail, Nelson-Bennett tunnel and Pt. Defiance by-pass, Bayside by-pass in Everett, Vancouver by-pass, and the Vancouver to Kelso 3rd mainline.

* Port of Tacoma (January 28, 2005).

Washington's Rail Corridors Move Containers to U.S. Markets

Railroads play a major part in the movement of containers, automobiles, and merchandise from Washington's seaports to final market. A map of Washington State's rail network is provided in Appendix C.

Exhibit 13: Intermodal Train on Puget Sound

In 2002, 76 percent of all international containers arriving at Puget Sound seaports were transferred to rail and transported to inland hubs.[47] Within this percentage,

[47] BST Associates. *2004 Marine Cargo Forecast: Technical Report Final*. (May 19, 2004).

according to BNSF, 70 percent of containers are destined for Chicago; 15 percent for distribution in East Coast states; and 15 percent are transported by rail to East Coast ports and then shipped by ocean vessel to Europe.

Another 21 percent of imported international containers move by truck, mostly to Washington warehouses, manufacturing plants and retail stores. A small percent of containers may also be shipped north, to Canada, or south to Oregon and California.

In 1997, the rail yards in Seattle and Tacoma ranked fifth and eleventh, respectively, in North American container volume.[48] Substantial land and capital investment is needed for the efficient and timely transfer of containers. Preservation and enlargement of rail yards in metro areas- such as Seattle, Tacoma, Spokane, and Vancouver, WA- is necessary to improve rail capacity in the sate and accommodate container volumes.

Operations of Washington State's Mainline Railroads

The Burlington Northern and Santa Fe Corporation (BNSF) owns and operates three east-west rail corridors in Washington: Stevens Pass, Stampede Pass and the Columbia Gorge. The Union Pacific (UP) also owns and operates an east-west rail corridor just south of the Washington- Oregon border. Exhibit 14 displays the current and projected operations of the mainlines in Washington, as estimated by MainLine Management in 2004.

Exhibit 14: Comparison of Mainline Rail Capacity With Current and Projected Operations (Trains per Day)

	Current Operations			Projected 2025 Operations		
Mainline Segment	Estimated Sustainable Cap.	Ave. Trains/Day	Peak Trains/Day	Estimated Sustainable Cap.	Ave. Trains/Day	Peak Trains/Day
Stevens Pass	28	23	25	28	46	51
Stampede Pass	20	6	7	20	16	18
Blaine to Everett	18	14	15	30	21	23
Everett to Seattle	50	45	50	100	84	92
Seattle to Tacoma	100	85	94	200	189	208
Tacoma to Kalama	60	45	50	120	80	88
Kalama to Longview	80	52	57	160	94	103

BST Associates. *2004 Marine Cargo Forecast: Technical Report Final.* (May 19, 2004). Original source: MainLine Management and HDR, Inc. (Page 115). Includes passenger trains.

[48] Rawling, Gerald, Director of Operations Analysis for Chicago Area Transportation Study. *Working Paper 97-03, Statistical Summary and* Value of the Intermodal Freight Industry to Northeast Illinois. (July 1997). The majority of containers transit through Chicago (the main U.S. rail transfer hub) and containers countered there may also be counted at other yards. For example, containers transiting from Seattle to Chicago will be counted in both yards.

Both BNSF and UP also operate on north-south corridors in Western Washington. Capacity on these lines is important because trains must move on them to get from seaports or rail yards to the east-west lines. The Seattle to Tacoma mainline currently has an estimated sustainable capacity of 100 trains per day and it operated at an average of 85 trains per day in 2003.[49]

BNSF's Steven's Pass line is the most northern route across the Cascade Mountains. In Washington, it carries the highest volume of intermodal containers. In 2003, BNSF moved 26 million gross tons on this corridor from Everett to Spokane, with equal volumes shipped in each direction. Stampede Pass was reopened in 1996 (after have been closed in 1983). It primarily carries empty containers and mixed trains as clearance constraints prevent double stack intermodal containers, and the steep grade does not allow for heavy bulk commodities. About three million gross tons traveled each way from Auburn to Pasco in 2001. The Columbia Gorge route is most often used for heavy agricultural commodities.

Funding Rail Capacity Improvement Projects through Public and Private Partnerships

Major railroad companies need to allocate the majority of their resources to maintenance, leaving very little for capacity expansion projects. These limited funds are rarely adequate and must be spread out over national networks.

"Public participation in rail system investment has historically addressed the bottom of the system: grade crossings, branch lines, and commuter rail services. The present need is to treat the key elements at the top of the system: nationally significant corridor choke points, intermodal terminals and connectors, and urban rail interchanges."*

Presentations at the July 23, 2004 Freight Mobility Strategic Investment Board meeting, surfaced the possible future use of public-private partnerships to address capacity enhancement projects on mainline track.

* American Association of State Highway and Transportation Officials (AASHTO). *Transportation Invest in America: Freight- Rail Bottom Line Report* (2002). (Pages 74- 75)

Burlington Northern and Santa Fe Corporation. *Washington Transportation Plan Rail Freight* Priorities. Presentation at the Washington State Freight Mobility Strategic Investment Board's Freight Forum (July 23, 2004).

[49] MainLine Management, Inc. (MLM), in association with HDR Engineering, Inc. (HDR). *Washington Public Ports Association (WPPA) Freight Rail Capacity Study.* (May 19, 2004). Retrieved as of November 2004 from: <http://www.washingtonports.org/Trade/tradecover.htm>

Supporting Washington's Demand for Freight Rail

According to BNSF, a traffic increase of 20 percent or more on Steven's Pass would require diverting trains to another east- west route. Container rail traffic from the Puget Sound ports, which predominately moves on the Steven's Pass line, is projected to increase at 4.5 percent a year – indicating a need to divert trains within two years.

BNSF cannot add capacity over Steven's Pass because the rugged topography does not feasibly allow for new sidings on either side of the Scenic Tunnel. Although other issues exist, the needed sidings are the main capacity constraint on this line. Maximum daily throughput is 28 trains per day.

BNSF is currently studying options to accommodate projected rail growth; these may include:

- Siding extensions/additions along the Columbia River Gorge route; these face environmental constraints.
- Crown cutting Stampede tunnel to accommodate double stack trains, and making accompanying improvements.

BNSF has also identified several other needs to support freight movements in Washington, including:

- Continued funding of the Vancouver By-Pass route
- Exploration of options for co-production between BNSF and UP on certain mainline routes to increase capacity and improve port access.

Batky, Catharine R. General Director, Public Private Partnerships Burlington Northern and Santa Fe Corporation. Signed letter to Douglas B. MacDonald, Secretary of Transportation Washington State Department of Transportation. Dated July 15, 2004.

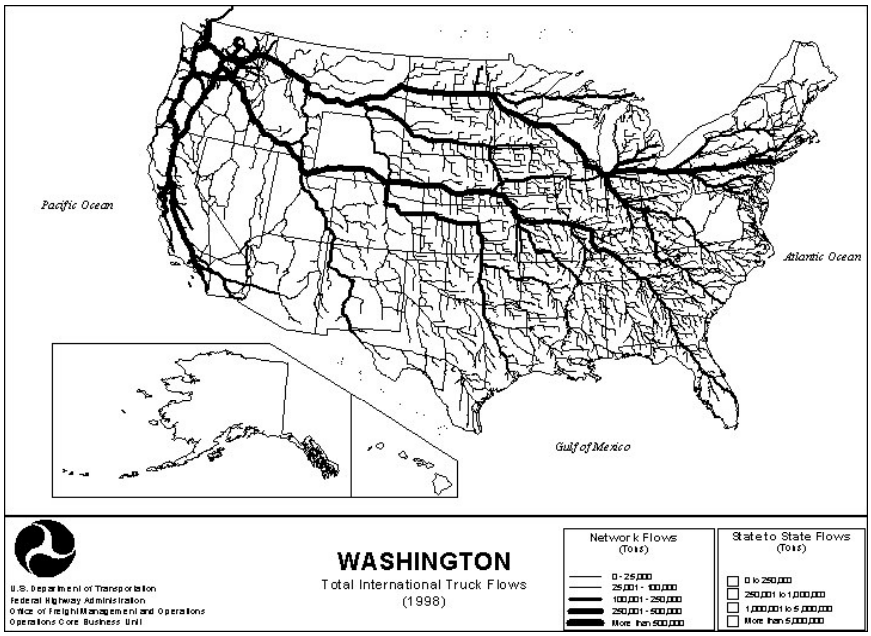
Burlington Northern and Santa Fe Corporation. *Washington Transportation Plan Rail Freight* Priorities. Presentation at the Washington State Freight Mobility Strategic Investment Board's Freight Forum (July 23, 2004).

MainLine Management, Inc. (MLM), in association with HDR Engineering, Inc. (HDR). *Washington Public Ports Association (WPPA) Freight Rail Capacity Study.* (May 19, 2004).

Highways are Also Important East-West Freight Corridors

As shown in Exhibit 15, there is also international trade moving on highway corridors in Washington.

Exhibit 15: Washington International Truck Flows on Highway Systems in 1998



U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations. *Freight Analysis Framework (FAF), Freight Flow Maps.* "Washington Total International Truck Flows (1998). Retrieved as of November 2004 from: <http://ops.fhwa.dot.gov/freight/freight_analysis/state_info/washington/truckflow_wa.htm>

I-90 and Snoqualmie Pass is the main highway route for east- west commerce in Washington. The importance of this route may increase, if container ships bypass the Port of Portland for Puget Sound seaports. As seen in 2004, when several shipping lines changed port of call from the Port of Portland to the Ports of Seattle and Tacoma. Containerized exports that previously traveled down the Snake/ Columbia River to the Port of Portland were diverted to I-90 for export out of Puget Sound.

In 2003, 7.4 percent of truck traffic headed east on I-90 originated from a marine terminal and 10.9 percent headed west was destined for a marine terminal.[50] Freight movement in the corridor is growing- with truck traffic showing an increase of 72 percent from 1994 to 2002. Regarding origin and destination information, the SFTA study found that only 39 percent of truck trips on I-90 had an origin and destination in Washington State. Snoqualmie Pass closures due to severe weather hinder the through movement of freight and east- west commerce.

[50] Washington State University, Strategic Freight Transportation Analysis (SFTA). *Origin and Destination Survey: Data Requests and Analysis.* Presentation to SFTA Steering Committee, September 14, 2004 (slides 13 and 14).

Emerging Directions for East- West Trade

- Future mainline rail capacity, constraints, and port- rail connections will be necessary to support the growth in east- west container trade. Container rail traffic from the Puget Sound ports is projected to increase at 4.5 percent a year and approximately 95 percent of BNSF rail cargo moving in and through Washington travels on east-west routes. BNSF is currently evaluating the economics of crown cutting Stampede Pass versus adding capacity on their Columbia River Gorge line. Co-production between BNSF and UP on certain mainlines should also be explored to increase capacity and improve port access. An efficient access/ egress is needed for both the Port of Seattle and Port of Tacoma area rail yards of BNSF and UP.
- Preservation and or enlargement of rail yards in metro areas: Seattle, Tukwilla, Auburn, Spokane, Tacoma, and Vancouver, WA. Projected growth in intermodal traffic, international and domestic, will greatly tax the ability of Puget Sound ports and the two railroads to provide sufficient car staging/ storage capacity to accommodate the volumes of cars that will be required. Available capacity near existing intermodal operations is limited and the prospect of expanding that capacity is minimal. Assembling trains to quickly and efficient move goods to market requires land capacity to build and stage trains. In urban areas, there may be encroachment on this land.
- Local road connections to the major container seaports in Seattle and Tacoma will be necessary for port connections. By 2015, in the peak hour three major highway intersections in the Seattle Harbor will suffer severe 'F' level delay for trucks and passenger cars: I-5 / Spokane St., SR 509 / SR 99 / E. Marginal, and 1st Ave. S. /S. Atlantic St. Similar problems will emerge on major access highways the Port of Tacoma.
- I-90 and Snoqualmie Pass is the main highway route for east- west commerce in Washington and is equally important for container trade. Containerized exports from Eastern Washington and imports destined for markets east of the Cascades can be negatively impacted by Pass closures. In 2003, 7.4 percent of truck traffic headed east on I-90 originated from a marine terminal.
- Grade separations at high- impact locations to mitigate the effects of rail traffic. Growth of rail volumes moving through metropolitan areas is projected to double car-truck-rail interactions and delay local freight deliveries by 2020. When a state road is also a city's main street, communities may experience a conflict between the need for freight system thruput and main street traffic.

State of Washington Freight Mobility Strategic Investment Board (FMSIB)

The Freight Mobility Strategic Investment Board (FMSIB) was created by the Washington State Legislature in 1998. With a twelve-member board, FMSIB's mission is to create a comprehensive and coordinated state program to facilitate freight movement between and among local, national and international markets that enhances trade opportunities. The Board also is charged with finding solutions that lessen the impact of the movement of freight on local communities.

FMSIB solicits proposed freight mobility projects every two years (the last call for projects was in 2004) from public entities that meet set eligibility criteria. The Board ranks eligible freight mobility and freight mitigation projects using the criteria. There are 46 projects on FMSIB's current list of six-year projects, with total project costs of more than $3 billion (FMSIB's total share is $341.6 million). Since 1998, FMSIB completed fourteen projects with total funding of $xx.

FMSIB homepage.
<http://www.fmsib.wa.gov/index.html>

FAST CORRIDOR PROGRAM

The FAST Corridor Program is an innovative partnership that is working to improve the movement of freight through the central Puget Sound region in Washington State. The FAST partnership consists of local cities, ports, counties, the trucking industry, the BNSF and UP Railroads, Economic Development organizations, business interests and WSDOT. Since its inception in 1996, the FAST partnership has helped to leverage $500M in investment in improvement projects that benefit passenger and freight mobility and safety in the central Puget Sound.

The FAST Corridor Program consists of 25 total freight mobility projects, with total project costs in excess of $500M. There are a total of seven FAST projects that have been completed to date. The FAST Corridor Program has secured almost $67M in federal funding for FAST projects and each federal dollar of investment has been matched by three dollars of local or state funds, so the leveraging of federal funds has benefited from state and local match. The FAST Corridor Program is seeking approximately $250M to complete the remaining FAST Corridor projects, with $62M of this unfunded amount being the FAST funding commitment to these projects

FAST Corridor Program homepage.
<http://www.wsdot.wa.gov/mobility/FAST/ >

Agricultural Exports: Washington Moves American Products to the Pacific Rim

Non-containerized bulk products are also exported to the Pacific Rim through Washington's seaports. In 2002, 84 percent of non-containerized goods leaving the Pacific Northwest's seaports were bound for Asian markets.[51]

[51] BST Associates. *2004 Marine Cargo Forecast: Technical Report Final.* (May 19, 2004). Most exports were destined for Northeast Asia, 70 percent, and 14 percent were destined for SE Asia. Of note, the share of Pacific Northwest non-containerized imports from Asia is very small, only 18 percent. This is because of the large amounts of limestone and building materials imported from Canada.

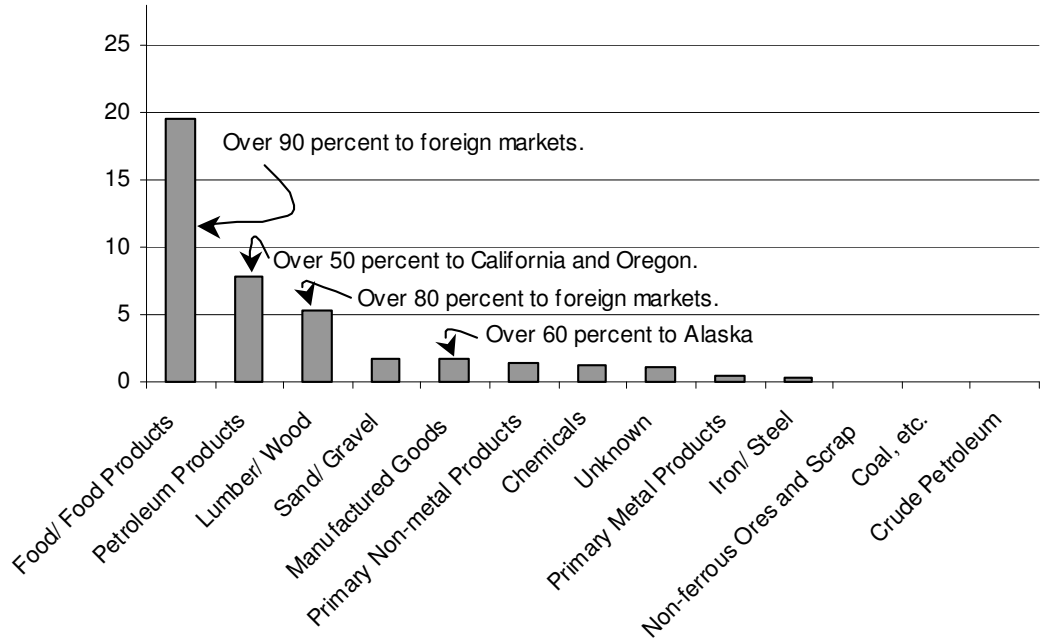
Exhibit 16 shows that, by weight, food and food products, primarily grain, were the most significant commodities exported through Washington's seaports in 2002. Other important international exports were lumber/wood products.

Return Containers Provide Access to Overseas Markets

Trade flows are two-directional, with an increasing number of empty containers returned to the State by rail from the Midwest. These containers can then be loaded with local agricultural commodities, such as apples and hay, and trucked to Washington's ports for shipment to overseas markets and Alaska.

Exhibit 16: Food and Food Products Leave Washington by Water

Goods Leaving Washington State by Water
2002, Million Tons



U.S. Army Corps of Engineers Navigation Data Center- Waterborne Commerce Statistics Center. *2002 Commodity Movements from the Public Domain Database. State to State by Destination and Origin.* (Revised March 31, 2004).

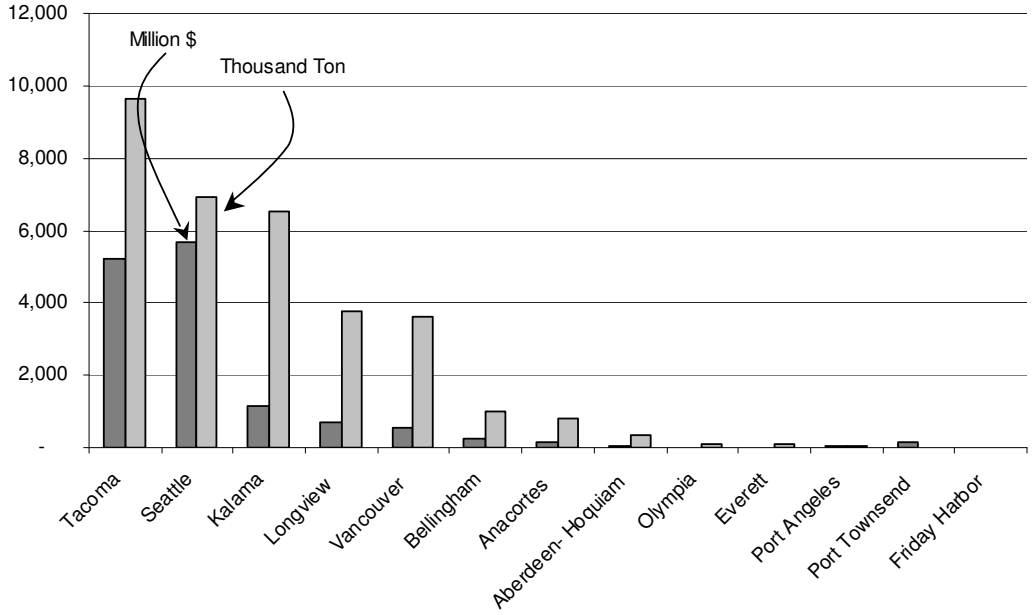
Washington's Columbia River Ports are Gateways for Agricultural Exports

Columbia River seaports, especially the Ports of Vancouver, Kalama and Longview, play major roles in the movement of exported agricultural products. As shown in Exhibit 17, these ports rank relatively higher in international waterborne exports, particularly by weight.

Lower Columbia River grain exports are expected to nearly double by 2025.[52]

[52] BST Associates. *2004 Marine Cargo Forecast: Technical Report Final.* (May 19, 2004).

Exhibit 17: International Exports Leaving Washington's Seaports in 2003



U.S. Department of Transportation Maritime Administration (MARAD). Official U.S. Waterborne Transportation Statistics*: U.S. Exports by U.S. Customs District and Port – 2003.*

Port of Vancouver

The Port of Vancouver handles a mix of cargoes including some containers, autos, forest and paper products, steel, aluminum and liquid bulks. The Port of Vancouver also has a grain elevator and uses the elevator as part of its dry bulk commodities export business. The port recently completed modernizing Terminals 2 and 3, at an investment approaching $50 million. Road access through a new port entrance and the Mill Plain extension was also recently improved- bringing the investment total closer to $60 million. The port is working on a "Columbia Gateway" plan, which will add an additional 500 marine and industrial acres. Additionally, the recent purchase of adjacent farmland should add over 100 more acres for industrial use all within the next five to ten years.[53]

The port's 40 tenants view the port's rail access as an attractive feature – 75 percent of port tenants use rail. The port generates approximately 40,000 railcars of product per year, with unit trains of up to 110 railcars each.

Port of Kalama

The Port of Kalama is the third largest seaport in the state, in terms of weight of commodity handled, with about seven million tons of freight throughput per year. Major exports include Midwest grain, soybeans and lumber. Imports of

[53] Port of Vancouver. 2004 correspondence.

approximately 200,000 tons of coiled steel from Korea are also unloaded at the port for shipment via truck and railroads to U.S. destinations.[54]

Port of Longview

The Port of Longview has three bulk loading terminals and handles general cargo and bulk import/ export cargoes. Dry bulk is a leading cargo, primarily chemicals, minerals, and agricultural products. The Port generates more than 200 rail cars per day of grain and soybeans from the Midwest. The Port reports an increase in cargo volume for 2003 to 1.6 million tons, with soy meal and specialty grain export cargos increasing by 11% compared with 2002.[55]

Port of Grays Harbor

The Port of Grays Harbor is also showing increased activity and associated growing pains. The port expected that its new specialty grain rail to ship facility would handle two thousand railcars per year, but the actual level will reach ten thousand per year in 2005 (only two years after start-up). Truck access through city streets can be a problem: Highway 12 and local streets are used to access the port, and traffic can back up in those corridors.[56] The Port of Grays harbor is about 45 miles from Interstate 5, via Highway 12, near the Olympia turn-off.

Columbia River Ports: Connecting Rail, Roads and Waterborne Transportation.

The most pressing needs at the Port of Vancouver include:

- Deepening of the Columbia River, planned to begin construction in 2005.
- The Vancouver rail project (funded in the 2003 Nickel Package and scheduled to begin in 2007) will increase capacity and improve schedule reliability by constructing a by-pass around the freight yard and 39th Street grade separation.
- Additional rail access into the Port of Vancouver to supplement the Columbia River "hill track" access.
- Coordination with the I-5 Trade Partnership (BNSF Rail Bridge across the Columbia River) and internal port road upgrades.

Rail car storage and a lack of capacity to stage unit trains are the most pressing issues for the Port of Kalama. According to the Port, trains back up into Idaho and county roads have blockages that last hours as the logistics of breaking up and reassembling the unit trains takes place.

Port of Vancouver. Interviews and correspondence with Washington State Department of Transportation, Freight Strategy and Policy Office. Final approval Larry Paulson, November 2004.

Port of Kalama. Interviews and correspondence with Washington State Department of Transportation, Freight Strategy and Policy Office. Final approval- November 2004.

[54] Port of Kalama. 2004 correspondence.
[55] Columbia River Channel Coalition. *E-mail Update – April 23, 2004 – Volume 4, Number 7.* Retrieved as of November 2004 from: <http://www.channeldeepening.com/channel_eml_updte_Apr23_04.asp>
[56] Grays Harbor Council of Governments. Vickie Cummings, Executive Director. Statement to Barbara Ivanov 2004.

Other ports in Washington State that handle freight include:

- The Port of Port Angeles, which serves as a gateway for logs and lumber.
- The Port of Anacortes, which exports logs, chemicals, and petroleum coke from the Anacortes oil refinery.
- The Port of Bellingham handles break-bulk and liquid bulk commodities.
- The Port of Everett handles fruit, logs, general break-bulk, and some containers.
- The Port of Olympia specializes in handling break-bulk, ro-ro, bulk, forest products, and containerized cargoes.

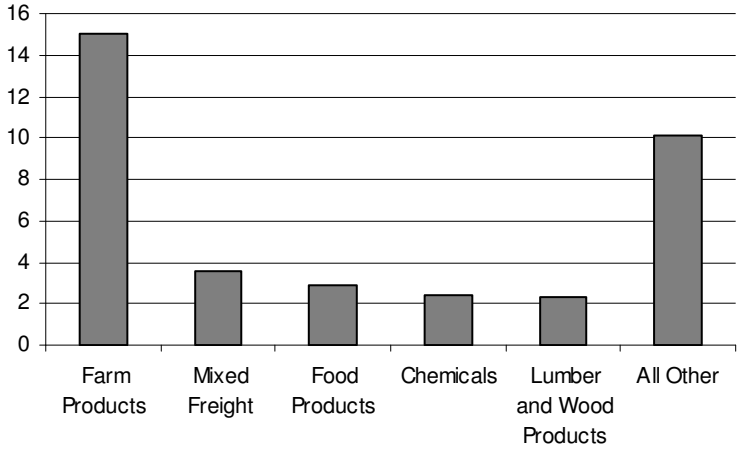
Rail and Barge Bring Agricultural Products to the Lower Columbia Ports

Agricultural products such as wheat, corn, and soybeans, from the Midwest and Eastern Washington travel by barge and rail to these Lower Columbia seaports.

The majority of commodities destined for Washington State, based on railroad waybills, are agricultural products. These commodities by tonnage are shown in Exhibit 18.

In 2002, 82 percent of all dry bulk cargo bound for the Lower Columbia ports, mostly grain, arrived by rail.[57] All of the grain exported from the Puget Sound is received by rail; more than 59 percent of the Puget Sound ports' share of dry bulk traffic moves by rail. In 2002, Puget Sound ports exported 5.2 million tons of corn, sorghum, and oilseed/ feeds, with corn comprising 71 percent of all total tonnage.[58]

Exhibit 18 Farm Products Comprise the Majority of Goods Bound for Washington By Rail
2002, Million Tons



Association of American Railroads. *RR Industry Info- Railroads and States. Railroad Service in Washington,* 2002. (January 2004). <http://www.aar.org/PubCommon/Documents/AboutTheIndustry/RRState_WA.pdf?states=RRState_WA.pdf>

The Columbia River Gorge rail line serves BNSF grain and coal trains. The Gorge is preferred for the transport of heavy bulk items because it is built at a more level grade than other east-west rail routes in Washington. In 2003, about 25 million gross tons traveled east from Vancouver, WA to Pasco and on to Spokane, and about 43 million gross tons traveled west from Spokane to Vancouver and on to Longview, Tacoma, and other points. The

[57] BST Associates. *2004 Marine Cargo Forecast: Technical Report Final.* (May 19, 2004).
[58] BST Associates. *2004 Marine Cargo Forecast: Technical Report Final.* (May 19, 2004).

Gorge line also serves increasing traffic to and from California, which must reach Vancouver or Pasco via the junction at Wishram. Adding capacity on this route faces environmental constraints, currently being studied by BNSF.[59]

The UP's east- west mainline also runs through the Columbia River Gorge, but on the south side of the Washington- Oregon border. Perishables from Idaho, and chemicals and fertilizers from Canada are major commodities traveling southwest on this line through Spokane and Pasco to the Columbia River seaports for export.

The Columbia River Barge System Supports U.S. Agriculture

The river system is the freight lifeline for the inland Northwest and the Midwest, connecting upriver ports with lower Columbia River export load centers. Barge traffic along the Columbia and Snake Rivers brings grain and other bulk goods downriver to lower Columbia River ports. Approximately 40 percent of all U.S. wheat exports travel down the Columbia- Snake system from Lewiston, ID to the ports of Kalama, Longview, Vancouver, and Portland, OR.[60]

Exhibit 19: Barge Traffic on the Columbia- Snake River System

COLUMBIA – SNAKE RIVER SYSTEM
Average Annual Tonnage of Shipments 1995-2003

Downstream	Tons	%
Wheat	5,187,202	70.0%
Forest Products, Lumber, Logs, Woodchips	961,100	13.0%
Sand, Gravel, Stone; Limestone Flux & Calcareous Stone; Phosphate Rock	441,346	6.0%
Rye, Barley, Rice, Sorghum & Oats	190,607	2.6%
Other	592,723	8.0%
Total Shipments (tons)	7,409,037	100%
Upstream	**Tons**	**%**
Gasoline, Jet Fuel, Kerosene	1,170,825	47.0%
Distillate, Residual & Other Fuel Oils; Lubricating Oils & Greases	795,874	32.0%
Fertilizer-Nitrogenous, Potassic, Phosphatic & Others	98,564	4.0%
Waste Material; Garbage, Landfill, Sewage Sludge & Waste Water	175,967	7.0%
Other	237,906	10.0%
Total Shipments (tons)	2,479,136	100%

Washington State Office of the Governor. Governor Gary Locke. *Northwest Maritime Trade: Commit to Compete.* (2004). Retrieved as of November 2004 from: <http://www.governor.wa.gov/transportation/maritime.pdf>

[59] MainLine Management, Inc. (MLM), in association with HDR Engineering, Inc. (HDR). *Washington Public Ports Association (WPPA) Freight Rail Capacity Study.* (May 19, 2004).
[60] Merchants Exchange & the Columbia Snake River Marketing Group. *The Great Waterway.* (2001): Page 5

Short Sea Shipping in Washington State

Short Sea Shipping describes a host of different vessel services- from barge traffic on the Columbia/ Snake River to voyages of several thousand miles serving Alaska and Hawaii. The Pacific Northwest has historically enjoyed active barge and coastal freighter operations. In 2002, almost 62 million tons of freight moved in the Washington State short sea shipping industry (includes Canada, Alaska, interstate, and intrastate).*

The Columbia- Snake River system, from the Pacific Ocean to Lewiston, Idaho, carries a major portion of the exported wheat and barley- as well as exports of forest products and agricultural products. The river system also supplies Eastern Washington with petroleum products and fertilizers. Other commodities include forest products, sand, gravel, chemicals and fertilizers, and garbage. Challenges to the system related to channel deepening, maintenance dredging and potential dam breaching must be addressed to preserve the viability of the system. One 15-barge tow can carry the equivalent of 870 large semi trucks, which if set bumper to bumper would extend 11.5 miles, or more than two trains with 100 rail cars on each train.*

Freight moved by barge and raft in the Puget Sound also serves an important purpose. Virtually all cargo shipped to and from Southeast and Arctic Alaska is moved by barge to/ from Seattle. The construction industry gets low cost moves of cement and aggregates from Canada and Puget Sound plants. The forest product industry would also face increased costs if they were unable to barge and raft logs. About half of Washington's refined fuel is shipped to market by barge and tanker. Although barge costs twice as much as pipeline for fuel distribution, it is used because Washington's pipelines are at maximum capacity.

Nationally, the U.S. Department of Transportation Maritime Administration (MARAD) is studying short sea shipping as an alternative to trucks moving on crowded roads and railroad networks. However, diverting truck traffic to barge in metro markets- such as containers currently trucked on I-5- would likely require substantial subsidies to offset the increase in shippers' costs. The cost of drayage and container handling at the ports are significant, and barge transport is slower than truck or rail. The bottom line to any shipper is the cost per ton for transportation and scheduled service.

Recent studies for the Puget Sound region estimate that barge transport would cost twice as much as transport by truck only. The Port of Port Angeles recently found that it would cost $30 to barge a metric ton of refuse to Seattle, versus $15 per metric ton by truck (assuming 60,000 tons of solid waste per year).* The barge service would remove 2,800- round trip truck transits per year but would cost almost one million dollars more per year. In another recent study undertaken by the International Mobility & Trade Corridor (IMTC), analysis concluded that barge service from Vancouver B.C. to Seattle would cost $870 per container (for a barge carrying 260 20- foot containers traveling at seven knots per hour) and would take 19 hours. The same trip by truck would cost $550 per container and only take six hours. Phase II of this study began in late 2004 and will cover a more detailed cost analysis.*

* U.S. Army Corps of Engineers Navigation Data Center- Waterborne Commerce Statistics Center. 2002 Commodity Movements from the Public Domain Database. State to State by Destination and Origin.
* BST Associates. *2004 Marine Cargo Forecast: Technical Report Final.* (May 19, 2004).
* Port of Port Angeles. *Municipal Solid Waste Barging Model- Briefing Paper.* (September 16, 2004).
* Whatcom Council of Governments. *Shortsea Shipping on the Canada-United States West Coast.* A briefing on findings of Phase I. Retrieved as of November 2004 from: <http://www.wcog.org/library/imtc/sss1summary.pdf>.

Washington's Freight Infrastructure System Supports the U.S. Military's Readiness and Operations[61]

Military facilities in Washington State are important contributors to the U.S. defense and national security system. 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. The military's ability to efficiently move freight in and through Washington State is dependent on an effectively functioning intermodal freight movement system. Specific freight mobility issues for the military in Washington are summarized below.

Puget Sound Seaports Have a Strategic Role in Support of Fort Lewis

Fort Lewis is the only Power Projection Platform – for gathering, staging and mobilizing forces and material – on the West Coast. If a major military conflict were to trigger mobilization activity, inbound cargo needed for that mobilization would travel by road and rail from across the U.S. to Fort Lewis, for shipment through the Port of Tacoma to points outside the country. Under such a scenario, it is expected that the Port of Tacoma would need to handle daily volumes of up to 600 containers, 350 railcars and 1,100 wheeled vehicles. This

The Economic Impact of Military Stations in Washington State

The military had an estimated economic impact on Washington State of $7.2 billion in 2003, according to a study by the Washington State Office of Financial Management. That included salaries, purchase of goods and services, construction and other spending, primarily in Pierce, Kitsap, Island and Spokane counties.

A snapshot of the U.S. military's presence in Washington, not including reserve forces, shows:

In 2003, major military bases in Pierce County employed 34,624 military and civilian employees, with a payroll of $1.9 billion. Fort Lewis is the largest Army base on the West Coast and the largest employer in Pierce County. McChord Air Force Base near Tacoma is the third largest employer in Pierce County. Pierce County is also home to the Madigan Army Medical Center.

More than 6,000 military and civilian employees were employed in Spokane County, with a payroll of $293 million in 2003. Fairchild Air Force Base is the largest employer in Spokane County.

Kitsap County and Island County are home to major Naval bases (including the Bangor and Bremerton Naval Stations). In Island County, 68 percent of employment is on major military bases, with 10,066 employees and $399.1 million in wages. Kitsap County military bases employed 27,375 military and civilian workers in 2003, with $1 billion in wages.

There are an additional 5,017 military and civilian employees on major military bases throughout Washington. In total, major military bases employed more than 83 thousand people and paid $3.8 billion in wages in Washington State during 2003.

Washington State Office of Financial Management. *Economic Impacts of the Military Bases in Washington* (July 2004). Prepared by Dr. Paul Sommers with assistance from forecasting division staff.

[61] This information is provided to the state for planning purposes from the Surface Deployment and Distribution Command - Transportation Engineering Agency: 2004.

volume could create truck bottlenecks at the I-5 / Port of Tacoma Road exit and rail chokepoints at Bullfrog Junction.

In 2004, the military also began using the Port of Olympia for shipments out of Fort Lewis. The efficient movement of cargo may be hindered because of needed rail capacity enhancements at the port. There has been a fivefold increase in the number of rail cars that have passed through the port since 2002. In 2002, 168 cars came through the port. It increased to 876 in 2004. The return of Army shipments related to the Iraq War accounted for about 17 percent of rail volume. In response, the port is spending $1.4 million this year to add a rail line on its docks closer to where ships berths.[62]

Fort Lewis is also dependent on the I-90 / I-5 connection between the Fort and the Yakima Firing Range. This range, the only large firing training center on the West Coast, also serves as an overflow site for Fort Lewis staging, if force deployment at Fort Lewis reaches capacity.

The Port of Seattle Has a Role in Supporting Overseas Military Logistics
The Port of Seattle has been designated as a sustainment port, one that will be used to ship consumable supplies to troops in the event of a major overseas conflict. Under this scenario, 300-600 containers of supplies could arrive on 100 to 350 railcars on a typical day, with a peak of up to 1,100 containers per day. Military logistics officials have expressed concern about potential bottlenecks to access Terminals 5, 18 and 46 at the intersection of East Marginal Way and South Spokane Street, and the single railroad track access under the Spokane Street Bridge to the Port's Terminals. The Port of Seattle is working to solve this problem through an East Marginal Way grade separation.

Ordnance Transport Requirements for Bangor
Ordnance is delivered to the Port Hadlock Naval Ordnance Center via rail car to Bangor on the Hood Canal, and then trucked to Port Hadlock. The truck trip is 70 miles longer by SR 101 than via the Hood Canal Bridge. Potential maintenance and weather-related closure of the Hood Canal Bridge are logistics concerns associated with the reliability of this supply route.

Emerging Directions for West- East Trade

- Future mainline rail capacity, constraints, and port- rail connections. Increases in both container trade and agricultural exports (wheat) will add to capacity constraints on the north- south and east- west mainlines.
- At the Port of Vancouver rail yard, several low-to-medium cost solutions to significantly improve rail capacity have been identified by the railroads, the ports, and the Washington and Oregon Departments of Transportation. They

[62] Amador, Jim. Marine terminal director of Port of Olympia. As reported by Szymanski, Jim, *Rail cargo business chugs along at port*. The Olympian. Sunday, February 27, 2005. Retrieved as of February 2005 from: htpp://www.theolympian.com/home/news/20050227business/96117.shtml

include: revising crossovers, increasing speeds, lengthening and/or connecting tracks in several yards. These improvements will address capacity needs for approximately five to ten years, given a growth rate of 1.625% - 3.25% per year, at a performance level of 200 hours of delay (96 hours).

- Within the next 10 to 20 years, growth on the rail system will require additional capacity across the Columbia River. Sixty-three freight trains and 10 Amtrak trains crossed the bridge daily in 2004. Freight trains are projected to reach 90 per day in 2025, and inter-city passenger service plans call for 26 trains per day.
- Local road connections to seaports
- Grade separations at high impact locations to mitigate the effects of rail traffic.
- Maintaining the Columbia- Snake River barge system (dredging and lock maintenance). Over 60 percent of Washington's wheat exports are barged down the Snake- Columbia River system. If the water level is reduced or silt allowed to build up, barges could not carry full loads and would need to decrease capacity by 500 tons per barge for every one and one- half feet of river depth.

Washington Supports Freight on North- South Corridors

As Washington State serves as a hub between Asia and the U.S., the State also moves freight to and from the West Coast, Canada, and Alaska.

The U.S.- Canadian Border is a Major Freight Gateway

Canada has a long history as a significant U.S. trading partner, and Canadian trade has a strong impact in the state. In 2002, Canadian goods valued at more than $10 billion entered the U.S. economy through Washington, and U.S. goods valued at $6 billion entered Canada through Washington State[63].

With the establishment of the NAFTA, this trading relationship has expanded. In our State, this increase in trading activity has historically affected truck rather than rail traffic volumes. In 2002, 58 percent of the value of Washington surface trade with Canada was transported by truck, nearly 7 percent by rail, 30 percent by pipeline, and the balance by other surface modes (such as airplane exports).[64] From 1994 to 2003, the number of trucks entering Washington from Canada has increased at an average annual rate of 3.3 percent.[65]

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[63] Washington State Office of Financial Management. *2003 Washington State Data Book. (January 9, 2004). Table CT14: International Trade*. Original data from: Washington State Department of Community, Trade & Economic Development. *2002 Washington State Exports* and *2002 Washington State Imports*. (All goods lade or unladed).

[64] U.S. Department of Transportation, Bureau of Transportation Statistics (BTS). *Transborder Surface Freight Data. Annual Summaries, State Reports, North American Trade by US State 2002.* Retrieved as of November 2004 from: <http://www.bts.gov/ntda/tbscd/reports.html>
On a tonnage basis, the modal shares for rail and other modes would be higher because the commodities transported are generally heavier and relatively lower value than those carried by truck.

[65] U.S. Department of Transportation, Bureau of Transportation Statistics (BTS). *Border Crossing Data U.S.-Canada. Table 1c- Incoming Truck Crossings, U.S. - Canadian Border 1994-2003*. Retrieved as of November 2004 from: <http://www.bts.gov/programs/international/border_crossing_entry_data/us_canada/>

Rail Crossings at the U.S. – Canadian Border

From 1994 to 2003, the number of trains entering Washington from Canada remained relatively constant at about 3,000 per year.[66] However, with the large rail freight surge that began in late 2003, new data in 2004 shows train counts growing.[67] The number of through trains between Everett and Vancouver has increased from two per day to three or four per day in each direction.[68] Much of this increase is due to NAFTA lumber.

Rail Delays at the U.S. Canadian Border

New security protocols, as well as increases in rail traffic, have led to delays for passenger and freight trains moving between Everett and New Westminster (Canada). Southward trains are stopped at the Swift sidings for an average of one hour to an extreme of two and a half hours. Northward trains are stopped for an average of two and a half hours, with an extreme of five to ten hours occurring weekly.

BNSF and WSDOT are exploring various solutions that will help alleviate rail congestion at the U.S.- Canadian border. Non- infrastructure improvements could include changes to current customs procedures (allowing customs inspections at terminals), improved traffic control, and sharing information about train movements. Infrastructure needs include modifying the Swift siding to allow for Customs inspections off of the main tracks and additional capacity to accommodate rail traffic growth.

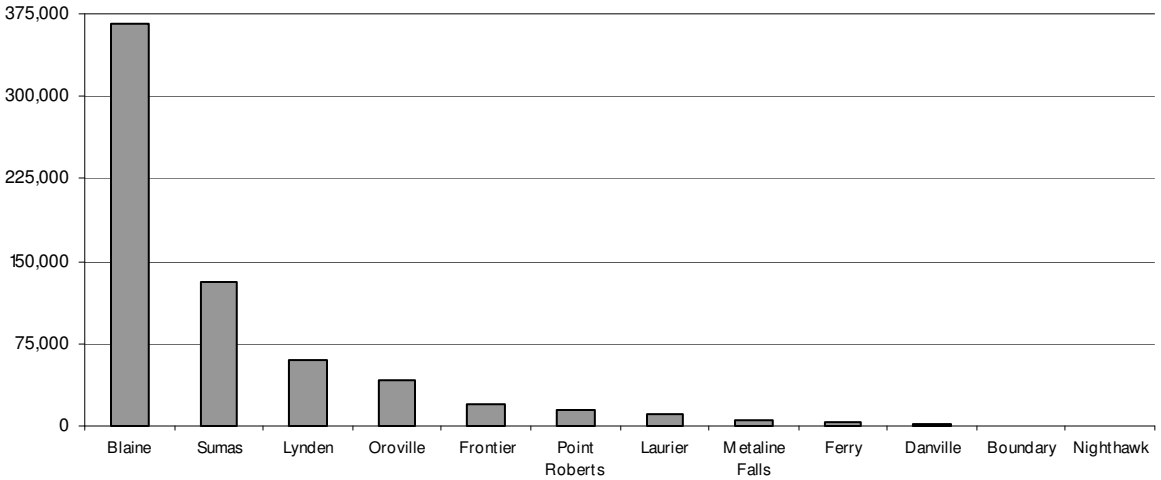
The U.S. federal government recently provided WSDOT with $3.0 million in late 2003 to begin addressing these growing delays.

The Blaine Border Crossing Handles a High Volume of Truck Traffic

Exhibit 20 graphically displays that most NAFTA traffic is west of the Cascades near the I-5 corridor, at the border crossings of Blaine, Sumas, and Lynden.[69] As shown, in 2003 almost 375,000 truck trips entered Washington from Canada through Blaine, and just under 150,000 trucks entered the state through Sumas. The border at Lynden ranked third highest in incoming truck crossing volume, followed by Oroville and Frontier.

[66] U.S. Department of Transportation, Bureau of Transportation Statistics (BTS). Border Crossing Data U.S.-Canada. Table 4c Incoming Train Crossings, U.S.- Canadian Border 1994-2003. Retrieved as of November 2004 from: <http://www.bts.gov/programs/international/border_crossing_entry_data/us_canada/index.html>.
[67] White, Thomas of Transit Safety Management. Contracted research provided to WSDOT Rail Office in September 2004 under subcontract to HDR Engineering.
[68] Washington State Department of Transportation, Rail Office. *Swift- Brownsville Congestion Draft Report:* (January 13, 2005).
[69] See Appendix for a map of all U.S.- Canadian ports of entry in Washington State.

Exhibit 20: Trucks Entering Washington State From Canada in 2003
Number of Trucks



U.S. Department of Transportation, Bureau of Transportation Statistics (BTS). *Border Crossing Data U.S.-Canada. Table 1c- Incoming Truck Crossings, U.S. - Canadian Border 1994-2003*. Retrieved as of November 2004 from: <http://www.bts.gov/programs/international/border_crossing_entry_data/us_canada/>

As shown in Exhibit 21, the border crossing at Blaine ranks fifth among the 75 U.S.-Canadian crossings in terms of merchandise value transported. The Exhibit also shows that in 2003, the Blaine border station ranked fifth in the U.S. by number of incoming truck crossings, with 365,089 incoming crossings in that year.

Exhibit 21: Blaine's Border Crossing Ranks in the Top Five for Value and Top Four for Volume of Crossings Among Land Ports Along the U.S.- Canadian Border

U.S.- Canada Merchandise Trade at Land Port Gateways, 2002

Rank, by Value	Land Ports	Value (billion $)
1	Detroit, MI	100.8
2	Port Huron, MI	57.4
3	Buffalo-Niagara Falls, NY	55.1
4	Champlain-Rouses Pt., NY	14.8
5	**Blaine, WA**	**11.4**

U.S.- Canada Incoming Truck Crossings, 2003

Rank, by Trucks	Land Ports	Number of Crossings
1	Detroit, MI	1,634,319
2	Buffalo-Niagara Falls, NY	1,162,961
3	Port Huron, MI	928,074
4	Champlain-Rouse Pt., NY	387,962
5	**Blaine, WA**	**365,089**

U.S. Department of Transportation, Bureau of Transportation Statistics (BTS). *Transborder Surface Freight Data: Summary Reports by Ports for 2002*. Retrieved as of November 2004 from: <http://www.bts.gov/ntda/tbscd/reports/annual02/port/2002port.html>

U.S. Department of Transportation, Bureau of Transportation Statistics (BTS). *Border Crossing Data U.S.-Canada. Table 1a- 1c- Incoming Truck Crossings, U.S. - Canadian Border 1994-2003*. Retrieved as of November 2004 from: <http://www.bts.gov/programs/international/border_crossing_entry_data/us_canada/>

Washington's Border Links Canadian Trade With Other U.S. States.

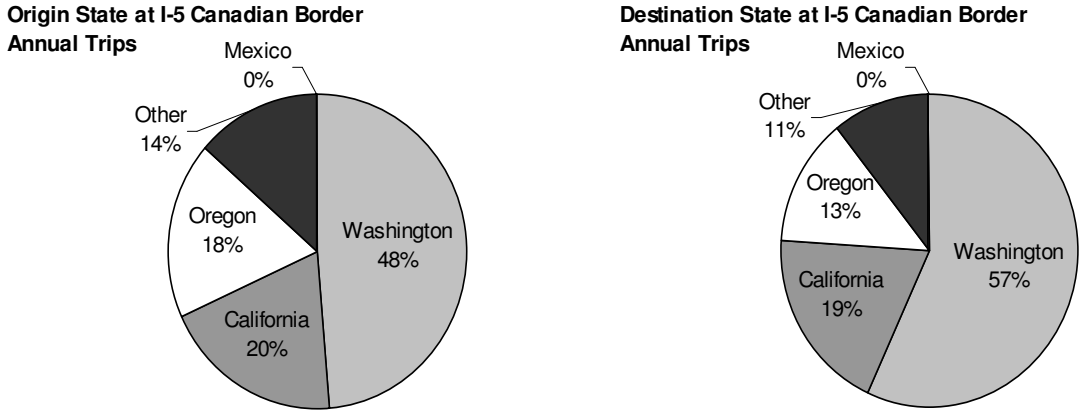
In 2002, 1.4 million trucks with an estimated annual value of $39.4 billion moved north on Interstate 5 to Canada. Another one million trucks with an estimated annual value of $23.4 billion moved south from Canada on Interstate 5.[70] Only about 50 percent of this traffic originated from or was destined for Washington State. The other half is passing through, to and from the states of California and Oregon.

Washington Gateways Move California and Oregon Trade Goods To and From Canada

In 2002, California used surface transportation to import goods from Canada valued at almost $14 billion, and Oregon imported an additional $2 billion worth of goods by surface mode. California used surface transportation to export goods to Canada valued at $7 billion and Oregon exported about $1 billion dollars in goods. These goods must travel through border states, such as Washington.

U.S. Department of Transportation, Bureau of Transportation Statistics (BTS). *Transborder Surface Freight Data Summary Reports by States for 2002.*

Exhibit 22: Trucks at I-5 Border- Origin and Destination



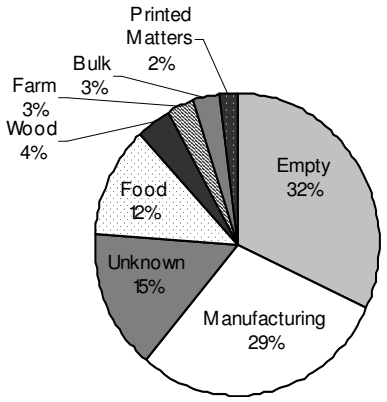
Washington State University, Strategic Freight Transportation Analysis (SFTA). *Origin and Destination Survey: Data Requests and Analysis*. Presentation to SFTA Steering Committee, September 14, 2004 (slides 16 and 17).

In 2002, the greatest commodities imported, by value, from Canada through Washington State were wood (sawn or chipped), exports of repaired imports/ imports of returned exports, petroleum and other gases, and crude oil. The highest value non-aircraft commodities exported to Canada were petroleum, data processing equipment, motor vehicles, and other specialized materials. [71]

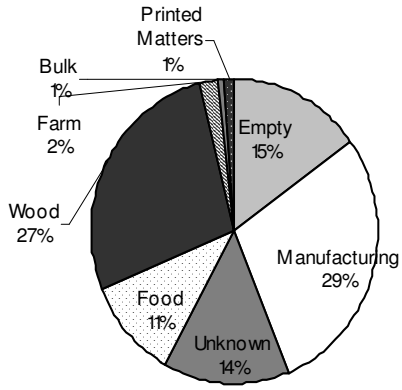
[70] Washington State University, Strategic Freight Transportation Analysis (SFTA). *Origin and Destination Survey: Data Requests and Analysis*. Presentation to SFTA Steering Committee, September 14, 2004 (slides 16 and 17).
[71] Washington State Department of Community, Trade & Economic Development. *2002 Washington State Exports* and *2002 Washington State Imports*. (2003).

Exhibit 23: Commodities Transported Cross-Border by Truck: North-South Commodities Comparison; Summer, 2001

Northbound



Southbound



Cambridge Systematics, Inc., in association with Tsi Consultants. *2000 IMTC Cross-Border Trade and Travel Study Final Report*. (September 5, 2001). Retrieved as of November 2004 from: <http://www.wcog.org/library/imtc/travelstudy.pdf> (Slides 80 and 82).

The majority of truck traffic crossing the Canadian border via I-5 is carrying either manufactured or agricultural goods. A 2001 study found that 60 percent of trucks originated from or were destined for manufacturing or warehouse facilities.[72] Reflecting the balance of trade flows, more than 30 percent of northbound trucks were empty, returning to Canada to transport cargo south, particularly timber products, a commodity which moves almost entirely from north to south. Exhibit 23 below shows a comparison of the mix commodities and goods traveling across the border at I-5.

Washington- Canadian Border Delays, Congestion, and Security Issues

It has been estimated that $40 million in operating costs are lost annually due to border crossing delays at the Blaine crossing.[73] These delays have increased due to increased security concerns following 9/11, and the growth in trade.

There has been an 85 percent increase in truck traffic in the last decade at the Blaine facility, an increase that has strained border crossing capacity there and resulted in queues of trucks north and southbound. At the Pacific Highway Crossing, average crossing time per commercial vehicle headed to Canada ranges from 9 to 91 minutes.[74] The average time for southbound commercial vehicles ranges from 31 to 46 minutes per vehicle. Demand at this crossing is expected to exceed increases in capacity, which will increase delay and cost.

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[72] Cambridge Systematics, Inc., in association with Tsi Consultants. *2000 IMTC Cross-Border Trade and Travel Study Final Report*. (September 5, 2001). Retrieved as of November 2004 from: <http://www.wcog.org/library/imtc/travelstudy.pdf> (Slides 36 and 38).

[73] IBI Group. *Transportation Technology at the Washington- British Columbia International Border Final Report*. (November 15, 2004). Prepared for the Washington State Department of Transportation. (Page 2)

[74] Science Applications International Corporation (SAIC) and Tsi. *Washington State – British Columbia International Mobility and Trade Corridor (IMTC) ITS- CVO Border Crossing Deployment Evaluation Final Report*. (October 2003). Prepared for the United States Department of Transportation, Report No. FHWA-OP-03-XXX. (Pages 65-66).

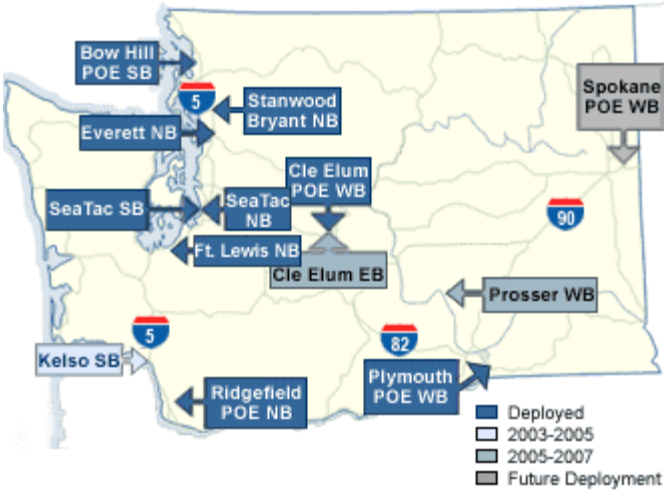
The annual cost of border operations for commercial vehicles is expected to increase by 250 percent to $54 million per year by 2013.[75]

Dedicated ITS truck lanes at the border would allow for expedited preclearance. While the ITS systems necessary are already deployed, physical infrastructure (additional lanes and revamped customs booth areas) are needed on both sides. Detailed costs estimates show a benefit- cost ratio of 29.1:1 to 42.2:1 (depending on the level of ITS market penetration).[76]

The U.S. Customs and Border Protection (CBP) and Canada Border Services Agency (CBSA) have implemented the bilateral Free and Secure Trade Program (FAST). The program aims to increase the integrity of supply chain security and efficiency by offering expedited clearance to carriers and importers enrolled in the Customs Trade Partnership Against Terrorism (C-TPAT) or Canada's Partner's in Protection (PIP). In October 2004, a northbound dedicated Free and Secure Trade Program (FAST) lane opened at the Pacific Highway border crossing in Blaine - offering expedited clearance and reduced crossing times for trucks.

Continued cooperation is needed between transportation and customs agencies at border crossings. A recent report made some recommendations for WSDOT- better traveler information deployed at border crossings, a comprehensive plan for construction mitigation, and enhancement of existing Commercial Vehicle Operations (CVO) projects. In addition, this report recommends that WSDOT continue their current efforts to link their highway based transponder system using the Commercial Vehicle Information Systems Network (CVISN) with the Customs' border data systems such as Free and Secure Trade Program (FAST). Linking these systems should enhance the usability and enrollment of both systems.[77]

Exhibit 24: Weigh-in-Motion (WIM) Scales Deployment in Washington



Washington State Department of Transportation, Commercial Vehicle Information Systems and Networks. Retrieved as of January 2005 from: http://cvisn.wsdot.wa.gov/

[75] Science Applications International Corporation (SAIC) and Tsi. (Page 69).
[76] Science Applications International Corporation (SAIC) and Tsi. (Executive Summary, Page ES- 7).
[77] IBI Group. *Transportation Technology at the Washington- British Columbia International Border Final Report*. (November 15, 2004).

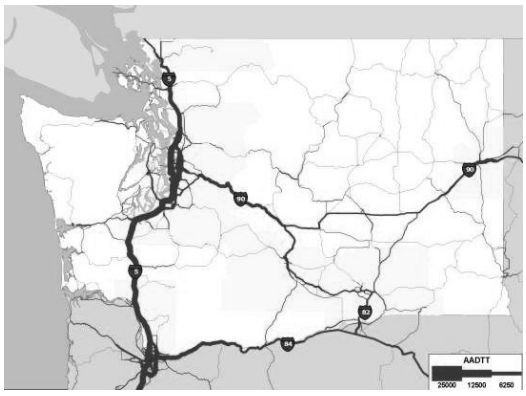
Freight Movement Along the North- South Highway Corridors

Interstate 5 Freight Movements

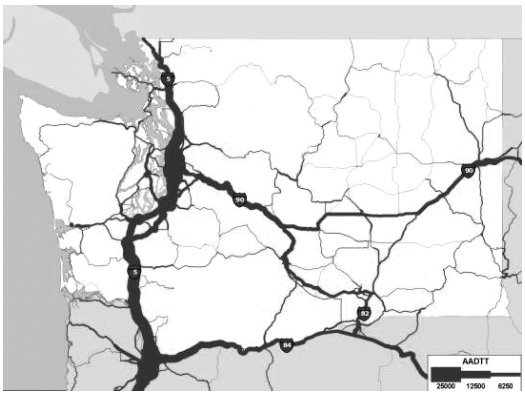
Through freight moving along the West Coast corridor generally travels on the I-5 highway corridor. As shown in Exhibit 25, the average annual daily truck traffic in Washington will increase substantially in the next 15 years- especially along I-5 and in urban areas.

Exhibit 25: Estimated Average Annual Daily Truck Traffic in Washington, 1998 and 2020

Estimated Average Annual Daily Truck Traffic, 1998



Estimated Average Annual Daily Truck Traffic, 2020



U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations. *Freight Analysis Framework - State Freight Profile*. Retrieved as of November 2004 from: <http://ops.fhwa.dot.gov/freight/freight_analysis/state_info/washington/profile_wa.htm >

Chokepoints along the I-5 corridor in Washington, Oregon, and California affect through traffic of all freight movements, including freight bound for export north to Canada and to the Puget Sound ports. As on all roads, freight on I-5 shares the road with passenger vehicles. Long-haul freight traffic is intermixed with local truck and distribution system traffic. Delays are costly, especially with the new 11- hour service rules. Problems include: congestion in the Portland, OR-Vancouver, WA metro area; congestion from Olympia to Everett; and Canadian border delays.

I-5 Columbia River Crossing Chokepoint

The duration of peak congestion on the I-5 bridge across the Columbia River is expected to increase from four to ten hours a day. Trucks constitute 8 percent of total traffic on the bridge and mostly travel during the midday – between morning and evening commutes to avoid times when the bridge is at full capacity.

Population in the Portland/ Vancouver metropolitan area is expected to increase from 1.9 million to 2.4 million by 2020. As a result, vehicle travel time will increase from 38 minutes to 44 minutes. The I-205 Bridge, a few miles east and running parallel to I-5, is expected to become equally congested by 2020. According to ODOT, 5.9 percent of vehicle traffic on this bridge is truck/ freight related.

Cambridge Systematics, Inc., in association with David Evans and Associates, Inc. *Regional Economic Effects of the I-5 Corridor/ Columbia River Crossing Transportation Choke Points.* (April 2003).

Interstate 5 Corridor : The West Coast's North-South Lifeline

Interstate 5 (I-5) is the backbone of the Washington State transportation system and the West Coast freight system, crossing three states and linking three nations. As the most heavily used highway in the state, it is critical to the regional, state, and national economy. Congestion in the corridor has a major impact on Washington shippers and impedes trade with national markets. There is no practical alternative route to I-5 for freight trucked within the North-South corridor.

The I-5 Corridor links Washington with the states of Oregon and California. In 1997, 43 percent by value and 38 percent by weight of all domestic shipments destined for Washington originated from Oregon or California (total for both states of $36.1 billion and 24.6 million tons). This same year, 33 percent by value and 72 percent by weight of all domestic shipments leaving the state were destined for Oregon or California (total for both states of $24.7 billion and 42.8 million tons).

Trucks traveling on I-5 face delays and congestion throughout Central Puget Sound and over the Columbia River bridge. Exhibit X presents a picture of the average hours of delay per day likely to be tallied for a given segment of highway. The highest spike depicted on the map is located at the interchange for I-5 and I-90 in Seattle, where the average tally is about 825 vehicle hours of delay per lane mile per day. As shown, the greatest delay on the state highway system is found in the Central Puget Sound area.

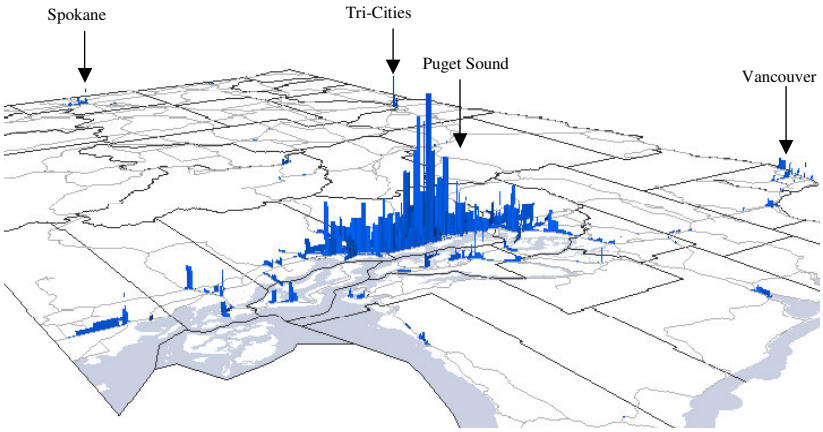
Several sections of I-5 in Washington State narrow to only two lanes in each direction. Although plans are underway to widen I-5 at several points in Lewis and Thurston Counties, a 20-mile gap through the Twin Cities and segments in Cowlitz and Whatcom Counties remain two-lanes. As truck volumes continue to grow along I-5 (see Exhibit 26), these segments will become more congested. Intermittent and nonrecurring delays are also more common on these segments because there is fewer alternate lanes to bypass an incident.

In 2004, the Washington State Legislature conducted the Commerce Corridor Study, a feasibility study of a new privately-financed multi-use corridor running north-south, parallel to I-5, from Lewis County to the Canadian border. On an average day, between 18,000 to 22,000 trucks haul freight up and down the I-5 corridor between the greater Seattle area and points south. As the majority of these trips are long-haul, the study concluded that there may be enough truck trips to fund a portion of costs through truck tolls, if the trucking industry found that they could increase productivity and lower their overall costs. The Commerce Corridor Study recommended further analysis of the benefits and feasibility of a truck-toll highway from Central Puget Sound to the Oregon border. This highway could be an extension of I-5, or I-405/Highway 167/I-5, or follow a parallel route.

U.S. Department of Transportation, Bureau of Transportation Statistics. *BTS State Transportation Profile*. "Table 3-1 and 3-2 Domestic Shipments to/ from Washington by State: 1997". Based on the U.S. Department of Transportation, Bureau of Transportation Statistics and U.S. Department of Commerce, U.S. Census Bureau, *1997 Commodity Flow Survey* (1999). Available as November 2, 2001 from: <http://www.bts.gov/ntda/cfs/cfs97od.html>.

The Wilbur Smith Associates Team. *Washington Commerce Corridor Feasibility Study, Technical Memorandum Six: Feasibility of a User Financed WCC* (page 6-16). Prepared for the Washington State Department of Transportation. Retrieved as of January 2005 from: <http://www.wsdot.wa.gov/freight/TechnicalMemos.htm>.

Exhibit 26: Total Daily Vehicle Hours of Delay Per Lane Mile across the State of Washington



Source: Washington State Department of Transportation (See Chokepoints and Bottlenecks Issue Paper for WTP Phase I). The map does not present a picture of delay on city or county streets or highways

Rail is not generally used in this corridor for intermodal container traffic, as it has not been able to compete on price and service offered by trucks.[78] There are also numerous facility and operational challenges to rail operations in the corridor.[79] These challenges include difficulties with intermodal transfers and limitations on rail capacity, for example, California's mountainous terrain, single track capacity limitations east of Bakersfield through the Tehachapi Mountains, and a lack of double stack clearance in a number of tunnels in Oregon on the single track routes operated by BNSF and Union Pacific. Newly available technologies may address the intermodal transfer issue, but the other constraints

Train Operations Are Delayed in Vancouver Area

As many as 63 freight and all the passenger trains cross the BNSF Columbia River Bridge, a double track swing span bridge that must open several times a day to accommodate waterborne commerce on the Columbia River. A 2003 study found that the current system is severely congested, causing delays to train throughput. Average freight speed was only 12.29 miles per hour in the Vancouver/ Portland area and delays averaged more than one hundred hours per day. This is comparable to delays experienced at the Chicago metropolitan area yard system, a notorious freight bottleneck.

Delays are primarily caused by lines crossing each other and waiting for other trains. It is projected that in ten to twenty years, the system will not be able to handle train growth. A list of moderate system improvements to relieve congestion and allow the system to handle projected growth over the next five to ten years was developed in response to this challenge. A preliminary estimate places the cost range for these improvements at $170 million.

[78] Rail is competitive on the north- south corridor for bulk commodities, such as lumber headed to Southern California.
[79] American Association of State Highway and Transportation Officials (AASHTO). *Transportation Invest in America: Freight- Rail Bottom Line Report* (2002). (Pages 108-110).
Wilbur Smith Associates. *Cascade Gateway Rail Study* December 2002

would require significant investment.

Historic and Forecasted Growth in Freight Traffic on I-5.
Freight traffic traveling on I-5 increased 94 percent between 1994 and 2002. A survey conducted in the summer of 2002 found that: 39 percent of trucks using I-5 had a Washington origin and destination; 23 percent originated in the State and were traveling of state; 9 percent originated out of State and were destined for Washington; and eight percent were traveling through the State with neither a Washington origin or destination.[80]

Other Important North- South Truck Corridors in Washington State.
Highway 395 is a strategic freight corridor and a designated NAFTA freight corridor. Although Highway 395 carries a much smaller volume of through trucks than I-5, it is important for the regional, natural resource industry. Oregon and Washington account for two-thirds of total origins and nearly three quarters of destinations for long-haul trucks traveling on Highway 395.

Exhibit 27: Daily Truck Trips

	1993/ 1994	2002
I-5	7,909	15,314
I-90	2,954	5,070
Hwy 395	1,207	3,283
US 97	700	2,300

Washington State University. *SFTA Origin-*

SR 97 is also a strategic freight corridor and a designated NAFTA freight corridor. Truckloads from Chelan to the Canadian border include empty back haul into Canada, livestock from Alberta (until the mad cow shut down of this historic trade pattern), wood-chip trucks from British Columbia, and finished lumber from Kelowna.

Emerging Directions for North- South Corridors

- Capacity and constraints throughout the north- south I-5 highway corridor, including congestion from Everett to Olympia, missing highway links and the Columbia River Bridge.
- Operational improvements for long- haul trucking companies. Completion of weight-in motion system, communications and ITS, and truck rest stops for larger, more modern trucks.
- Washington- Canadian border delays, congestion and security issues need to be addressed. Post 9/11 security concerns have created urgent requirements to upgrade processes and technologies to track, inspect and ensure the safety of cargo shipments at the U.S.- Canadian border. Carriers and shippers are struggling to comply with rapidly evolving regulations. New

[80] Washington State University. *SFTA Origin- Destination Freight Data 1993/ 1994- 2002 Spring/ Summer Preliminary Comparisons: Presentation to SFTA Advisory Committee Meeting Walla Walla, WA*. Retrieved as of November 2004 from: <http://www.sfta.wsu.edu/presentation/pdf/7_Steering_Origin_Destination.pdf>

Customs clearance processes are causing delays, bottlenecks, and inefficiencies for the multimodal transport system that links the movement of freight between the U.S. and Canada.

Washington's Freight System Connects Alaska with the United States and Points Beyond

The value and volume of freight moved between Puget Sound seaports and Alaska makes this one of the nation's most important routes for domestic waterborne commerce with Alaska.

By weight, the most significant commodity carried to Washington State from Alaska is crude oil. Oil travels south from Alaska onboard tankers through the inland waterway, and is offloaded at refineries in Cherry Point, Ferndale, March and Tacoma. In 2002, Washington received 24.6 million tons of crude oil from Alaska by water, constituting 96.5 percent of all freight coming into Washington State from Alaska by water and 88 percent of Washington's total domestic, waterborne trade with Alaska.[81]

According to the 2004 Marine Cargo Forecast, the volume of Alaskan crude petroleum that landed in Washington State each year from 1992 to 2002 was relatively flat. Towards the end of the forecast period of 2025, as Alaska production begins to decline, the forecast predicts than an increasing share of crude oil receipts to

Totem Ocean Trailer Express (TOTE)

Totem Ocean Trailer Express, Inc. (TOTE), a privately owned shipping company serving Alaska since 1976, operates a fleet of two diesel-electric roll-on/roll-off (RO/RO) cargo ships, with twice weekly service between the Port of Tacoma, Washington and the Port of Anchorage, Alaska. TOTE also owns three steam turbine vessels, which are currently on charter.

In 2003, TOTE introduced two new diesel-electric ships called the Orca Class. On these new ships, which can hold up to 600 28- to 53- foot highway trailers and 275 vehicles, cargo travels the dangerous waters to and from Alaska.

On sailing days, TOTE's terminal at the Port of Tacoma is a scurry of activity with over 1,000 moves. TOTE operators drive whole truck trailers onto the ship, then disconnect and lock down the cargo units.

Trucks arriving at the terminal are often from retail distribution centers (DCs) in California and Oregon. Wal-Mart and Fred Meyer move cargo from DCs through the Port of Tacoma to retail stores in Alaska. TOTE also ships military cargo from distribution centers in California and military bases throughout the U.S. Most Washington State goods movements originate in Kent Valley distribution centers (DCs).

As with other Alaska carriers, about 80 to 90 percent of all of the cargo that TOTE moves is one- directional, headed north to Alaska. TOTE must bring empty trailers and equipment back to its customers in the Lower 48, so that they can again be loaded with the goods and supplies Alaska needs.

[81] U.S. Army Corps of Engineers Navigation Data Center- Waterborne Commerce Statistics Center. *2002 Commodity Movements from the Public Domain Database. State to State by Destination and Origin.*

Washington refineries will come from other sources.[82]

In turn, consumer products and supplies leave Washington seaports for Alaskan markets. More than 77 percent of domestic waterborne cargo tonnage entering Alaska originated from Washington State in 2002.[83]

In 2002, Washington's seaports sent more than two million tons of goods to Alaska. Manufactured goods constituted almost 50 percent of this weight, or one million tons. Approximately 70 percent of waterborne cargo destined for Alaska's from the Lower 48 moves through the Port of Tacoma; in 2003, Tacoma's waterborne trade with Alaska totaled more than $3 billion.[84] The same year, almost 84,000 full 20-foot container equivalents (TEUs) were moved to Alaska through the Port of Seattle.

Cargo runs the gamut, from department store goods to building materials, new cars, military vehicles, and school buses. Most major retailers do not have distribution centers in Alaska. Companies are reliant on Alaskan shipping lines to transport retail goods in a timely manner to reach markets in Alaska.

Exhibit 28: TOTE Alaskan Vessel

M. V. North Star, one of the new Orca Class vessels. Photo by Greg Martin- http://www.totemocean.com

Lynden Transport

Lynden Transport, Inc., founded in 1906, is a complete multi-modal, regional, common and contract carrier primarily serving Alaska. Lynden Transport also provides LTL cargo service on motor-water-motor routes using steamships, barges, and the Alaska State Ferry System and scheduled over-the-road freight service via the Alcan Highway, from the local terminal in Tacoma and airfreight through Seattle.

About 90 percent of all Lynden's shipments are headed north; their transport returns home empty. Steamships and barges leave the Port of Tacoma and Seattle's Duwamish area twice a week, respectively, for Central Alaska and Southeast Alaska- with about 1,000 full containers per week to Central Alaska and 750 to 800 40-foot equivalents to Southeast Alaska.

In addition to water and air service to Alaska, Lynden offers all truck and rail- truck service to Alaska. Lynden sends a full- truckload on customer demand, averaging about five per week.

Lynden runs 24 hours per day, offering customers flexibility. Although they would prefer to run truck pick-up deliveries at night for better equipment utilization, customers prefer daytime delivery hours.

[82] BST Associates. *2004 Marine Cargo* Forecast. *Technical Report Final.* (May 19, 2004). By 2025 Alaska crude is projected to account for less than half of total receipt of about 39 million tons

[83] U.S. Army Corps of Engineers Navigation Data Center- Waterborne Commerce Statistics Center. *2002 Commodity Movements from the Public Domain Database. State to State by Destination and Origin.*

[84] Hoehne, Kurt. "Dedicated to Alaska". *Pacific Gateway* (Winter, 2003). Port of Tacoma. Retrieved as of November 2004 from: <http://www.portoftacoma.com/files/PacificGatewayWinter2003.pdf>

Major Issues for Alaskan Shipping Lines
Because Alaskan shipping lines, Lynden and TOTE, use trucks almost 100 percent of the time to get goods to and from their marine terminals, they are particularly concerned with road and highway connections to those terminals.

- Taylor Way needs to be widened and improved. Alexander Avenue, currently used 40 percent of the time, will be closed in late 2004 or early 2005 - leaving some Port of Tacoma tenants completely dependent on Taylor Way until the Hylebos Bridge becomes operational in 2007. The dozen small rail crossings can isolate Port of Tacoma tenants.
- Other difficulties include the I-5 congestion from south of Tacoma to Fife. Shipping lines deal with unpredictable transit times through these areas.
- A lack of consistent regulations throughout the West Coast add costs for Alaskan carriers because they have to purchase and manage so many truck configurations. Other regulation differences, such as hours of service and employee security clearances, create headaches for managing these complex companies; one set of standards would greatly increase efficiency.

Washington's Airports are Gateways for High-Value and Time-Sensitive Goods

Between 1985 and 2000, world air cargo grew at an annual rate of 7.3 percent. Washington State has kept pace with the world market. Between 1985 and 2000, total air cargo volume at Seattle- Tacoma International Airport (Sea-Tac) and Boeing Field grew by 180 percent (an average annual growth rate of seven percent).[85]

Insufficient Air Cargo Data

Currently there is insufficient information and documentation on air cargo in the State, including total value, commodities shipped, and origins and destinations of air cargo. While there is some information available about air cargo volumes, it is not consistently collected or reported for all airports, is often outdated, and may exclude deplaned (incoming) cargo and cargo flying in the belly of passenger planes.

A statewide air cargo study is needed to identify air cargo trends, origin and destination of cargo, and strategies to facilitate efficient movement of air cargo. There is a need to identify airports that provide international, domestic and regional air cargo service and constraints on landside cargo movements. Another need is to identify performance measures to evaluate air cargo system efficiencies and identify areas for improvement.

Some regional planning efforts may help guide the development of a statewide air cargo study- such as the Puget Sound Regional Council Air Cargo Strategy (preliminary information in Spring 2005).*

* Puget Sound Regional Council. *Regional Air Cargo Strategy Final Scope of Work*. (September 16, 2004)

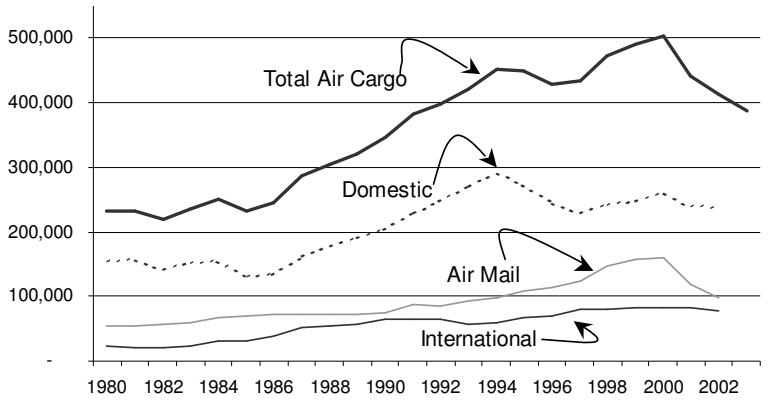
In 1996, Sea-Tac International handled 66 percent of Washington's air freight (excluding mail), with 22 percent handled at Boeing Field and 11 percent at Spokane International.[86] The remaining one percent was dispersed throughout the State. In 1999, the FAA reported that Sea- Tac handled 65 percent of enplaned cargo, Spokane International 22 percent, and Boeing Field 12 percent.[87] The FAA only collects enplaned data and only reports cargo transported by a freighter (not in the belly hold of a passenger plane).

The Majority of Air Cargo Moves Through Sea- Tac

Sea-Tac ranks eighteenth in the U.S. by tons of cargo handled, with a total of more than 400,000 tons of air cargo passing through the airport in 2002. Total cargo is equal to airfreight plus airmail. Adjusting for airmail volumes, 316,428 net tons of cargo were handled.[88]

Exhibit 29 shows the history and trends for Sea-Tac's air cargo activity from 1980 to 2002. As the Exhibit shows, the airport experienced upward growth in air cargo during the period before September 11, 2001. Since 9/11, the airport reports a seven percent decrease in air cargo volume, caused by a decrease in airmail.

Exhibit 29: Air Cargo Through Sea- Tac International Airport
1980- 2002 (Tons)



Port of Seattle. *Sea- Tac 2002 Airport Activity Report.* Page 29. As reported to Port of Seattle by the airlines. Retrieved as of November 2004 from <http://www.portseattle.org/seatac/statistics/index.shtm>

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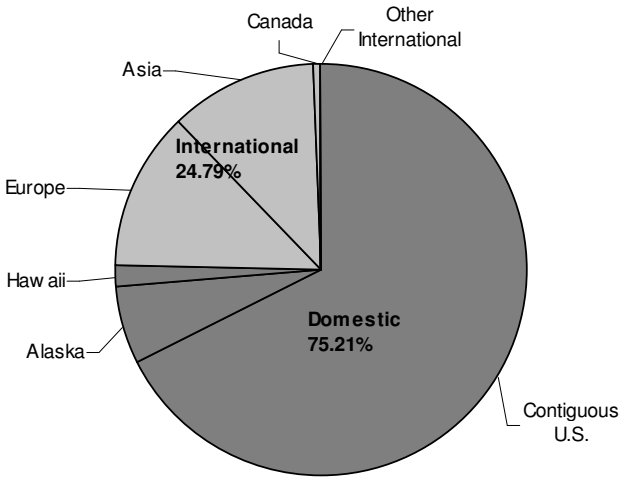
[85] Puget Sound Regional Council. *Regional Air Cargo Strategy Final Scope of Work.* (September 16, 2004): Page 1.
[86] Allison, Stanley C. *Washington State Air Freight Movement.* (January 1998): Page 9.
[87] Washington State Department of Transportation Aviation Division. *Aviation System Plan - Forecast and Economic Analysis Study.* (2001): Pages 73- 77. Original source: Department of Transportation, Bureau of Transportation Statistics, Results of Airport Surveys.
[88] Port of Seattle. *Sea- Tac 2002 Airport Activity Report.* Page 29. As reported to Port of Seattle by the airlines. Retrieved as of November 2004 from <http://www.portseattle.org/seatac/statistics/index.shtm>

Exhibit 30 shows the split of air freight volume between U.S. and international destinations at Sea- Tac in 2002. As the Exhibit reflects, 75 percent of air freight is domestic, just under 25 percent is bound for or arrives from Europe or Asia, and less than one percent is related to Canadian, Russian, or Mexican origins or destinations.

Exhibit 30: Seattle- Tacoma International Airport Air Freight
Percent Based on Tons



Port of Seattle. *Sea- Tac 2002 Airport Activity Report.* Page 30. As reported to Port of Seattle by the airlines. Retrieved as of November 2004 from <http://www.portseattle.org/seatac/statistics/index.shtm>

King County International Airport/ Boeing Field Air Cargo.
Boeing Field handled approximately 142,000 tons of air cargo in 1997, an increase from 40,000 tons from 1994.[89] In 1997, it was projected that air cargo volumes would increase at an average rate of 4.6 percent a year through 2015.[90] A more recent forecast is needed.

Other Washington Airports Handling Air Cargo.
There are 29 airports in Washington State providing airfreight service.[91] In addition to Sea- Tac and Boeing Field, there are significant air cargo operations at Bellingham and Spokane International Airports. Bellingham International Airport handled about 1,440 tons of airfreight in 2002, a decrease of almost 60 percent from 1993 volumes of more than 3,500 tons.[92] Spokane International Airport handled about 80,000 tons of air cargo in 1999, increasing to nearly

[89] King County International Airport. *King County International Airport/ Boeing Field Revised Draft Master Plan.* (August 2001): Tables B1 and B2.
[90] Forecasts based on TRA/ BV forecast, developed from 1997 data. Given substantial changes in airfreight since 1997, especially following 2001, more information is needed to assess the airport's needs.
[91] Washington State Department of Transportation Aviation Division. *Aviation System Plan - Forecast and Economic Analysis Study.* (2001): Appendix
[92] Port of Bellingham. *Comprehensive Annual Financial Report: For The Year Ended December 31, 2003.* (April 23, 2004): Page 47. Retrieved as of November 2004 from: <http://www.portofbellingham.com/about/CAFR2003.pdf>

100,000 tons in 2002.[93] At Spokane, air cargo growth has surpassed passenger growth; activity has doubled in the last five years. Spokane International Airport forecasts an average annual air cargo growth rate of 5.8 percent until the year 2020.

Emerging Directions in Air Cargo

Worldwide, air cargo volumes are expected to grow more than six percent per year, doubling current volumes by 2015. Growth at Sea-Tac may be constrained by the capacity of regional roadways, and by the availability of cargo handling facilities.

Widening SR- 518 to three lanes eastbound is the most critical need for landside airport access, according to port officials. High- volume shippers and carriers across the state say that congestion on I-5 between Everett and Olympia is driving down performance in Washington's air cargo system. The Puget Sound Regional Council is reviewing ground access and landside capacity needs and issues in its Regional Air Cargo Strategy project, scheduled for completion in 2006.

[93] Spokane International Airport. *Twenty-year Master Plan Update: Spokane International Airport.* (September 2001). Retrieved as of November 2004 from: <http://www.spokaneairports.net/MasterPlan.htm>

Washington Producers Rely on Air Freight: Northwest Airlines Case Study

Northwest Airlines is the world's fourth largest airline, operating a dedicated fleet of twelve Boeing 747 freighters. Northwest Airlines cargo operations in Washington are based at the south end of Sea-Tac. Additional facilities called "Northwest Freight Stations" are located along the West Coast.

Northwest operates on a hub and spoke system; freight hubs are located in Amsterdam, Anchorage, and Tokyo. Flights travel to all of Northwest's hub stations, and cargo can be routed to any destination in the network. About 30 percent of cargo flies in dedicated freighters, and 70 percent flies in the belly of passenger planes. A variety of services are offered, from premium next-day delivery, to cheaper, two to three day, delivery. Most dedicated cargo flights leave at night.

As of 2004, air cargo destined for Asia from Sea-Tac is transported in the cargo hold of daily passenger flights to Tokyo. Cargo is also trucked to PDX, to support Northwest's new daily cargo flight to Narita, Japan.

About 80 percent of cargo leaving Northwest Airlines' Sea-Tac facility originates in Washington State- the other 20 percent originates from Oregon, California, or British Columbia. Likewise, 80 percent of cargo arriving at the Sea-Tac facility is destined for Washington state markets.

Perishables are one of the airline's largest markets. Washington-grown cherries, blueberries, raspberries, blackberries, and asparagus all ship by air. Northwest Airlines also specializes in shipping seafood. Almost all of the seafood leaving Sea-Tac originates in Washington: either local catch, or Alaskan product caught by the North Pacific Fishing Fleet and processed in Seattle. Without a fast and reliable air cargo system, aerospace, medical equipment and high-tech manufacturers such as Intel, Medtronic, Hewlett Packard, WaferTech, and Boeing could not do business in Washington State.

Northwest Airline's Sea-Tac facility receives shipments directly from customers and from freight forwarders. For air cargo, on time means no lead-time. Even one minute past the cut-off time means that a shipment cannot be accepted - the plane cannot wait. Most of the state's freight forwarders are located in the Kent Valley; they are concerned about delays on the Orillia Road crossing under I-5.

The customer or freight forwarder delivers to Northwest, then Northwest trucks the cargo between the "Northwest Freight Stations" as needed. Truck trips usually occur at night and run between Vancouver, BC, Seattle, Portland, and San Francisco or Los Angeles. The majority of Sea- Tac generated truck trips are to and from Vancouver, B.C. and border congestion at Blaine is a problem. Northwest Airlines representatives recommend improving the two-lane road and signage at Lynden.

Congestion on I-5 is a big problem for airfreight customers, as delays force Northwest to push back its cut-off time for accepting freight. Because it may now take four hours, or more, to truck freight between Sea- Tac and PDX, Northwest cannot accept any freight after 7:00 pm on Friday evening to make a 3:00 am Saturday departure from PDX. This has a domino effect up the supply chain, from freight forwarder to manufacturer. Saturday and Wednesday departures are the busiest because they fall at the end of business cycles. This makes it is increasingly hard to avoid the peak Friday evening commute and make the standard employee shift.

Northwest Airlines' number one need is to improve I-5 from Portland to Bellingham.

Summary and Outlook for the Future

Washington State is a global gateway to the Pacific Rim, Canada and Alaska, serving as an important and growing gateway for markets and trade access to Alaska; producers, suppliers and markets in Washington, Oregon and California; and as a key transportation hub for Asian trade. Washington's transportation system functions as an interconnected network of gateways and transportation corridors – seaports, airports, borders, rail and highway systems -- that provide access to markets, help create family wage jobs and economic growth, and link business, government and economic activities together locally, nationally and internationally. The State's economy, as well as those of its neighbors in Canada, Alaska and throughout the U.S., depends upon an effectively functioning intermodal freight movement system. Yet the pace of change, growth and innovation associated with the flow of trade poses challenges and opportunities for Washington in its role as a global gateway and key trade corridor. Growth in the State's freight volumes is expected to continue, fueled by the growth of U.S.-Asian Pacific trade, further integration of North American manufacturing, variations in the commodity mix, and new freight security measures. Emerging and new market economies, especially those in the Pacific Rim, will likely influence the flow of goods through Washington State's corridors.

Globalization and Trade Trends

The U.S. and world economy continues to change in dramatic ways. Due in part to lower transportation costs, geographic distance no longer protects industries from international competition as much as it once may have. The global nature of manufacturing makes it difficult to determine if a computer is 'American,' a car 'Japanese,' or a television 'Mexican.' Many expect globalization to continue to shape world economic activities, influence where and how goods are produced and distributed, and ultimately affect the transportation of goods into and out of the United States.

United States Department of Transportation, Bureau of Transportation Statistics. *U.S. International Trade and Freight Transportation Trends.* (February 2003): Pages 3-4.

The State's challenge is to serve today's freight mobility needs, while anticipating and preparing to be an effective global gateway of the future.

"Today's most competitive businesses are typically those that thrive in a global market. To flourish, though, they require easy access to a transportation network able to move goods reliably, efficiently and often rapidly over great distances. This is especially true for those companies taking aggressive advantage of worldwide production- sharing arrangements, global supply chains and just- in-time delivery schedules."

Made in Washington: Freight Transportation Serves Washington State's Own Producers

Washington State has built strong and distinct regional economies based on industry and agriculture. These regional economies and their manufacturing, agriculture, construction and forestry components depend, in turn on an effective and efficient freight transportation system.

Our State's manufacturers and farmers rely on the freight system to ship Washington-made products to local customers, to large domestic markets in California and the East Coast, and worldwide. Washington producers generate wealth and jobs in every region of the state.

This chapter is organized by the State's major regions as shown in the map below. Seven regions are profiled:

- **Southeast Washington**: home to major wheat production and an agricultural export center.
- The **Columbia Basin and North Central Washington**: center for agricultural products including potatoes apples, onions and hay; wine grape growing and wine production; and timber harvesting.
- **Central Puget Sound**: a manufacturing center for Boeing aircraft and thousands of other mid- market manufacturers, and with strong construction and maritime sectors.
- The **Spokane Region**: the manufacturing and commerce center for the east side of the State.
- **Vancouver and Southwest Washington**: connected economically with the Portland, Oregon area, and connected from a transportation perspective by the Columbia River bridge system and the Ports of Vancouver and Portland.
- **Northwest Washington**: with a focus on the U.S.-Canadian border connection.
- The **Coastal Counties**: home to forestry and manufacturing products transport, including lumber production and exporting, as well as plywood and value-added wood products.

Regional Economies Rely on Washington's Freight System

Exhibit 31: Washington State Regional Economies

Overview of the State's Production Economies

Agri-business, a key industry in the State, supports family farmers, food processors and other agricultural businesses. In 2003, Washington State farmers and ranchers grew $5.79 billion in food products, and food processors produced $12.3 billion.[94] The combined sectors supported 161,000 jobs in 2001.[95] The transportation network is especially important for Washington's agriculture industry, since the state produces about three times as much food – and for some commodities up to twenty times as much – as it consumes, and is separated by long distances from the majority of the nation's consumers.

Manufacturing is rebounding in Washington State. In 2003, manufacturing Gross Business Revenues in Washington were $88.3 billion, which was 21.3 percent of the total State Gross Business Income and up 13 percent from 2002's $77.9 billion.[96] The sector employed more than 265,000 workers (13 percent of all

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[94] United States Department of Agriculture: Washington Agricultural Statistics Service. *2004 Washington Annual Bulletin. Summary and Value of Production* (Page 5). Retrieved as of November 2004 from: http://www.nass.usda.gov/wa/annual04/agriwa04.pdf
Gross business income for the food processing industry (SIC 20) was $12,272,896,585 in 2003; Washington State Department of Revenue. (http://dor.wa.gov/docs/reports/2003/qbrcal03/t1cal03.xls)
[95] The total farm and farm-related employment in 2001 was 160,847; USDA Economic Research Service. (http://www.ers.usda.gov/Data/FarmandRelatedEmployment)
[96] Washington State Department of Revenue. *Quarterly Business Review Calendar Year, 2003. Table 1: Total Gross Business Income Statewide by Industry (SIC).*

jobs) and paid 16 percent of total wages in Washington. Average wages in manufacturing are over $48,000 - the highest of all industry groups. Several manufacturing sub sectors paid even more, including industrial machining with an average wage above $53,000, and instruments and aerospace, both averaging over $58,000. Each manufacturing job supports another 1.5 to 3 jobs in our state, according to Washington Manufacturing Services.

Construction Gross Business Revenues topped $27 billion in 2003.[97] New home construction alone provided over 300,000 jobs, $2.7 billion in wages, and $1.1 billion in federal, state, and local taxes in 2002, according to the Building Industry Association of Washington.[98]

Value-added wood and paper products produced $12.7 billion of Washington's Gross Business Revenues in 2003.[99]

Southeast Washington Sells Wheat to the World

In 2002, Washington ranked third nationally in wheat production (130 million bushels grown on 2.7 million acres, with sales of $537 million), after Kansas and North Dakota. In 2003, Washington farmers grew 140 million bushels of wheat that sold at an average of $3.75 per bushel for total sales of $521 million.[100]

After factoring in economic multipliers, wheat production contributed $1.18 billion dollars to the State's economy annually, on average over the last decade, and $1.02 billion of that directly flowed to citizens in eastern Washington, according to the Washington Wheat Commission.[101] Fifty-seven percent of all wheat grown in Washington came from seven southeast Washington counties - Adams, Asotin, Columbia, Franklin, Garfield, Walla Walla and Whitman – in 1999. Grant, Douglas and Lincoln Counties grew 31 percent of the total[102].

Eighty-five percent of Washington state wheat is sold to export markets, primarily Asia. Until recently, many Asian governments purchased U.S. wheat in a political environment and Washington had very little competition for its soft white wheat exports. Times have changed, and today's world buyers are predominately private sector flourmills that make decisions based on price and quality. Although Washington is still the United States' main supplier of soft white wheat

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[97] Washington State Department of Revenue. *Quarterly Business Review Calendar Year, 2003. Table 1: Total Gross Business Income Statewide by Industry (SIC).*
[98] Building Industry Association of Washington. 2004 Legislative Issue Papers (Page 2). Retrieved December 2004. http://www.biaw.com/2004%20Issue%20Papers.pdf
[99] Washington State Department of Revenue. *Quarterly Business Review Calendar Year, 2003. Table 1: Total Gross Business Income Statewide by Industry (SIC).*
[100] United States Department of Agriculture: Washington Agricultural Statistics Service. *2004 Washington Annual Bulletin. Field Crop Summary and Acreage* (Pgs 28-30). Retrieved as of November 2004 from: <http://www.nass.usda.gov/wa/annual04/wheat04.pdf>
[101] Washington Wheat Commission. *Economic Impact of the Wheat Industry to the Washington State Economy* and *Economic Impact of the Wheat Industry to the Eastern Washington Economy*. Retrieved as of November 2004 from: <http://wawheat.com/pdf/washdata_chart1.pdf> and <http://wawheat.com/pdf/washdata_chart2.pdf>
[102] United States Department of Agriculture: Washington Agricultural Statistics Service. *2004 Washington Annual Bulletin. Field Crop Summary and Acreage* (Pgs 28-30). Retrieved as of November 2004 from: <http://www.nass.usda.gov/wa/annual04/wheat04.pdf>

to the world market, Australia has increased production and made significant inroads into Washington's market share. For example, twenty years ago U.S. wheat growers had a 95 percent share of the Korean market, but today Korea imports almost half of its wheat from Australia.

Exhibit 32: Grain Elevator on Columbia River

Effective and efficient in-state transportation - from field to ship waiting at a Columbia River port - determines whether eastern Washington wheat farmers can compete internationally. Global wheat prices typically include delivery to port, so every cent of in-state transportation cost reduces farmers' profit by an equivalent amount. Washington state wheat growers' get a big boost from our state's low-cost multimodal system that allows them to deliver commodity goods on demand to global markets.

Over 60 percent of Washington's wheat exports reach loading facilities on the Snake-Columbia River system via truck (9/10th share) or rail (1/10th share) and then are barged downriver for export. The rest moves wholly by rail to the export loading ports, including the Washington state ports of Kalama and Vancouver. Grain is loaded on ocean freighters at these seaport terminals and exported to nations around the world.[103]

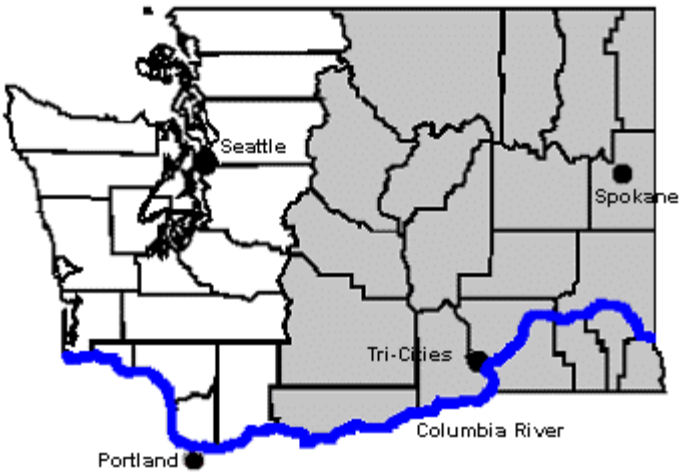
[103] wawheat.com

Average through shipping rates to export ports in cents per bushel range from $0.25 for more efficient 110-car rail trains up to $0.31 for smaller trains with 1-25 cars. For combined truck- barge through rates, the average is $0.14 for the truck segment and $0.18 for the barge segment plus $0.05 per bushel transfer charge at the river.[104]

Wheat growers surveyed by WSDOT in 2004 indicated that they are very concerned with risks to the current multimodal system. Federal policies and environmental issues may reduce barge productivity on the lower Snake/Columbia River system. Although the water level on the Snake River is currently running one foot above the minimum operating pool (spring 2004), if the water level is reduced or silt allowed to build up, barges couldn't carry full loads and would be forced to 'light load.' Every one and one-half feet of light loading reduces barge capacity by 500 tons.

The Snake River hasn't been fully dredged in four years, failing jetties need rehabilitation, locks and dams need major repairs, and 15 to 20 percent of the current operations and maintenance budget will likely be diverted to improving security according to the Pacific Northwest Waterways Association (pnwa.net) Today, over 80 percent of the vessels in transpacific trade are larger, more fuel-efficient ships that are constrained by the current authorized depth of 40-feet in the Columbia River navigation channel. Larger vessels will not be able to call on Columbia ports until the navigation channel is deepened from 40 to 43-feet, and even then not all ships will be able to come in.

Exhibit 33: Columbia – Snake River Transportation System



[104] Washington State University. *Strategic Freight Transportation Analysis*. (2004).
Burlington Northern Santa Fe (BNSF). *BNSF Reduces Wheat Rates for Smaller Shippers, Simplified Rate Structure*. (October 2004). Retrieved as of November 2004 from:
<http://www.bnsf.com/news/articles/2004/10/2004_10_18a.html?index=/news/index.html>

In 2004, two shipping lines, "K" Line and Hyundai, announced that they would no longer call at the Port of Portland, resulting in alarms throughout the river system. More than 50 percent of the containerized cargo exported through Portland is sent to Japan, containing mostly hay and other agricultural, paper, and wood products. "K" Line and Hyundai called on Japan but Hanjin did not, so farms and businesses exporting these products were in danger of losing direct container service to Japan through Portland. Although, Hanjin began offering service to Japan in 4Q/04 to maintain that connection for Northwest exporters, this new service will not fully replace the pre-existing volume of trade.

New railroad strategies and technologies impact rural shippers by reducing the viability of branch lines and short line railroads and reducing the number of grain shipping stations. Class I carriers are introducing 104-110 car shuttle train service for grain, deploying 286,000-pound cars in grain service and evaluating the future potential of 315,000-pound cars. Those shortlines that cannot generate higher volumes will be unable to recoup their capital costs on their own and may be abandoned.

Truck hauls on county roads are weight restricted for up to two months during spring thaw, and there aren't adequate funding sources to upgrade county roads to all-weather standards.

Producers' needs drive the performance goals for the Washington state freight system. So, how do Southeast Washington producers rate the current performance of our state's freight system?

Only 40 percent of southeast Washington grain associations are highly satisfied with current freight system performance. Most (47 percent) grain associations put low cost transportation at the top of their list of freight services, while another 33 percent say that on-time delivery to meet a ship's sailing schedule is most important.[105]

Fifty percent of southeast Washington wheat growers are highly satisfied with the current performance of the freight system. Fifty-three percent of growers say that price of freight service matters most to them, while another 20 percent say that adequate storage at the right location is most important.[106]

Southeastern Washington also produces numerous other food crops and ships them by truck to retail chains such as Safeway, Albertsons and Costco on the Westside of the State. Eighty-five percent of all trucks trips originating in southeast Washington move west on I-90.

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[105] Hebert Research, Inc. *Washington Department of Transportation Freight Customer Study: Summary Report* (July 2004).
[106] Hebert Research, Inc. *Washington Department of Transportation Freight Customer Study: Summary Report* (July 2004).

The Columbia Basin and North Central Washington: Agricultural Growing and Processing Center

95,916 jobs in the Columbia Basin and North Central Washington are directly dependent on the efficiency of our freight system: 46,529 in agriculture and mining, 25,916 in manufacturing (processed food and other sectors), 14,643 in transportation/utilities and 9,024 in wholesale trade.[107] This region is a national center of apple, potato, onion, hay, wine and lumber production.

Exhibit 34: Apple Farming in Washington

Photo credit: Washington Apple Commission <http://www.bestapples.com/grower/index.html>

The Columbia Basin, center of potato production (93,150 thousand cwt. in 2003) makes Washington state the second largest potato producing state in the country. Washington's 300 growers provide fully one fifth of the nation's potato supply.[108] In 2003, the industry harvested $489 million in potatoes, trailing only apples, milk, and wheat as the leading agricultural product in Washington State.[109]

According to the Washington Potato Commission, Washington-based processors turn nearly 90 percent of the annual potato yield into value-added products, increasing the value of the crop nearly six-fold. A 2001 Washington State University study concluded that potatoes and related businesses helped create almost 28,000 jobs and more than $3 billion in annual sales. Ninety percent of the state's potato crop is consumed in the U.S.; exports account for ten percent of sales.[110]

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[107] Washington State Office of Financial Management. *2003 Washington State Data Book*. (January 9, 2004). *County Profiles.* Retrieved as of November 2004 from: <http://www.ofm.wa.gov/databook/county/index.htm>. Includes Benton, Chelan, Douglas, Ferry, Grant, Kittitas, Klickitat, Okanogan, Pend Oreille, Stevens and Yakima.
[108] The Washington State Potato Commission. *WSPC Information: Washington State Potatoes and the Economy.* Retrieved as of November 2004 from: <http://www.potatoes.com/WSPCInfo.cfm?InfoPath=About.cfm>
[109] United States Department of Agriculture: Washington Agricultural Statistics Service. *2004 Washington Annual Bulletin. Summary and Value of Production* (Pg 5). Retrieved as of November 2004 from: <http://www.nass.usda.gov/wa/annual04/agriwa04.pdf >.
[110] Washington State University. *Strategic Freight Transportation Analysis*. (2004).

Eighty to 96 million boxes of Washington state apples, each weighing about 40 pounds, are harvested annually in north central Washington and the Columbia Basin; in 2002 the harvest totaled 5.15 billion pounds.[111] Washington State ranks number one nationally in apple production, and grew 51 percent of all U.S. apples in 2003. Apples topped the list of all Washington state agricultural products with a value of $1.16 billion, representing 20 percent of total agricultural value in 2003.[112]

However, freight patterns are shifting as apple exports decline due to competition from China and other new producers. In the 1980s Washington apple growers exported up to 60 percent of their crop, but by 2000 exports were down to 31 percent. Washington state apple growers interviewed by the WSDOT Freight Office said that major growers have cut capacity, and that current levels of production are sustainable at 70 to 80 million 40-pound boxes.

Apples and potatoes must be processed and cold stored, then loaded into refrigerated truck or rail cars to market. About 90 percent of fresh product is trucked to domestic markets and ten percent moves by rail. WSU estimated that over 80,000 refrigerated truckloads of potatoes and 43,000 refrigerated truckloads of apples were shipped from Washington to east coast markets in 2000. Continuing refrigerated truck shortages are likely due to fresh fruit and vegetable seasonal peak demands, as well as a strong pull from other U.S. regions for refrigerated capacity.

Much of Washington's onion and hay crops are produced and processed in the Columbia Basin, with statewide values of $141 million and $381 million in 2003, respectively.[113] Fifty-eight percent of onions grown are consumed domestically and forty-two percent are sold overseas. Washington state hay is exported to support the beef industry in Korea, Taiwan and Japan. These exports move west on I-90 to the Ports of Seattle and Tacoma.[114]

With more than 300 wineries and almost 30,000 acres planted in grapes, Washington is the second largest premium wine producer in the United States. The retail value of production was $628.4 million, with $2.4 billion total economic impact, according to the Washington Wine Commission.[115] Washington has five recognized American Viticulture Areas: Puget Sound, Yakima Valley, Columbia

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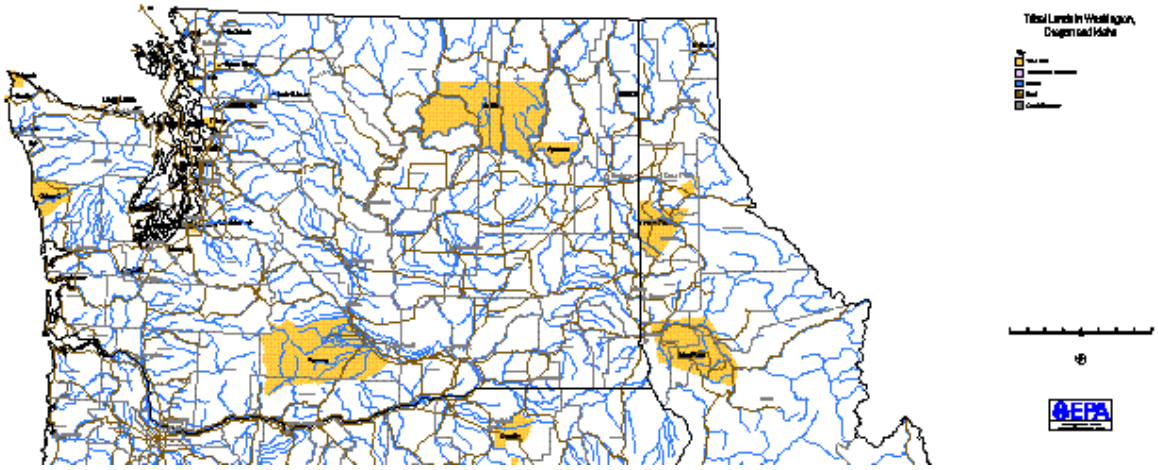
[111] Washington Apple Commission. *Washington Apple Crop Facts*. Retrieved as of November 2004 from: <http://www.bestapples.com/facts/cropfacts.html>.
[112] United States Department of Agriculture: Washington Agricultural Statistics Service. *2004 Washington Annual Bulletin. Summary and Value of Production* (Pg 5). Retrieved as of November 2004 from: <http://www.nass.usda.gov/wa/annual04/agriwa04.pdf >.
[113] United States Department of Agriculture: Washington Agricultural Statistics Service. *2004 Washington Annual Bulletin. VEGETABLES: Narrative, Acreage, Production, and Value* (Pgs 89-92) and *Field Crop Summary and Acreage* (Pgs 28-30). Retrieved as of November 2004 from: <http://www.nass.usda.gov/wa/annual04/veggie04.pdf> and <http://www.nass.usda.gov/wa/annual04/hay04.pdf>
[114] Source: http://www.nass.usda.gov/wa/annual03/agriwa03.pdf
[115] Washington Wine Commission. *Washington Wine* Facts. Retrieved as of November 2004 from: <http://www.washingtonwine.org/default.cfm?action=showfeature&story=num.cfm&page=10>

Valley and Red Mountain and Walla Walla Valley.[116] The Yakima Valley and the Columbia Valley make up 94 percent of the state's total acreage of wine grape producers. Shipments of Washington wine go to all 50 states and more than 40 countries; 17 million gallons were shipped in 2003.[117]

Timber sales from tribal lands such as those owned by the Confederated Tribes of the Colville Reservation and the Yakama Nation have become an important industry in Eastern Washington. Washington's harvest from tribal lands totaled 324 million board feet in 2001; almost 300 million board feet of the harvest was in Eastern Washington.

Exhibit 35: Washington Tribal Lands



Timber sales are also important to Ferry, Stevens and Pend Oreille Counties.

How do Columbia Basin and North Central Washington producers rate the current performance of our state's freight system?

Sixty-six percent of these growers and processors are very satisfied with freight service. The largest group – 50 percent of growers and processors surveyed - said that additional capacity in refrigerated trucks, rail cars and cold storage is their company's most important requirement of the freight system.[118]

Shippers' ability to benefit from efficient freight systems depends, in part, on their location. Columbia Basin growers and processors sited on throughput corridors such as I-90, I-82 and Highway 97 can ship their product at lower costs than those off the mainline, as there's more truck traffic moving up and down these

[116] Washington Agricultural Statistics Service for the Washington Wine Commission. *2002 Washington Wine Grape Acreage Survey*. Retrieved as of November 2004 from: <http://www.washingtonwine.org/survey.pdf>
[117] Washington Wine Commission. *Washington Wine* Facts. Retrieved as of November 2004 from: <http://www.washingtonwine.org/default.cfm?action=showfeature&story=num.cfm&page=10>
[118] Hebert Research, Inc. *Washington Department of Transportation Freight Customer Study: Summary Report* (July 2004).

high volume corridors than elsewhere. Shippers located off state throughput routes, or at the end of a route, find little opportunity for backhaul and therefore pay more for every shipment than shippers on throughput routes. They don't get price increases for being in an out-of-the-way location, they simply get a lower margin.

Central Puget Sound: Manufacturing, Construction, and Maritime Center

Over 497,977 jobs in Central Puget Sound directly depend on the freight system to produce and ship goods: 199,801 in manufacturing, 93,591 wholesale trade, 93,399 transportation/utilities, 92,463 in construction and 18,723 in agriculture.[119]

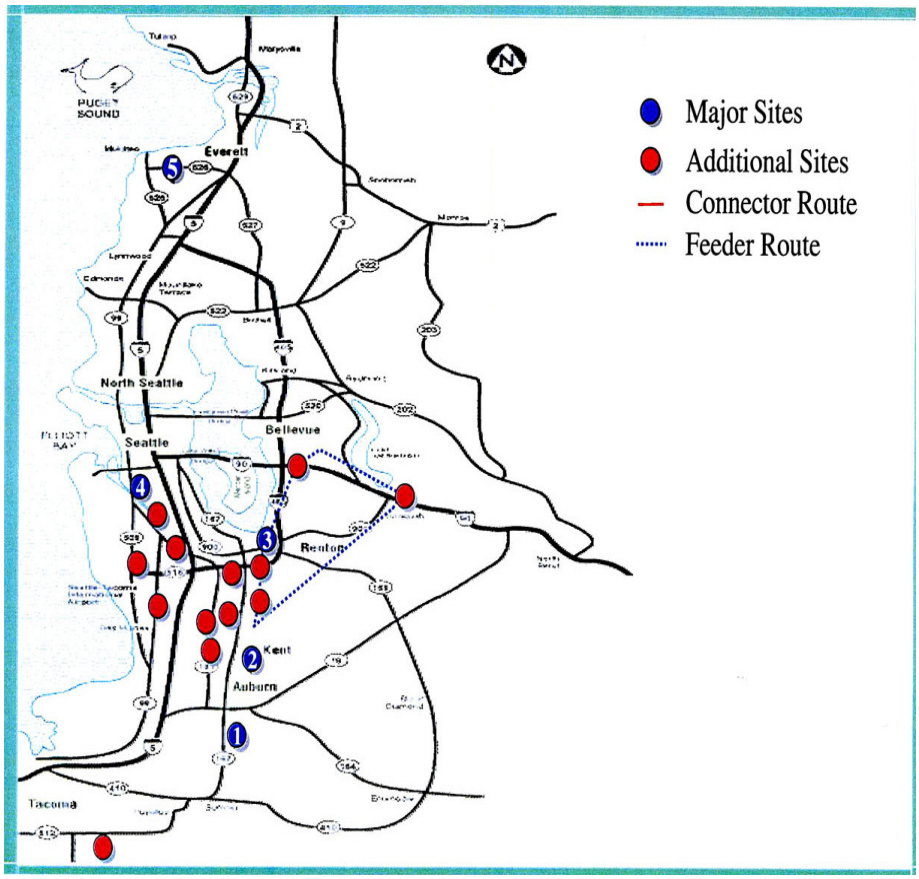
The Boeing Company, employing 53,000 statewide in 2004, is Washington's largest manufacturer. Boeing Commercial Airplanes reported $22.4 billion in revenues from delivery of 281 airplanes in 2003.

Boeing's manufacturing supply chain covers the region, state, country and the globe. Its exports, though generally flown directly overseas from Boeing's assembly plants, lift Washington State from an 'average' exporting state to the highest rate of export value per citizen in the country.

Boeing has five key and another 12 support manufacturing facilities in Central Puget Sound. Exhibit 36 shows the key connector and feeder routes linking its facilities. According to Boeing, traffic congestion increases travel time between key Boeing facilities in Washington State by up to 20 percent.

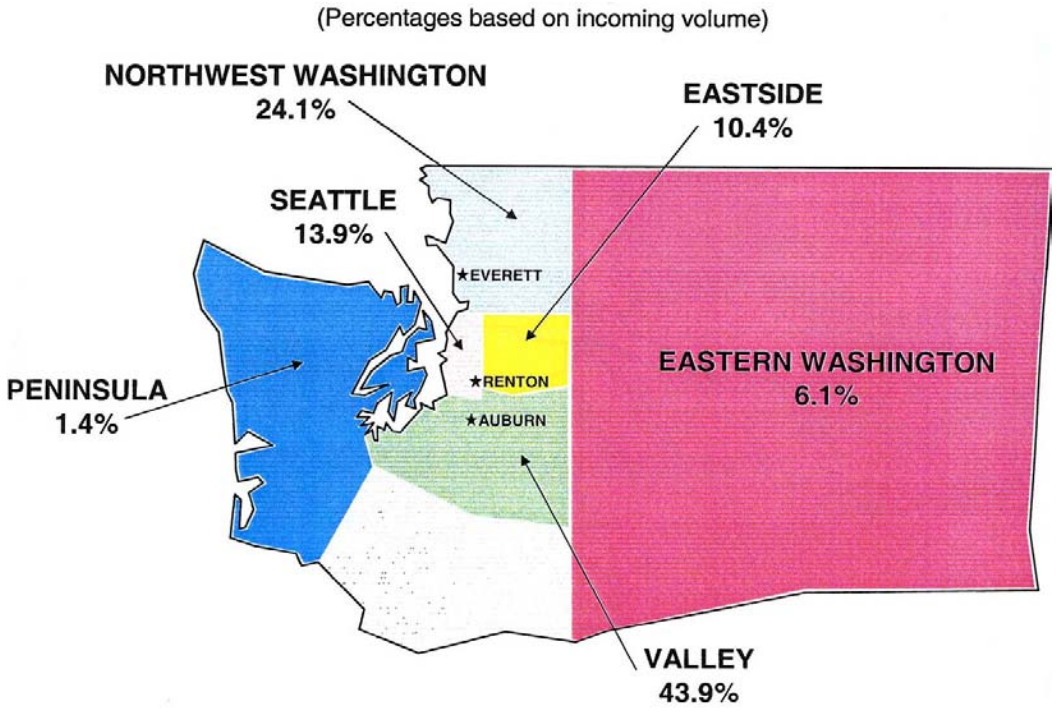
[119] Washington State Office of Financial Management. *2003 Washington State Data Book.* (January 9, 2004). *County Profiles.* Retrieved as of November 2004 from: <http://www.ofm.wa.gov/databook/county/index.htm>. Includes Island, King, Kitsap, Pierce, Snohomish, and Thurston.

Exhibit 36: Boeing's Western Washington Facilities and Routes



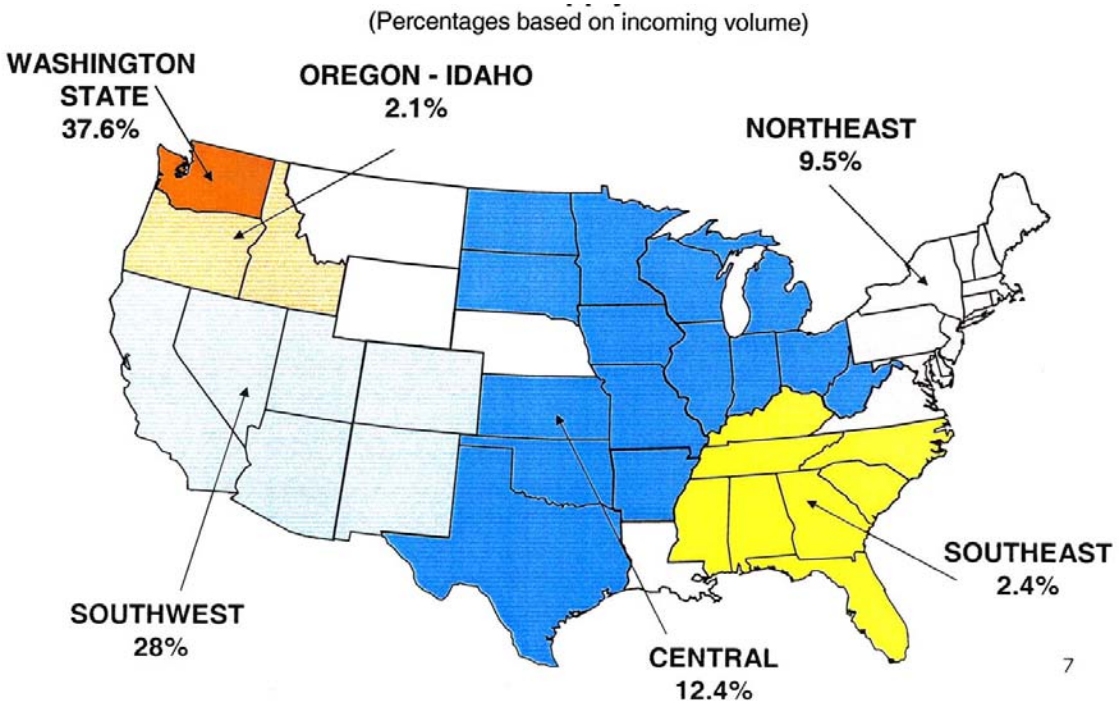
Boeing Company. *Presentation to the Regional Freight Mobility Roundtable.* (September 5, 2003). Puget Sound Regional Council. Retrieved as of November 2004 from: <http://www.psrc.org/projects/freight/boeing.htm>

Exhibit 37: Boeing's Washington State Supply Base



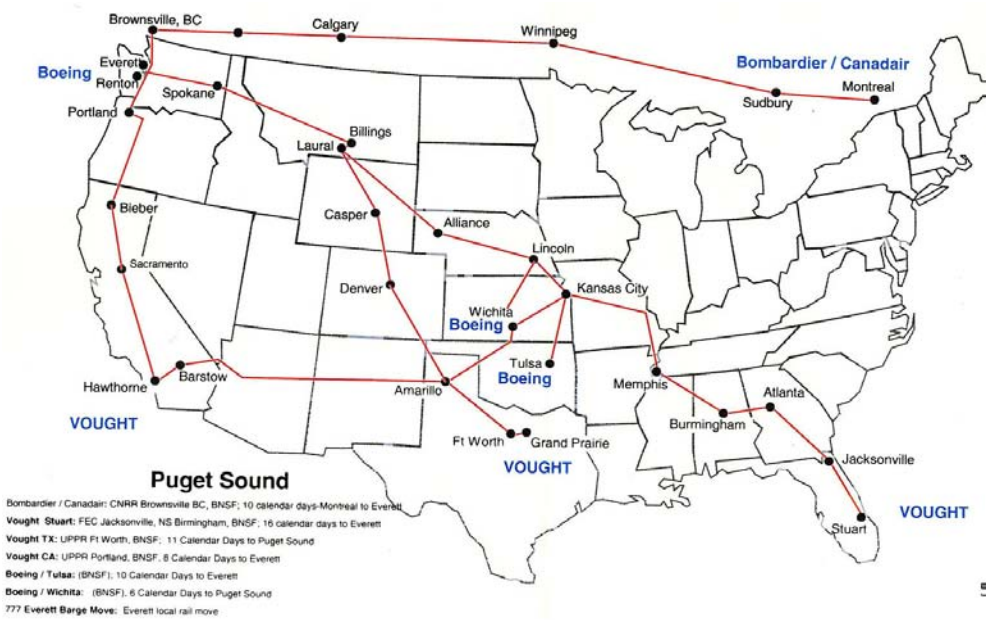
Boeing Company. *Presentation to the Regional Freight Mobility Roundtable.* (September 5, 2003).

Exhibit 38: Boeing's United States Supply Base Overview



Boeing Company. *Presentation to the Regional Freight Mobility Roundtable.* (September 5, 2003).

Exhibit 39: Boeing's Supply Chain Moves on Rail as Well as Road



Boeing Company. *Presentation to the Regional Freight Mobility Roundtable.* (September 5, 2003).

Boeing's dependence on the freight system will become even greater as it sets new levels of efficiency in the manufacture of the new 7E7 Dreamliner. Separate factories around the world will each build a specific section of every plane – such as the tail, wings or cockpit – and send it to final assembly in Everett. Although Boeing has historically made planes from up to a million smaller pieces and shipped them by truck, train and boat, its new strategy to gain efficiency is based on major component assembly. Fewer parts – under 200 – with more frequent deliveries from approximately 500 suppliers will support their just-in-time inventory reduction strategy. This strategy will require transportation of larger parts (80' x 20') and more local receiving areas for inventory.

Moving by night four times a week starting in 2006, the entire oversize 7E7 empennage (horizontal and vertical tail surfaces) will be trucked up Hwy 167, I-405 and I-5 from the structural composites plant in Frederickson to final assembly in Everett. Boeing itself will build only 35 percent of the 7E7 structure. Mitsubishi Heavy Industries, Kawasaki Heavy Industries and Fuji Heavy Industries in Japan will build 35 percent of the aircraft's structure, not including the engines, and fly major components to Washington in converted 747 air freighters.

Although the 7E7 empennage move will block several freeway lanes in Central Puget Sound for two to four hours in the middle of the night, this complex move pales in comparison to a similar move in Europe. According to the Wall Street

Journal, Boeing's competitor, Airbus, and the French government rebuilt a 159-mile route at a cost of almost $400 million, including bypasses of five towns, to handle the oversize trucks necessary to carry huge A380 component assemblies to final assembly locations in France and Germany.

The Central Puget Sound region also includes thousands of mid-size manufacturers that receive raw materials and ship finished goods to market. Aerospace subcontractors machine and bend high-tech metals, processed food companies package cookie and muffin mix, mints and vitamins, various manufacturers mix printers inks and coatings, and form energy-efficient windows and composite decking for homes. In 2003, 4,433 manufacturing firms were doing business in King County, 1,107 in Snohomish County and 983 in Pierce County.

Sixty-five percent of South Sound manufacturers and 63 percent of East Side manufacturers are very satisfied with current freight system performance. Fifty-six percent of eastsiders identified on-time delivery as the most important freight service, 20 percent said predictable travel time, and 17 percent said price is the most important factor. Fifty-two percent of southenders identified on-time delivery as the most important freight service, 31 percent said price is the most important factor, and only seven percent said predictable travel time.[120]

Central Puget Sound Truck Carriers

Only 50 percent of trucking firms based in Central Puget Sound report high satisfaction with the current performance of the freight transportation system. This compares to 62 percent of Spokane trucking carriers and 54 percent of Vancouver/Portland metro carriers with high satisfaction ratings. Forty-seven percent of Puget Sound trucking firms said that on-time delivery is their single most important performance requirement, 32 percent said cost per move, and 18 percent said predictable travel time.[121]

According to the 2003 SFTA survey taken on the major highway system, every day 16,574 truck moves originating in Central Puget Sound delivered goods to western Washington cities – primarily Tacoma (3,487 trucks/day), Seattle (1,994/day) and Kent (1,363/day). 3,786 trucks moved goods from Central Puget Sound to Oregon, 2,411 trucks were bound for eastern Washington, 1,420 trucks went to British Columbia and 1,300 to California, daily.[122]

Over the course of the year 2003, 3.6 million truck trips began and ended in Central Puget Sound. Another 709,481 truckloads left Central Puget Sound bound for northwest Washington and 305,141 truckloads went to southwest

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[120] Hebert Research, Inc. *Washington Department of Transportation Freight Customer Study: Summary Report* (July 2004).
[121] Hebert Research, Inc. *Washington Department of Transportation Freight Customer Study: Summary Report* (July 2004).
[122] Washington State University. *Strategic Freight Transportation Analysis*. (2004).

Washington. 454,388 trucks were sent from British Columbia to the Central Puget Sound, and 465,386 loads moved from Central Puget Sound up to B.C.[123]

The majority of air cargo in Washington State flies through Sea-Tac International Airport and King County/Boeing Field. Before 9-11, 60 percent of Sea-Tac's air cargo flew in the belly of passenger jets and 40 percent went by freighter, according to Sea-Tac Airport representatives. Since 9-11, the airline industry has retired many of its older, larger planes, resulting in reduced freight capacity. The Transportation Security Administration (TSA) has enacted new regulations outlawing cargo in the belly of passenger planes unless it's screened. These changes caused a shift in mode, so that 60 percent of current air cargo shipped through Sea-Tac is currently flying on freighters and 40 percent in passenger airplanes.

Central Puget Sound Maritime Sector

Exhibit 40: Central Puget Sound Maritime Sector

Building on Central Puget Sound's natural advantages: deep water ports, fresh water berths, and a short all-water route to Alaska, and supported by a multi-modal freight system that converges in the urban area, the region has created a maritime industry that employed over 22,000 in King County in 2002.[124] The Seattle maritime sector's annual output totaled $2.1 billion in 2002, with total economic impact in King County reaching $4 billion. The maritime sector includes fishing, water transportation, boat building, seafood processing and cold storage, marine construction and water-dependent industries such as cement plants.

Seattle: Home of the North Pacific Fishing Fleet.
Seven of the 25 largest seafood companies in North America are headquarted in Central Puget Sound, with combined revenues of $2.91 billion in 2003, according to Seafood Business Magazine.

[123] Washington State University. *Strategic Freight Transportation Analysis*. (2004).
[124] University of Washington: Paul Sommers, Daniel J. Evans School of Public Affairs and Derik Andreoli, Department of Geography. *Seattle's Maritime Cluster: Characteristics, Trends, and Policy Issues*. (April 28, 2004): Page 8. Prepared for the Seattle Office of Economic Development. Retrieved as of November 2004 from: <http://www.seattle.gov/economicdevelopment/april_2004_pdfs/0404_final_maritime_study.pdf>

The North Pacific fishing fleet based in Ballard catches 30 to 40 percent of the total U.S. domestic fish harvest. About 230 fishing and processing vessels are berthed along the Lake Washington Ship Canal. In 2001, the Alaskan and Washington catch value was $1 billion and totaled 5.4 million pounds; industry sources state that Washington based vessels bring in about 80 percent of the Alaska catch.

Before every fishing season, vessel owners repair and restock their boats with fuel, groceries, bait and fishing gear that comes by truck in the local distribution system. Upon their return, the catch is typically trucked to a cold storage facility, trucked to a secondary processing center, trucked to another cold storage facility, and then trucked to its final destination.

Seattle's maritime cluster supported 4,500 boat building, repair and waterborne transportation jobs – twice as many as Los Angeles and Oakland combined - according to a University of Washington study commissioned by the City of Seattle Office of Economic Development.[125] Seafood processing employs 4,300 in King County. In Seattle alone, fishing output (equivalent to revenues) was $512 million, shipbuilding $245 million, water transportation $534 million, seafood processing $717 million, cruise ships $75 million and boat dealers/suppliers $11 million.[126]

Big issues for the maritime sector

The Alaskan Way Viaduct is the most direct connection between the fleet based in Ballard/Interbay and marine services located in the Duwamish manufacturing industrial center. I-5 is not a direct path and is highly congested. The Viaduct truck route is at risk, due to structural fault. The City of Seattle has identified the Viaduct as their top transportation priority, and Spokane Street as their second highest priority project.

The only east-west truck routes connecting the Viaduct to I-5 are at Spokane Street and Michigan, but the Spokane Street connection is problematic. There is no connecting route through north Seattle. The Viaduct's two biggest bottlenecks are at the southbound Elliott exit, and northbound off Western Ave. The crosswalk at the bottom of the off ramp poses a safety hazard and creates queuing on the Viaduct.

In order to adapt during reconstruction, industry needs alternative routes throughout the process, and construction coordination with other major projects. The Seattle Manufacturing Industrial Council recommends maintaining Western and Elliott Avenue ramps, the Broad Street underpass, and creating new ramp access at SR519, to support industrial sectors.

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[125] University of Washington: Paul Sommers, Daniel J. Evans School of Public Affairs and Derik Andreoli, Department of Geography. *Seattle's Maritime Cluster: Characteristics, Trends, and Policy Issues*. (April 28, 2004). Prepared for the Seattle Office of Economic Development.

[126] NOAA, Fisheries of the U.S. and NMFS Alaska Fisheries Science Center for the North Pacific Management Council, Stock Assessment and Fishery Evaluation

Trident Seafoods Corporation Case Study

Trident Seafoods Corp. is a vertically integrated harvester, processor and marketer of seafood products from Alaska and the Pacific. The privately held company was the fifth largest seafood supplier in North America, with $650 million sales in 2003. Trident holds one fourth of the total U.S. crab, salmon and pollock quota; in 2004 they produced 280 million pounds of finished product. Their 30-plus vessel fleet - catcher boats, factory trawlers, floating processors, catcher processors and support vessels – plies the Gulf of Alaska from January to April, returns to Seattle to restock, and runs a second season from June to October. Ninety-five percent of their product line, mostly pollock, is frozen and five percent canned. Processing begins shipboard, in floating processors or on land. Trident owns and operates North America's largest seafood processing plant in Akutan, Alaska, which can produce up to three million pounds of finished frozen product per day.

About 60 percent of all Trident sales are exports; this portion of the catch is shipped direct to foreign markets by water. The other 40 percent is sold in the U.S.; two thirds is shipped from Washington to California and Texas, the rest goes all over the U.S. Refrigerated trucks deliver frozen product from Washington to Texas in four days, to San Francisco in two days and to Los Angeles in three.

Refrigerated containers are filled at Trident source plants, barged to Dutch Harbor, and then shipped to the Port of Tacoma. An average of 100 to120 containers arrive at the Port of Tacoma each week, the number may range seasonally from 0 to 350. One fourth of these containers leave the Port of Tacoma by rail for final processing in Canada or on the East Coast. Three fourths – 75 to 100 truckloads per week – are driven from the Port of Tacoma to cold storage and/or origin plants in Washington. Trident's U.S. distribution center is at Pier 91 in Seattle; it has a processing facility and is their cold storage hub. Over 200 LTL trucks pick up product from Pier 91, weekly.

Trident's value-added processing facilities in Bellingham, Anacortes, Seattle and Fife, Washington; Newport, Oregon; and Ucluelet, British Columbia; make portion-controlled, ready to prepare foods such as surimi and battered or breaded fish. The Anacortes plant ships 20 to 30 full truckloads of fast food chain product every week.

Ninety percent of their U.S. customers are restaurants and about ten percent grocery stores. Finished goods ship on Thursday and Friday, because truck drivers need to meet restaurant demands for deliveries on Monday and Tuesday. Restaurant customers' primary service requirement is on-time delivery, and most use an appointment system within a one-hour delivery window. Some restaurants impose penalties ranging from $200 - $400 for late arrivals.

Trident's freight transportation issues include getting trucks from Ballard and Pier 91 to I-5; they recommend connecting Hwy 99 to Spokane Street or Royal Brougham to I-5. Because they use independent drivers who aren't familiar with local routes, they would like truck routes through Seattle to be more clearly marked.

South Sound Logistics Costs Top State Average

Washington State producers' total logistics costs - including transportation, warehousing, and loss of customers due to shipment failures - varies from region to region. South Puget Sound manufacturers report paying the most, with a

mean total logistics cost equaling 16 percent of cost of goods sold. Logistics costs for manufacturers in Spokane, the eastside of Central Puget Sound and Whatcom County average a much lower 11 to 12 percent of cost of goods sold.

Exhibit 41: Percentage of Cost of Goods Sold that is Total Logistics Costs	**0-2%**	**3-5%**	**6-10%**	**11-20%**	**21-30%**	**31-50%**	**51%+**	**Mean**
Eastern Washington								
Spokane Manufact.	17.6%	11.8%	29.4%	41.2%	11.8%	0.0%	0.0%	**11.24%**
SE WA wheat growers	0.0%	0.0%	66.7%	22.2%	11.1%	0.0%	0.0%	**12.33%**
Vancouver: SW Washington								
Vancouver: SW Washington Manuf.	17.1%	31.7%	9.8%	31.7%	0.0%	4.9%	4.9%	**12.68%**
Eastside/Central Puget Sound Manuf.	24.1%	17.2%	31.0%	10.3%	10.3%	3.4%	3.4%	**11.72%**
Puget Sound/NW Washington								
South Puget Sound Manuf.	4.3%	21.7%	39.1%	17.4%	8.7%	0.0%	8.7%	**15.96%**
Northwest WA Manufacturing	20.0%	20.0%	30.0%	10.0%	15.0%	5.0%	0.0%	**11.85%**

Percentage of Cost of Goods Sold that is Transportation Costs	**0-2%**	**3-5%**	**6-10%**	**11-20%**	**21-30%**	**31-50%**	**50%+**	**Mean**
Eastern Washington								
Spokane Manufact.	26.7%	26.7%	40.0%	6.7%	0.0%	0.0%	0.0%	**6.40%**
SE WA wheat growers	0.0%	45.5%	36.4%	18.2%	0.0%	0.0%	0.0%	**8.36%**
Vancouver: SW Washington								
Vancouver: SW Washington Manuf.	21.7%	21.7%	30.4%	10.9%	4.3%	8.7%	10.9%	**11.89%**
Eastside/Central Puget Sound Manuf.	25.8%	38.7%	9.7%	16.1%	9.7%	0.0%	0.0%	**8.48%**
Puget Sound/NW Washington								
South Puget Sound Manuf.	11.5%	30.8%	23.1%	19.2%	3.8%	3.8%	0.0%	**14.12%**
Northwest WA Manufacturing	16.7%	25.0%	33.3%	20.8%	4.2%	0.0%	0.0%	**8.92%**

Hebert Research, Inc. Washington Department of Transportation Freight Customer Study: Summary Report (July 2004).

Spokane Region: Eastside Center of Manufacturing and Commerce

Spokane's manufacturing sector makes windows and cabinets for new homes, rugged laptops for military and telecom workers in the field, colorful dinnerware, plastic and metal parts for complex machinery and equipment, advanced medical devices, salsa, sausage and soups and other processed foods for homes and restaurants, and much more. Spokane manufacturers support their customers and gain repeat business by delivering goods on time.

51,728 jobs in the Spokane region are directly dependent on the freight system: 18,035 in manufacturing, 11,122 wholesale trade, 9,354 construction, 7,549 transportation/utilities, 3,900 military and 1,768 in the agricultural sector.[127] The regional health care center receives vital supplies via the I-90 corridor.

[127] Washington State Office of Financial Management. *2003 Washington State Data Book.* (January 9, 2004). *County Profiles: Spokane.* Retrieved as of November 2004 from: <http://www.ofm.wa.gov/databook/county/index.htm>.

According to the WSDOT freight survey, a high number – 79 percent - of Spokane manufacturers are very satisfied with current freight system performance. Fifty-six percent identified on-time delivery as the most important freight service, while 26 percent say price is the most important factor.

The Spokane trucking market is competitive. Service rates float near one price point as shippers have ready access to carrier pricing information in their regional marketplace. Price increases began to stick in 2004 as a result of the closure of many under-capitalized trucking companies during the recession, as well as the pick up in the regional economy and corresponding volume increase. The new federal hours of service rule means that small delays occurring at the end of a driver's shift can cause a one-day delay in delivery. East Spokane has developed into a manufacturing and trucking center along I-90, with near-by truck services and access to the north route on Market Street.

Of the truck movements identified in the SFTA study, 42 percent of truck moves originating in Spokane stay in Spokane or go to other eastern Washington cities such as Yakima or Pasco. Twenty five percent of moves originating in Spokane deliver products to Central Puget Sound, 19 percent to Oregon, four percent each to California and Idaho, and three percent to Canada. Eighty-seven percent of all truck trips originating in Spokane moved west on I-90 in 2003.

Unless speed of delivery is critical to their customers, manufacturers rarely use air (only for late shipments) due to the high cost. For example, according to a Spokane manufacturer interviewed by the WSDOT freight office, the cost of shipping a 350-pound pallet from Spokane to Seattle was $700 by air vs. $80 by truck in February 2004.

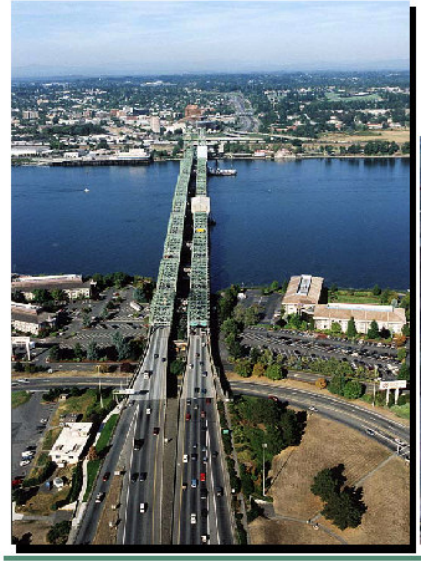
There are a small number of high-tech air-cargo-dependent firms in Spokane. Those firms source from Asia, value speed of transit, and want Spokane to become a distribution air hub offering direct flights from Asia to Spokane. As a regional air services market, Spokane draws far fewer flights than Sea-Tac International and therefore often loses the value of air speed for delivery. It's often just as fast and much cheaper to fly product to Sea-Tac and truck it to Spokane, as to fly on to Spokane. Spokane Airport has lift to Anchorage, but doesn't directly reach Miami/S. America or Boston/Europe. It is currently constrained by its shorter runway length, but airport management expects the FAA to grant authority in 2004 so they can break ground for a planned runway expansion in 2005.

Vancouver: Southwest Washington Metropolitan Area

57,861 jobs in the Vancouver metro region depend on the freight system: 27,950 in manufacturing, 6,476 wholesale/trade, 12,226 construction, 8,178 in the transportation/utilities sector and 3,031 in agriculture.[128]

Clark County's (372,300 population) economy is integrally linked with that of the larger Portland-Vancouver metropolitan (1.92 million population, 2003) area. Downtown Vancouver and Portland are just nine miles apart, yet separated by the Columbia River.

Exhibit 42: I-5 Columbia River Bridge Connects Oregon and Washington



The Vancouver/Portland metro region is connected by two bridges over the Columbia River on I-5 and I-205, while comparable cities such as Kansas City (pop. 1.78 million) has 10 bridges and Cincinnati (pop. 1.65 million) has seven river bridges. The I-5 Columbia River Bridge lift span causes significant traffic backups when raised for shipping traffic. The bridge currently operates at capacity four hours per day and will be at capacity nearly ten hours per day by 2020. Trucking costs associated with this delay are estimated at $14 million in 2000 and $34 million in 2020.[129]

The Columbia River Rail Bridge connects the UP and the BNSF lines at the Washington-Oregon border. Because the swing span opens towards the bank and the I-5 bridge arches in the center of the river, slow moving river barges must make a sharp right-angle turn to clear both the rail bridge and the I-5 Bridge. The swing span mechanism is slow to maneuver and lock into position. The Vancouver community has asked Congress for funding to move the swing span to the center.

The Ports of Portland and Vancouver are both export-dominated ports and the Portland-Vancouver region is a national freight distribution center. The Port of Vancouver rail yard is highly congested. The annual freight tonnage carried by

[128] Washington State Office of Financial Management. *2003 Washington State Data Book.* (January 9, 2004). *County Profiles.* Retrieved as of November 2004 from: <http://www.ofm.wa.gov/databook/county/index.htm>. Includes Clark, Cowlitz, Lewis and Skamania.

[129] Oregon Department of Transportation and Washington State Department of Transportation. Portland/ Vancouver I-5 Transportation and Trade Partnership. *Findings and Recommendations of the Governors Task Force: Final Strategic Plan.* (June 2002). Retrieved as of November 2004 from: <http://www.i-5partnership.com/assets/FinalStrategicPlan.pdf>. (Page 14).

truck, rail, water, pipeline and air modes is estimated to increase from 260 million tons in 1997 to 515 million tons by 2030 in the Portland/Vancouver region.[130]

The majority of freight moving in the metro area - 64 percent - is carried by truck. The remainder moves by pipeline (10.8 percent), ocean (9.7 percent), rail (5.6 percent), barge (5.4 percent), intermodal (4.5 percent) and air (0.1 percent).[131]

Thirty-seven percent of Vancouver/Portland metro trucking firms said that on-time delivery is their single most important performance requirement, 30 percent said cost per move, and 17 percent predictable travel time.[132]

Southwest Washington's diverse manufacturing sector runs the gamut, as exemplified by the three chips: silicon wafers, potato chips, and wood chips for paper mills. Fast growing east Clark County is the center of the I-5 Silicon Valley in Washington. Traditional manufacturers, such as the enormous paper mills on the Columbia River, have a long history in the region. Each sector seeks to respond to customers' needs that place varying demands on the freight transportation system.

East Clark County's high-tech industries value speed of transit to ship valuable, time-sensitive freight such as silicon chips and associated tooling on I-205, the route to Portland International Airport. Because Sea-Tac International Airport draws more direct flights from Asia than Portland, their air cargo is often routed to Sea-Tac and trucked in-bond to PDX, where it clears customs. Xxxx # of interviewed trucks leaving Sea-Tac International delivered cargo to Portland, and xxx# of trucks with cargo destined for Sea-Tac Air Terminal came from Portland in 2003.[133]

There are no backend services for wafer manufacturers in the Pacific Northwest; testing and assembly processes are labor intensive and outsourced to Asia. One missing tool can shut an entire plant down, so speed of transit is paramount. Washington high-tech manufacturers are concerned about customs delays, labor disruptions, port or airline strikes, terrorist strikes, anything that disrupts speed of the supply chain. Additional service requirements for the freight system are competitive price, and on-time truck movements for inbound raw materials. The WSDOT Freight survey indicates that some Vancouver-area manufacturing firms rely on inbound air cargo. (Appendix chart xx)

More traditional manufacturers such as Frito-Lay in Vancouver and Weyerhaeuser's joint venture with Nippon Paper Industries in Longview

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[130] DRI-WEFA, in association with BST Associates. *Commodity Flow Forecast Update and Lower Columbia River Cargo Forecast Final Report*. (July 8, 2002).
[131] Oregon Department of Transportation and Washington State Department of Transportation. Portland/ Vancouver I-5 Transportation and Trade Partnership. *Findings and Recommendations of the Governors Task Force: Final Strategic Plan*. (June 2002). (Page 13).
[132] Hebert Research, Inc. *Washington Department of Transportation Freight Customer Study: Summary Report* (July 2004).
[133] Washington State University. *Strategic Freight Transportation Analysis*. (2004).

(producing 750 thousand metric tons of newsprint, annually) locate in the metro region to be close to customers, throughput routes and raw materials.

As an example, in peak summer snacking season the Vancouver Frito-Lay plant receives up to 50 truckloads of fresh potatoes each week from growers in the Columbia Basin. Potatoes begin to lose quality after just eight hours at room temperature, and the plant keeps just enough potatoes on hand for one eight-hour shift. If the potatoes don't arrive on time, the plant can't run. Corn and oil comes by rail from the Midwest, packaging and seasoning is trucked in from the southeastern U.S. Raw materials in - and finished snacks out. Fresh Frito-Lay products are sent to Central Puget Sound in trucks that must leave the plant between 2:00 and 4:00 am to avoid congestion on I-5 and arrive at distributors on time.

How do Vancouver/Portland metro manufacturers rate current performance of the state transportation system? Fifty-two percent said that on-time delivery is their single most important performance requirement, 30 percent said cost per move, and seven percent predictable travel time. A substantial 72 percent are highly satisfied with the state's current freight system performance.[134]

Northwest Washington

38,785 jobs in northwest Washington depend on the freight system: 14,551 in manufacturing, 4,268 wholesale trade, 8,677 in construction, 4,745 in the transportation/utilities sector and 6,544 in agriculture.[135] The region's manufacturing sector 's customers are predominately to the south and ship via the I-5 corridor. Their first priority is I-5 congestion from Olympia to Everett that delays fast truck service to California and Washington markets, airfreight to and from Sea-Tac International Airport, and container moves to the Ports of Seattle and Tacoma. Border delays caused by multiple federal databases regulating freight transport are an issue, as is the need for all-weather local roads, and improved east-west connections between I-5 and the Guide and Hwy 9.

Washington's 140 million cubic feet of public refrigerated warehouse space ranks third in the nation. Bellingham Cold Storage (BCS) is the largest portside cold storage facility on the West Coast and the largest cold storage in Washington State, with one million square feet of refrigeration and freezer space. More than one billion pounds of product flow in and out of BCS annually, and the velocity of those moves has dramatically increased with new enabling technologies. BCS has a 900-ft deepwater dock, and has proposed improvements to facilitate container moves from Bellingham to Central Puget Sound.

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[134] Hebert Research, Inc. *Washington Department of Transportation Freight Customer Study: Summary Report* (July 2004).

[135] Washington State Office of Financial Management. *2003 Washington State Data Book.* (January 9, 2004). *County Profiles.* Retrieved as of November 2004 from: <http://www.ofm.wa.gov/databook/county/index.htm>. Includes San Juan, Skagit and Whatcom.

Northwest Washington not only has a strong domestic manufacturing sector, it has unique transport issues related to the Canadian – U.S. border. Between 1994 and 2000, U.S. trade with Canada increased from $243 billion to $406 billion, an average annual growth rate of 8.9 percent. Truck traffic across the Washington – British Columbia border has grown at an even faster average annual rate of 11.6 percent since the late 1990s. In 2003, the WSU/SFTA survey counted 686,590 truckloads that originated in Washington State and headed north via I-5. A total of 1.4 million trucks from all over the U.S. crossed the border traveled on I-5 northbound, and 1.02 million moved south from Canada in 2003. This growth has strained border crossing facilities and enforcement agencies processes, resulting in queues of trucks north and southbound. The International Mobility and Trade Corridor (IMTC) partnership estimates that the annual loss due to delays at the Blaine border crossing is $40 million.

Post 9-11 security concerns have created urgent requirements to upgrade processes and technologies to track, inspect and assure the safety of cargo shipments. Carriers are struggling to comply with rapidly evolving regulations. Advance transmission of electronic cargo information to U.S. Customs Border Protection will be required for both arriving and departing cargo; a pilot project for truck carriers at the Blaine crossing began in 2004.

Coastal Counties: Forestry and Manufacturing

17,415 jobs in Jefferson, Clallam, Grays Harbor, Mason, Pacific and Wahkiakum counties are in freight-dependent industries: 9,468 in manufacturing, 3,505 in construction, 2,002 in the transportation and utilities sector, 1,472 in agriculture and forestry, and 968 wholesale trade.[136] Seventy-one percent of Mason County's total manufacturing employment was in the forest products sector in 1999, as was 66 percent in Grays Harbor County and 45 percent in Pacific County.[137]

Over 90 percent of Pacific County is in forestland. Over 88 percent of Grays Harbor County's land is in renewable forests; timber harvests there have stabilized at 500 to 600 million board feet. Wahkiakum County retains large private timber holdings with fewer restrictions on harvest levels than federal and state lands.[138]

Resource-based industries such as forestry and agriculture rely heavily on county roads to move product to highways and on to market. Eighty percent of the five million tons of logs harvested annually in Grays Harbor move over county

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[136] Washington State Office of Financial Management. *2003 Washington State Data Book.* (January 9, 2004). *County Profiles.* Retrieved as of November 2004 from: <http://www.ofm.wa.gov/databook/county/index.htm>. Includes Clallam, Jefferson, Grays Harbor, Mason, Pacific, and Wahkiakum.
[137] 2002 Comprehensive Economic Development Strategy for the Columbia-Pacific Region; http://www.colpac.org/assets/noncritical/files/CEDS_2002.pdf
[138] 2002 Comprehensive Economic Development Strategy for the Columbia-Pacific Region; http://www.colpac.org/assets/noncritical/files/CEDS_2002.pdf

roads.[139] $2.95 billion total products were shipped in 170,000 truckloads on Highways 12, 8 and 101 from the coast to the I-5 corridor in 2003. Thirty-six percent of that - $1.06 billion – were logs, wood and paper products. $840 million, 28 percent, was machinery.[140]

The forest industry in Washington is the second largest in the nation, behind Oregon, with about 10 percent of U.S. forestry employment. Thirty-six percent of Washington's forests are privately owned; slightly more than half of these lands are managed by the forest products industry for timber production. These lands account for more than 80 percent of the timber harvested in the state today; federal timber harvests currently account for less than three percent of Washington's annual harvest of approximately four billion board feet.

During the last five years, Washington lumber production has stabilized and averaged 3.8 billion board feet, about 11 percent of the nation's total softwood lumber production. Plywood production has averaged 1.1 billion square feet, representing about five percent of the national market share. Other primary products of lumber, plywood, and panels have increased their relative share of the export wood basket, while value-added products has shown substantial potential.[141]

Large volumes of lumber imports coming from Canada, Europe and South America affect Washington lumber producers and freight patterns. Non-Canadian imports of softwood lumber in 2002 totaled approximately 1.3 billion board feet, representing an increase of more

Weyerhaeuser in the Coastal Counties

Weyerhaeuser managed 1.14 million acres of forest in Washington in 2003, and operates extensive value-added facilities in the Coastal Counties. The company has export facilities in Aberdeen and Longview, hardwood lumber centers in Centralia (2003 annual production: 60 million board ft.) and Longview (60 million board ft), a liquid packaging center in Longview (260 thousand tons), a pulp plant in Cosmopolis (140 thousand metric tons), softwood lumber facilities in Aberdeen (300 million board ft.) and Raymond (200 million board ft.), and veneer plants in Aberdeen (170 million sq. ft.) and Elma (130 million sq. ft.).

Weyerhaeuser representatives state that Grays Harbor is a hub for multimodal freight flow. UP and BNSF serve the Grays Harbor area, and Puget Sound and Pacific Railroad, a Rail America, Inc. shortline operator, provides service to the mainlines. The short line rail moves over 1,000 cars for Weyerhaeuser a year, the company's truck traffic must get to the I-5 corridor, and they expect barge traffic carrying both raw materials and finished goods to British Columbia and California to continue to grow.

Weyerhaeuser Company. *Fact Sheets: Major Operating Areas in the U.S.- Washington*. (REV 06/2004). Retrieved as of November 2004 from: <http://www.weyerhaeuser.com/aboutus/facts/8.14_Washington.pdf>.

[139] County Road Administration Board. Written comments on WTP Freight Report from County Engineers; Dec. 2003.
[140] Washington State University. *Strategic Freight Transportation Analysis*. (2004).
[141] Washington State Employment Security Department, Labor Market and Economic Analysis Branch. *Industry Profiles: Lumber and Wood Products*. (Last Update : August 31, 2000). Retrieved as of November 2004 from: <http://www.wa.gov/esd/lmea/sprepts/indprof/lumber.htm>.

than 250 percent in just five years.[142] Between 1992 and 2000, exports of private logs from Washington ports plunged 75 percent, according to the wood products association. Meanwhile, public logs cannot be shipped overseas because of export bans.

The Coastal Counties are also important for specialty agricultural crops including nursery stock, Christmas trees, cranberries, and aquaculture. Food processing is also a significant manufacturing activity in the region, with the exception of Wahkiakum County[143]. All of these products must reach the I-5 corridor for export markets.

Summary and Conclusion

This chapter documents the importance of the State's freight transportation system for Washington's regional economies. Seven regional economies are profiled: Southeast Washington; the Columbia Basin and North Central Washington; the Central Puget Sound; the Spokane region; Vancouver and Southwest Washington; Northwest Washington; and the State's Coastal Counties. Within each regional economy, key economic activities are highlighted and the transportation needs of those sectors are explored.

The chapter also summarizes the economic impacts of key industry sectors within each of the regions, and focuses on specific products and companies that contribute substantially to the economic health of the region. In all, the chapter makes a compelling case for the inter-relationship between economic vitality and an efficient, effectively functioning freight transportation system. The assessment then goes further to identify specific freight transportation challenges facing the State as it works to best serve Washington's agricultural and manufacturing producers.

[142] WSU Inland NW Forest Products Research Consortium, 2003
[143] 2002 Comprehensive Economic Development Strategy for the Columbia-Pacific Region; http://www.colpac.org/assets/noncritical/files/CEDS_2002.pdf

Delivering Goods to You: Washington's Retail and Wholesale Distribution System

Washington State's freight system distributes the necessities of life, and affects the daily life of every person and organization in our state. The retail and wholesale distribution system delivers food, fuel, consumer goods, medicine and documents to restaurants, offices, grocery stores, gas stations and hospitals.

The chapter presents information on recent trends, influences and challenges experienced within the state's freight distribution system. It defines terms to create a common vocabulary, and summarizes data from a variety of state and federal studies of freight transportation and distribution issues relevant to Washington. The chapter provides context for the systems assessment by featuring more than a dozen case studies of Washington State distributors.

The chapter is organized in seven sections:

- An overview of the state's distribution system characteristics and key challenges;
- Food distribution to groceries and restaurants;
- Retail goods distribution;
- High-value, time-sensitive materials shipping, including medical supplies;
- Waste removal, transport, and disposal;
- Fuel transport and distribution; and
- A summary and conclusions.

Overview of the Distribution System

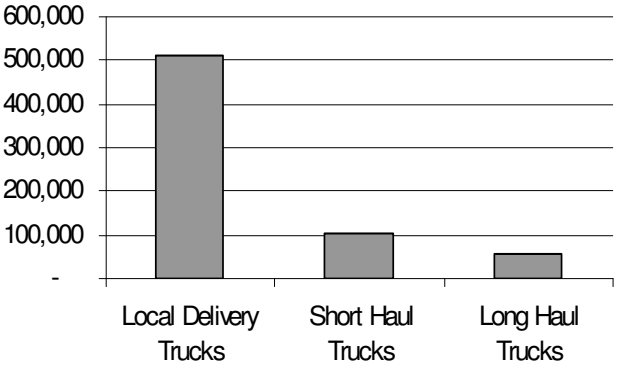
Final distribution of goods is almost 100 percent by truck.

Look around your home. Virtually everything in it has taken a ride in a truck. The groceries, box of tissue, television, couch, bathtub, cabinets, carpet, pillows, and even the kitchen sink. The garden, too, including the landscape rocks, concrete paths, beauty bark, trees, and flowers. Almost everything Washingtonians buy - food, fuel, household goods, furniture, electronics, and automobiles - arrives at the store by truck.

Pick up and delivery of freight within a state or urban region is a fundamental local need. Distribution trucks on the road have the same importance to modern life as the pipes and wires that carry clean water, natural gas, electricity, and telecommunications to consumers.

Distribution is a critical component of the freight system, as it produces up to 80 percent of all truck trips in metropolitan areas.[144]

Exhibit 43: Central Puget Sound Average Daily Truck Trips by Type



Cambridge Systematics, with TranSystems Corporation, Heffron Transportation, and the University of Washington. *FASTrucks Corridor Needs Study, Truck Model Documentation.* (December 2000). Prepared for the Washington State Department of Transportation. (Page 11).

FASTrucks Definitions

Local Delivery: Light trucks with four or more tires, two axles and less than 16,000 lbs. gross vehicle weight

Short Haul Trucks: Medium trucks with a single-unit, six or more tires, two to four axles, and 16,000 to 52,000 lbs. gross vehicle weight.

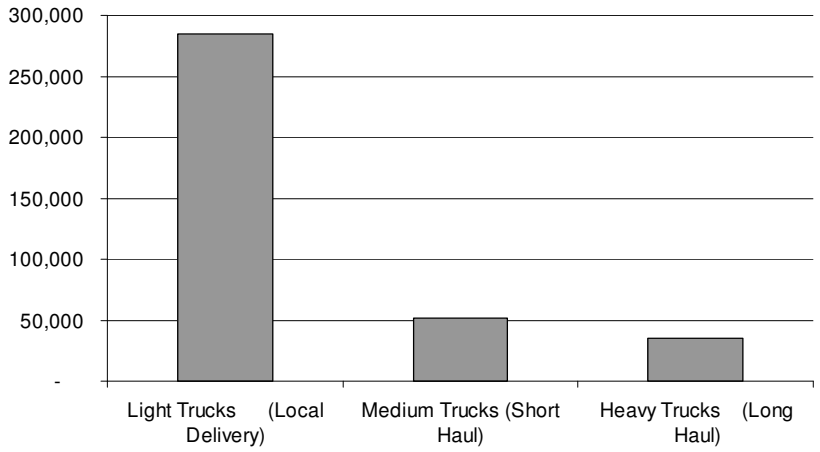
Medium Trucks: Single-unit trucks

Long Haul Trucks: Heavy trucks with double or triple-unit combinations, five or more axles, and greater than 52,000 lbs. gross vehicle weight

As shown in Exhibit 44, in 2004 almost ten times more light and medium trucks than heavy trucks were licensed in Washington State.

[144] Cambridge Systematics, with TranSystems Corporation, Heffron Transportation, and the University of Washington. *FASTrucks Corridor Needs Study, Truck Model Documentation.* (December 2000). Prepared for the Washington State Department of Transportation. 97.1 % were determined to be internal trips (page 26, Table 16).
Transmode Consultants, Inc. *Planning for Freight Movements in the Puget Sound* Region. (January 1995). Prepared for the Puget Sound Regional Council. "As much as 70 percent of total truck miles take place inside urban regions." (page 17).
Niles, John. *Truck, Traffic, and Timely Transport: A regional Freight Logistics Profile*. (June 2003). Mineta Transportation Institute, College of Business San Jose State University. Library of Congress Catalog Card Number: 2002114180. Retrieved as of November 2004 from: <http://transweb.sjsu.edu/publications/Freight.htm>. "When the Puget Sound region's intraregional and public service trips are combined, the total percentage (81 percent) is quite close that for internal-trips in the San Francisco Bay area (85 percent)." (page 57).

Exhibit 44: Most Commercial Trucks Licensed in Washington State are Light



Washington State Department of Licensing, Agency Computer Services. Vehicle records inquiry made by the Washington State Department of Transportation, Freight Strategy and Policy Office. (September 2004)

Local or short haul traffic is made up multi-stop trips, where one truck and driver stops at many businesses, delivering and picking up goods. Just-in-time distribution trends, combined with increasing antipathy to and regulation of larger truck movements in congested areas, means the number of small-volume deliveries made by smaller trucks in urban areas will continue to increase.

A long haul movement, that is truck trips greater than 250 miles in length with only one end of the truck trip in the urban area, account for only about seven percent of truck vehicle miles traveled nationally.[145]

The distribution system produces more trucks, going more places, than any other part of the freight system, and the numbers are getting bigger.

Distribution Centers (DCs)

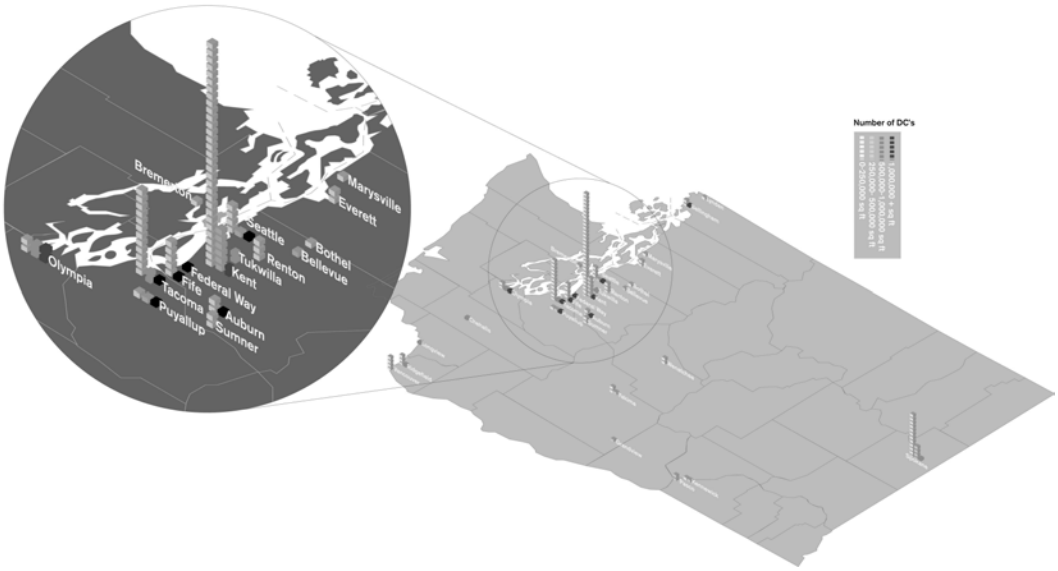
The most common method of distributing goods is by truck from large Distribution Centers (DCs) to stores, businesses, and homes. In Washington State and elsewhere in the country, retail consolidation has exerted pressure on firms to build increasingly larger DCs. The high cost of new supply chain technologies also concentrates functions into larger facilities that are more efficient than a network of small DCs. The new equipment requires laser-leveled floors, high ceilings, wide aisles, and plenty of parking room for trucks. It's cheaper to build new facilities that are able to accommodate efficient inventory and materials management processes than to retrofit existing facilities in urban areas.

[145] Transmode Consultants, Inc. *Planning for Freight Movements in the Puget Sound Region.* (January 1995). Prepared for the Puget Sound Regional Council.

Logistics and site selection specialists say that businesses want to site their DCs near growing, future markets. Retailers that source international products need access to seaports and intermodal facilities. Daily truck trips must complete their routes and return within 11 hours, as required by the new federal hours of service rule. Lower land costs, good access to the transportation network, labor force needs and government incentives have all caused retailers to site DCs at the periphery of urban cores.

Exhibit 45 shows the location and relative scale of major distribution centers in the State. As the Exhibit shows, the centers are located near but not in urban areas and primarily along the I-5 corridor

Exhibit 45: Distribution Centers in Washington Cluster Near Major Freeways



Hall, Cliff. Washington State Department of Transportation, Strategic Planning Office. Telephone calls to regional and city representatives, private business, and online web search (August 2004). Washington State University. *Strategic Freight Transportation Analysis*. (2004). Database was referenced for additional distributor locations and size.

Economic Impacts of the Distribution System.

84,100 people were employed in the trucking and warehousing sectors of Washington State's economy in 2002. Retail trade employed 306,000 and wholesale trade 116,200 in 2002, with $91.5 billion and $84.4 billion of Gross State Business Revenues in 2003, respectively.[146]

[146] Washington State Department of Revenue. *Quarterly Business Review Calendar Year, 2003. Table 1: Total Gross Business Income Statewide by Industry (SIC).* Retrieved as of November 2004 from: <http://dor.wa.gov/content/statistics/2003/qbrcal03/default.aspx>.

Emerging Distribution Issues[147]

- Shippers prefer to use larger trucks to gain efficiencies, but they are difficult to maneuver and park in the urban environment. Many companies distributing goods into dense urban areas are using fleets of smaller trucks. Smaller trucks can better negotiate narrow streets and turning radii, can park on street when needed, and are more economical when making very short trips. The need to use small trucks, however, means that distribution and transloading centers must be located closer to the delivery areas.
- Distributors state that there is no alternative to Washington's major highway system, and use I-5, Highway 167 and I-405 as primary routes. Significant congestion is found on I-5 from Everett to Olympia, and the full length of I-405 and Highway 167. The bottleneck where I-5 narrows to two lanes under the convention center in Seattle is a major structural problem. Trucking companies may try to schedule around congestion patterns, but must meet customer demands for on-time service in preferred time windows. They recommend adding capacity to Highway 167 from Renton to South Hill in Puyallup to create a parallel North-South corridor to relieve congestion on I-5.
- Additional bottlenecks include: Highway 16 at the Tacoma Narrows Bridge, I-5/Highway 526 interchange, Highway 3 in Bremerton, Highway 512 at Spanaway. An intermittent bottleneck appears on I-5 on Friday and Sunday nights from 6:00 to 10:00 p.m., where it narrows to two lanes at Centralia.
- The trucking industry is vital for just-in-time food deliveries, and current truck shortages are causing inbound service disruptions. Trucks swarm to California and the southeast U.S. when regional harvests peak, leaving Washington companies scrambling for available service. From May to August it's difficult to get trucks to the Pacific Northwest.
- Global business trends are also causing long-haul truck imbalances on the West Coast. As major retailers consolidate, large distribution hubs are increasingly located near metropolitan areas to serve regional chain stores. In the Pacific Northwest, this has caused imbalances in I-5 corridor truck traffic resulting in a price differential of $1,500 per truckload moved from Los Angeles to Seattle, versus $400 per truckload moved from Seattle to Los Angeles. LTL rates run ten to 20 percent lower from Seattle to Los Angeles than on the reverse trip.
- Some companies are suggesting authorization of triples in Washington to reduce the number of trucks on the road and improve productivity. They also said that speed limits on some eastern Washington routes could be raised and maintain safety standards.
- According to Washington distributors, I-90 works well, except for Snoqualmie Pass closures due to severe weather. Closures cause scheduling nightmares, cost trucking-dependent companies up to $100 per hour in labor and fuel alone, and stop eastern Washington's food products getting to Central Puget Sound customers. For example, FSA sends eight trailers over the pass every

[147] Washington State Department of Transportation, Office of Freight Strategy and Policy. Over 150 Interviews and relevant organizational meetings attended during 2004 throughout Washington State.

night. The winter of 1996-97 closed the pass a total of 323 hours in either direction over a 48-day period. With no reliable way over the pass, FSA chartered a DC-3 to fly Yakima beef to the Kent distribution facility. The workaround didn't work, and FSA dropped the Yakima supplier because of Snoqualmie Pass unreliability. Their meat is now processed in Tukwila.

- Truck bottlenecks regularly appear at metered freeway on-ramps, as the distance between the stoplight and the freeway isn't long enough for trucks to get up to 50 mph merge speed. Car drivers don't like to get stuck behind trucks merging onto freeways, so they don't let them in; on-ramps with separate truck lanes and freeway merge lanes for trucks would provide congestion and safety benefits for passenger traffic.
- Truck drivers are trained to keep a safe following distance from cars; when cars cut in front of them they must slow to make more space. These intermittent, moving bottlenecks slow passenger traffic behind the truck and reduce overall thruput.
- Distributors recommend that new designs address weave issues, such as the recurring delay experienced when car drivers in the I-405 left hand HOV lanes cross to the I-90 exit. In designated truck corridors, new freeway design could include two truck-only lanes on the right-hand side, so trucks can pass each other.
- Concern for the security of the food chain is causing distributors to use more sophisticated technology to track each item from source to final destination. Federal Hazard Area Critical Control Points (HACCP) mandates documentation of each handling. Smaller carriers will be more exposed to loss, and find it more difficult to invest in new technologies. Trucking companies will continue to consolidate, thereby increasing pricing power.
- The ferry system is the only route to the San Juan Islands and it is a big seasonal problem, say distributors interviewed by the WSDOT Freight Office. In the spring and summer, trucks may have to wait so long for ferry service that they cannot get on and off the island in one day. For a seasonal administrative fee, WSF reserves tall space for commercial trucks that travel at least twice weekly throughout a sailing season. Trucks with reservations may be bumped from the system if they have a pattern of not using their reserved space or if there is a vessel breakdown on a given day. They lose their reservation and priority status, but will still be treated as a first-come, first-serve customer. WSF manages the system each sailing season and priority requests must be faxed in to WSF on a specific day, set by WSF. Requests are treated on a first-come, first-serve basis and entered into a database. If a company does not get one of its reservation requests, WSF calls that company and works to provide a 2nd choice. On occasion, WSF has also authorized additional tall space to be allocated for a reservation, if it is workable. There are usually enough priority spaces for the seasonal requests, but there are heavier traffic days where there are just not enough tall spaces for the demand on a given sailing - typically in the early morning.[148]

[148] Washington State Department of Transportation, Washington State Ferries. Email correspondence. Brewer-Rogstad, Traci. Received November 9, 2004.

- According to distributors, ferries to the Olympic Peninsula and Bremerton don't run early enough to meet restaurant and grocery companies' needs. One distributor called it "the highway that closes every night" and recommended scheduling 4:30 am freight runs from May to September. However, WSF builds its schedules, within its legislated funding framework, to best accommodate heavy traffic movement during commute periods in both the morning and the afternoon. Moving sailings earlier in the morning would cause the later evening sailings to be canceled. Capital resources are limited and operational resources are strained. WSF is in the position of allocating its resources, where the revenue stream will pay for the service and where traffic statistics show it is appropriate.

Delivering Food To Groceries and Restaurants

Most major supermarket retailers have their own distribution centers located within Washington State, or in neighboring states:

- Safeway, Inc. is constructing a new 1.4 million square-foot distribution center on 100 acres in Auburn
- Costco in Sumner
- Associated Grocers in south Seattle, Renton and Clackamas, Oregon
- Albertson's in Idaho
- Kroger's (which supplies Fred Meyer & QFC), near Portland

Grocery Stores Contribute to Washington State's Economy.

In 2002, the grocery industry's 2,000 food stores employed 53,304 workers and accounted for 20 percent of total retail trade employment in the state.[149] Employment in this sector is expected to increase to 69,000 by 2012. Large grocery chains such as Albertsons, Safeway, QFC, and Fred Meyer- as well as retail chains such as Wal-mart, Costco, Walgreens, and Target - have the majority of Washington's market. In the Seattle area, Safeway, Albertsons and the two Kroger chains, QFC and Fred Meyer, have 70 percent of the market.[150]

The Effect of Congestion on the Distribution System

Increasing traffic congestion will cause more trucks to be dispatched from a DC, adding to overall congestion. Because of the new Hours of Service federal rule and basic transportation routing dynamics, truck routing from a distribution center will most often disperse in a flower from the DC. A truck will serve as many stores as possible out of the DC in a loop formation, and en route back to its home. If congestion decreases the number of stores served in a given set of time (which by federal rule is a set, unchangeable constraint) more trucks must be dispatched.

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[149] U.S. Census Bureau. *2002 County Business Patterns (NAICS): Washington State by Industry Code*. Retrieved as of November 2004 from: <http://censtats.census.gov/cgi-bin/cbpnaic/cbpdetl.pl>. Industry code 4451, "Grocery Stores".

How Many Trucks Are Needed to Support a Grocery Store?

Changing market trends have affected the grocery distribution system. Most grocery stores in Washington State are part of nationwide companies that retail thousands of types of food goods. In response to increased consumer demand for a wider variety of food products, retailers are increasing overall store size and shelf space. But back-storage space doesn't generate sales, so modern grocery stores have cut costs by reducing storage space. Reduced storage requires more frequent deliveries in smaller quantities.

The typical supermarket receives two daily deliveries of goods from semi tractor-trailer trucks, and multiple deliveries from vendors in smaller trucks, bringing fresh items such as bakery goods, flowers, and other specialty items. Deliveries at supermarkets supported by large distribution centers, such as Safeway, receive on average 10 to 20 such smaller truck deliveries, Specialized stores, such as The Metropolitan Market, receive more deliveries from smaller trucks and vans.[151]

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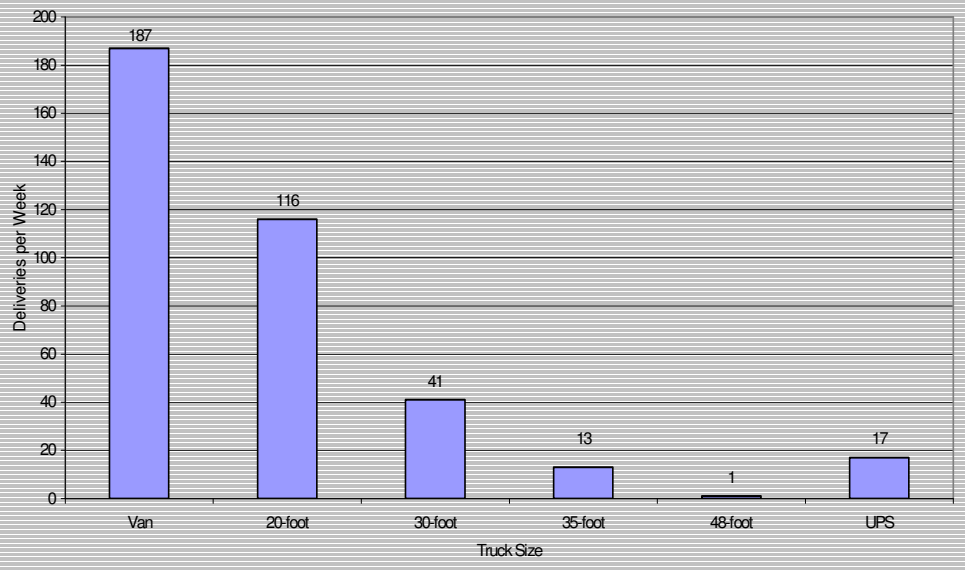
[150] Raine, George. "Grocery talks to move northward." *SFGate.com*, Sunday, July 4, 2004. Retrieved as of November, 2004 from: <http://www.sfgate.com/cgi-bin/article.cgi?file=/c/a/2004/07/04/BUGB67G3Q51.DTL&type=printable>
[151] Heffron, Marni. *WTP Update- Freight Element: Local Distribution of Goods*. (June 9, 2004). Contracted research paper for Washington State Department of Transportation Freight Strategy and Policy Office.

Metropolitan Market Case Study

The Metropolitan Market on Seattle's Queen Anne Hill receives about 375 deliveries per week (an average of about 70 deliveries on weekdays)[1]. Fifty percent of these deliveries are in vans and 31 percent are in small trucks. Trucks larger than 35 feet account for only three percent of weekly deliveries.

Exhibit 46: Weekly Deliveries to Metropolitan Market



[1]Heffron Transportation, Inc. *Howe Street Mixed-Use Project Traffic and Parking Impact Analysis,* November 2001.

Why Can't These Deliveries Happen At Night?

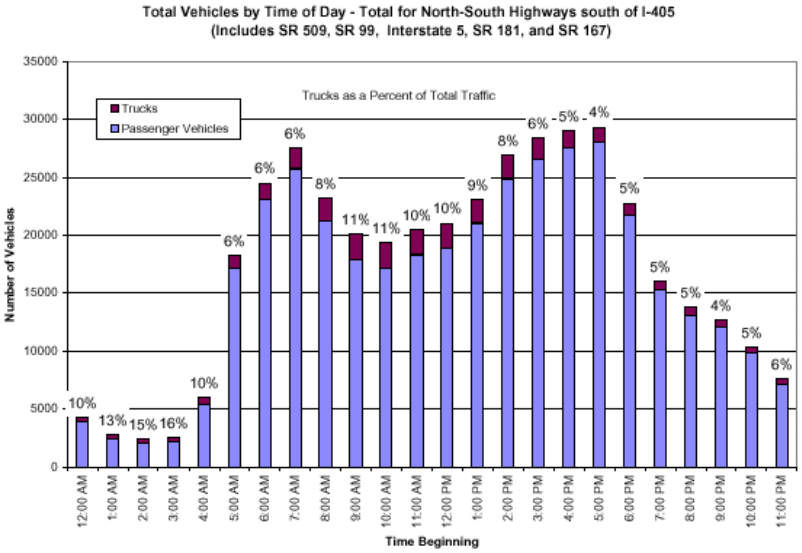
The vast majority of all food deliveries occur during daytime hours. Smaller groceries are staffed during daytime hours only, and restricting truck deliveries to night hours would burden these businesses. Larger, 24-hour stores receive specialty deliveries from small businesses during the day for the same reason. Even for larger chain stores with vertically integrated operations and 24-hour distribution centers, nighttime deliveries may be restricted because of noise ordinances in residential neighborhoods. Not all groceries are integrated operations, for example Associated Grocers is a co-op, not a chain, and cannot demand night operating hours from its clients.

Safeway's Distribution and Supply Approach

Safeway runs a 24-hour, seven day a week operation. The grocery delivers to every store twice, each day, to provide fresh produce and reduce backroom storage needs. Multiple deliveries also smooth and limit the inventory carried at DCs. Safeway's goal is to keep every piece of equipment in operation 24 hours a day.

As Exhibit 47 shows, the majority of truck traffic on the state's highway system moves during daytime hours, similar to the movement of passenger traffic.

Exhibit 47: Total Vehicles by Time of Day on Washington's North-South Highways



Heffron, Marni. *WTP Update- Freight Element: Local Distribution of Goods*. (June 9, 2004). Contracted research paper for Washington State Department of Transportation Freight Strategy and Policy Office.

Emerging Food Distribution Issues:

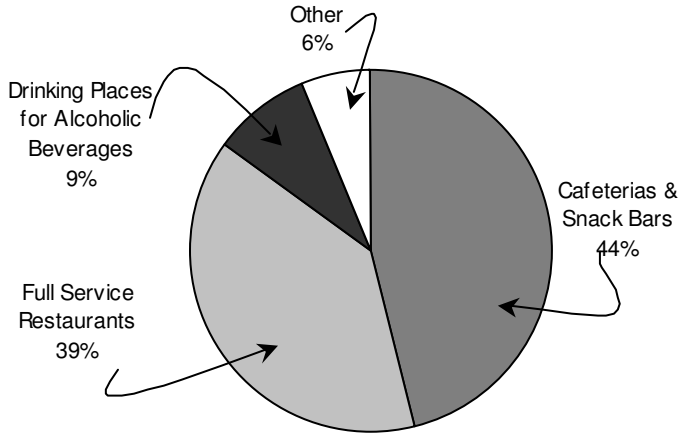
WSDOT's conversations with the Washington Food Industry (WFI), a statewide trade association representing more than 1,200 grocery retailers, wholesalers, brokers and manufacturers such as SuperValu, Safeway, Associated Grocers and Wilcox Farms Inc., surfaced the following issues. In every case, the primary service requirement is on-time delivery, typically in a two-hour window or less. Obstacles to achieving that goal include:

- Congestion on I-5 from Olympia to Everett, the entire length of I-405 and Highway 167.
- Local noise ordinances that restrict hours of delivery and operation. SuperValu sited its DCs in Auburn and Tacoma, about three miles from interstates, in order to reach customers. When SuperValu tried to adapt customers to night deliveries to avoid congestion, grocery stores made it clear that they don't want to stock during prime daytime customer hours. They prefer receiving goods from 3:00 to 8:00 pm so that stocking is completed overnight.
- Because the majority of truck trips on our state's highways are for local deliveries, which mostly occur during the day, both vendors and retailers could be significantly burdened by construction schedules that do not take truck delivery schedules into account.
- Several firms recommended truck-only toll lanes with fees set to make business sense for users.
- Snoqualmie Pass closure information needs to be updated more frequently, especially the predicted re-opening time.

Restaurants Also Receive Frequent Truck Deliveries.

In 2002, Washington had 12,160 food and drink service establishments, with a total payroll of $2.2 billion.[152]

Exhibit 48: Food Service and Drink Place Establishments in Washington State, 2002



U.S. Census Bureau. *2002 County Business Patterns (NAICS): Washington State by Industry Code*. Industry code 722, "Food Service and Drinking Establishments".

For restaurants, the typical floor space ratio is five percent stockroom to 95 percent dining floor. Restaurant industry economics are shrinking back-storage space, so distributors are making more frequent - two to three times per week - small volume deliveries. Population growth and increased discretionary income will build restaurant demand, and increase delivery volumes. By implication, the greatest increase in overall distribution truck volumes will be seen in many more, smaller trucks on the roads.

Food Distribution to Restaurants, Schools and Health Care Centers: Two Case Studies

Food Services of America (FSA)
Food Services of America is a national foodservice distributor serving over 5,500 restaurants, health care facilities, maritime vessels and schools from three major distribution centers in Washington. FSA Western Washington Group in Kent and Everett delivers throughout western Washington and east to Chelan. FSA's Spokane facility serves eastern Washington and northern Idaho. Their customers' primary service requirement is on-time delivery within a two-hour window. Many of FSA's 1,200 daily deliveries are made on an appointment system from 5:00 am to 4:00 pm. Peak hours are from 5:00 am to 11:30 am; 11:30 am to 1:30 pm is blacked out for restaurants' lunch rush. Western Washington Group owns more than 150 power units and employs 220 drivers; Spokane has 55 trucks and 70 drivers. Outbound trucks start loading at 7:00 pm and start delivering goods at 4:00 – 5:00 am, six days a week. One hundred percent of inbound deliveries come by truck; 60 percent in refrigerated and 40 percent in general equipment. FSA contracts with common carriers and requires them to maintain GPS on board for real-time inventory tracking; deliveries are run on an appointment system.

[152] U.S. Census Bureau. *2002 County Business Patterns (NAICS): Washington State by Industry Code*. Retrieved as of November 2004 from: <http://censtats.census.gov/cgi-bin/cbpnaic/cbpdetl.pl> Industry code 722, "Food Service and Drinking Establishments".

SYSCO SEATTLE

In 2003, Sysco Corporation, North America's largest marketer and distributor of food service products, bought $1.8 billion worth of Washington State food products for distribution in the United States and Canada. In 2004, Sysco Corporation's Washington subsidiary, Sysco-Seattle, served its customer base from 'farm to fork' in Washington, Northern Idaho and Alaska. In 2005, the Kent-based hub will concentrate its marketing and distribution efforts in Western Washington and Alaska after a new Sysco facility opens in the Spokane area. Sysco-Seattle owns 120 power units and employs 150 drivers who make nearly 1,000 deliveries per day of food and related products to restaurants, healthcare facilities, schools and other organizations in the region. Their customer base demands daytime deliveries from 3:00 am to 3:00 pm; peak hours run from 6:00 to 11:00 am; with a blackout from 11:00 am to 1:00 pm to accommodate the rush of lunch business. Sysco customers value consistent and predictable delivery times because restaurants base staffing on delivery schedules and meal rushes. Sysco-Seattle also receives in-bound product from over 100 trucks per day.

Retail Goods Distribution

Retail distribution has a significant impact on the State's economy.

In 2003, the Seattle region ranked 17th in retail sales in the nation, with sales of more than $39 billion.[153] As of March 2003, retail employment was 10.4 percent of total employment in the Puget Sound area.[154] In 2003 gross business income from Washington's retail trade was $91.5 billion, 22 percent of Washington industries' income.[155]

Some of the biggest retail DCs in Washington State include:[156]

- Wal-Mart's new 900,000 square-foot facility in Grandview employs 400 people;
- Target's 1.5 million square foot

Home Depot Distribution Center

Home Depot is America's second largest retail chain; it has 29 retail stores in Washington that each stock 40,000 to 50,000 different kinds of building materials.

Home Depot's Washington State operations reflect the integration of local distribution, interstate commerce, and international trade. From the chain's Kent and Lacey facilities, Home Depot receives and processes goods arriving in shipping containers from the Ports of Seattle and Tacoma, as well as all over the United States.

All of these goods are then delivered to Home Depot's Washington stores. The Lacey facility will receive 50 to 70 truck loads a day from the ports, and send 30 to 50 outbound loads to retail stores.

[153] The Seattle Times Company. *Market Overview: An overview of the Seattle and Puget Sound marketplace.* (Fall 2003). Retrieved November 2004 from : <http://www.seattletimescompany.com/smu/marketOverviewFall03.pdf >
[154] The Seattle Times Company. *The Seattle Market Update: Puget Sound Economic Trends.* (2003). Retrieved November 2004 from: <http://seattletimescompany.com/advertise/market/03.summer/economicpulse.htm>
[155] State of Washington Department of Revenue. *Table 1: Total Gross Business Income Statewide by Industry (SIC): Calendar Year 2002 and 2003.*
[156] Niles, John. Distribution for the Cost of Living and Way of Life. *Section on Local Distribution for WSDOT freight planning background paper* (June, 18 2004). Contracted research paper for the Washington State Department of Transportation Freight Strategy and Policy Office.

DC in Lacey employs 350 workers;

- Home Depot's 756,000-square-foot facility in Lacey supports 175 warehouse and trucking jobs;
- Dollar Tree's 665,500-square-foot facility in Ridgefield (Clark County) employs 315 people;
- Ferguson Enterprises' 340,000-square-foot warehouse and distribution facility in Richland employs 80 people; and
- Vanity Fair, a subsidiary of Jansport, has an Everett distribution center, supporting 170 jobs.
- The Fred Meyer distribution center in the Chehalis Industrial Park has broken ground on a 36.5-acre site. The 225,000-square-foot expansion will add 200 new jobs, and the company has room to expand even further to a total of 500,000 square feet.[157]

Bellevue Square: A Regional Shopping Center

Bellevue Square has over 200 stores and draws 16 million visitors a year. Show time begins at 9:30 am everyday, and most freight deliveries must be completed before customers begin arriving. Twenty percent of total sales happen between Thanksgiving and Christmas, and the rush is on during seasonal peaks. To manage deliveries during peak season, Bellevue Square has freight drivers drop their trailers and then queue their power units in parking lots away from the congested loading docks.

Retailers' ideal store configuration is 25 percent stockroom and 75 percent retail floor; for restaurants the ratio is five percent stockroom to 95 percent floor. These economics drive on-time delivery requirements that are usually scheduled around historical patterns. Nordstrom receives freight from 10:00 pm to 4:00 am; Bellevue Square restaurants take deliveries from 5:00 to 11:00 am.

Bellevue Square's biggest distribution headache is a daily event that gets worse on the weekends: no garbage pick up after 2:00 pm. The restaurant compactors fill up, but there's no pick up because garbage truck drivers have to get to Cedar Hills Landfill on congested I-405, before it closes at 3:30 pm.

They are also concerned when wholesalers send large trucks to the center during operation hours, and prefer deliveries in two-axle or smaller vans. When 53-foot trailers enter the mall they have to use the same routes as customers and block traffic.

They recommend adding a general purpose lane on I-405, improving the I-5 merge to Denny under the convention center, and adding a freight-lane bypass to I-5 from Roanoke to Albro.

[157] Mittge, Brian. "State of county is bright, leaders say", *The Chronicle.* February 15, 2005. http://www.chronline.com/Main.asp?SectionID=49&SubSectionID=109&ArticleID=18879

Oak Harbor Freight Lines, Inc. 'Less Than Truckload' (LTL) Case Study

Oak Harbor Freight Lines, headquartered in Auburn, operates a fleet of trucks, 30 terminals, and three large distribution centers in the West. Oak Harbor picks up, consolidates and distributes freight for manufacturers, wholesalers and retailers, including the Gap stores and many regional manufacturers.

Oak Harbor's terminals, with 15 to 30 loading doors to receive and cross-dock freight, are hubs for local LTL trucks that pick up larger-than-a-parcel but smaller-than-a-full-truckload retail and manufactured goods shipments. Drivers begin picking up shipments in 28 to 32 foot trailers at 6:00 am daily, and deliver them to hub terminals before 6:00 pm. They run daytime hours to match customers' hours of service.

After the local freight reaches the terminal, it moves outbound from 8:00 pm to 6:00 am in double trailers driven by long-haul drivers, either directly to another terminal or to one of Oak Harbor's consolidation and distribution centers. Each center has 75 to 100 doors, and is sited within one mile of a freeway, with no stoplights between the site and the freeway on ramp. The distribution centers are always located close to metro centers because the stem time, defined as the time between the driver's departure to his first stop, must average 30 minutes or less.

There are significant effects of Central Puget Sound congestion on short-haul freight. Oak Harbor benchmarks their pick up performance to an industry standard of three shipments or 'bills' per hour. They currently achieve this in Spokane and Yakima, but average only two pick ups per hour in congested Central Puget Sound. Their trucks spend six percent of their time in short idle, compared to the three percent normally found in free flowing traffic. The cost of doing business reflects the effects of congestion; similar services run $24.74 in Central Puget Sound, but only $17.12 in Yakima and Spokane.

Oak Harbor reports that a high percentage of Central Puget Sound manufacturers stop shipping by 3:00 pm, although many Vancouver/Portland metro and Sacramento firms run until 5:00 pm. Congestion may cause Central Puget Sound manufacturers to end shifts by 3:00 pm, so workers can get home before peak hours. Where commuter congestion shortens freight delivery hours, distribution companies must squeeze more trips into a shorter time window, resulting in more trucks on the road.

Washington's Distribution System Includes High Value, Precision Timing Shipping

High value, time-critical materials, including business documents and packages, cash in armored cars, medical supplies, and drugs, must move quickly through the freight distribution system. For business and medical packages, timeliness is the overriding issue. When business and life depend on on-time deliveries, the supply chain must function properly.

While some companies may consider relocating out-of-state if Washington's transportation systems degrade, distribution companies don't have that option. They must provide fast and service, reliable under all conditions. FedEx and UPS drivers don't go home until every package is delivered. Hospital patients

can't wait for drug deliveries. Washington's modern service economy depends on speed of delivery through the freight system.

Express Package Delivery: Two Case Studies

The Role of UPS in Precision Timing Shipping

A global leader in supply chain services, UPS has built large scale information technology networks capturing and using real-time information to improve movement of goods in corporate supply chains and within UPS's own global network. This technology supports everything from the rapid dispatch of spare parts needed to repair customer equipment to the real-time transfer of funds as a package is delivered.

UPS picks up packages in package cars (the standard UPS brown delivery truck), which deliver their contents to sorting hubs. Packages leave the sorting centers in feeder vans and are taken to other sorting centers serving the destinations of the packages, or to the airport for delivery to the national UPS Air sorting center in Louisville, KY. Packages also move by rail and UPS is one of the BNSF's largest customers.

Overnight, feeder vans deliver packages sent from other hubs and from the airport. At a sorting center in Washington a coded label based on the delivery address is placed on each package describing van location, based on a truck route planned by the Dispatch Planning System (DPS), leaving drivers some discretion. The Preload Assist System (PAS) produces the labels that specify truck loading consistent with the order of delivery determined by the DPS routing.

UPS recently surveyed U.S. business executives and found broad agreement that today's modern supply chains are not very efficient. By a two-to-one margin, the executives identified the "next frontier" as synchronizing the entire interaction between vendors, customers and suppliers, rather than optimizing small pieces of the process. UPS has made supply chain visibility one of the most important strategic priorities in its efforts to help synchronize global commerce for its customers.

Niles, John. Distribution for the Cost of Living and Way of Life. *Section on Local Distribution for WSDOT freight planning background paper* (June, 18 2004). Contracted research paper for the Washington State Department of Transportation Freight Strategy and Policy Office.

Federal Express Case Study

FedEx's Express business delivers around three million packages every day. While volume numbers for particular states are proprietary, a merging of data in the 2004 FedEx Annual Report and the Census Bureau Commodity Flow Survey supports an estimate of 50,000 to 60,000 express packages handled per weekday in Washington State, out of 2.8 million nationwide. Average package weight is three pounds. The FedEx Express truck fleet statewide is estimated to be about 800 vehicles.

FedEx Express packages are picked up by late afternoon at offices, service centers such as FedEx Kinko's, or from drop boxes. Then the packages are moved by delivery trucks to airports and loaded on cargo airplanes that fly to aggregation points and/or sorting centers. For example, a package leaving Bellingham Airport would first fly to Seattle, and then fly on a larger plane to a hub in Oakland, Indiana or Memphis for further sorting to get on the right plane for the destination city. The hubs use a highly automated sorting process in the early hours of the morning. Packages reaching airports in their destination cities are then put on trucks for delivery in a series of time windows spaced throughout the day, as shown in the following table. FedEx Express service sets the price for various delivery options so that later times are progressively more economical for the sender. Every single FedEx package is tracked closely with recording of its location and time point as it proceeds through the system.

FedEx makes use of small airplanes to reach airports throughout Washington, including Port Angeles, Bellingham, Wenatchee, Yakima, Pasco, and Spokane. Vancouver and the Clark County area are served via the Portland, Oregon International Airport. The U.S. Post Office now contracts with FedEx for the air movement of its overnight Express Mail packages.

According to the freight research firm Colography Group, a sound business reason for FedEx's expansion into more surface-transported, non-aircraft shipping services is that most express shipments move fewer than 600 miles. This distance can be served by trucks for a fraction of the cost of airfreight, as reflected in the business practices of competitor UPS. Furthermore, time-definite deliveries two or three days after shipment expand the reach of trucks and can meet many business needs as well as overnight service.

FedEx also has expanding logistics services that completely manage and execute a company's warehousing and supply chain. Some businesses now load product from the factory floor onto FedEx trucks even before the ultimate destination is known. One feature of this logistics business is a service called Global Inventory Visibility System, that lets companies view the count and location of their entire inventory via the Internet no matter which warehouse, truck, or other location holds the products.

Traffic congestion affects the setting of the last pickup time at urban locations where FedEx collects shipments. The last drop-off times for shippers at service center locations closest to FedEx-served airports are 4:45 pm in Vancouver, 5:00 pm in Bothell, 5:30 pm in Tacoma, 6:00 pm in Seattle, and 6:30 pm in Spokane. Drop boxes and service locations throughout Washington State that are upstream from these "last chance" locations have earlier cutoff times.

Washington shippers must adjust to any shifts by package express companies to earlier cutoff times as a result of traffic congestion for trucks getting to airports, as well as from operational process changes downstream from pick up. FedEx Express would like to see urban traffic congestion reduced through government investments in infrastructure and operations management, as long as improvements do not constrain express industry time-patterns of operation built around the fundamental concept of overnight sorting in distant cities. That is, FedEx absolutely, positively needs to drive its trucks during peak periods.

Niles, John. Global Telematics and Cascadia Center of Discovery Institute. *FedEx Express and the Express Package Industry Case Study for the Washington State Transportation Plan, Freight Component.* (October 1, 2004). Contracted research paper for the Washington State Department of Transportation, Freight Strategy and Policy Office.

Washington's Health Care System Depends on Daily Deliveries.

Washington's major medical centers and small clinics receive thousands of truckloads of medicines, medical and other essential supplies from regional medical wholesalers, weekly. A large medical center, such as Providence in Spokane, will receive about 300 truckloads of supplies every week.

Hospitals are on priority routes in local communities and they are typically well served on local roads. Hospitals are on priority routes in local communities, therefore they are typically well served on local roads. But just like other businesses, the state's health care system must manage the effects of transportation uncertainties on the major highways. I-5 corridor congestion impacts deliveries of supplies to many health care centers, and in Eastern Washington severe weather closures at Snoqualmie Pass on I-90 are a big issue.

Washington Health Care System: Three Freight Case Studies

Providence Health Care (PHC) and Sacred Heart Medical Center Case Study
Providence Health Care operates a 10-building campus in Spokane, and five hospitals in Spokane and Stevens Counties. With 623 beds, Sacred Heart is one of the largest hospitals in the Northwest, employing over 4,000 healthcare professionals and support staff. The medical center system has over 1,000 beds. Pathology Associates, a medical reference laboratory within the PHC system, operates an internal distribution system with 75 couriers who pick up specimens across eastern Washington, Idaho and Montana and deliver them to a lab, 7:00 am to 6:00 pm, Monday to Friday. The service requirement is on-time same-day delivery; speed of transit is also important as the lab processes 24 hours a day.

Sacred Heart's primary distributor ships one semi-truckload of medical supplies per day from Auburn; supplies arrive in Spokane by 5:30 am. Another 50 trucks deliver goods to the center everyday; 80 percent of these come from outside Spokane and over half from Central Puget Sound. The center requires on-time delivery, defined as within a two-hour window. Medical and surgical supplies make up about 60 percent of all goods received; pharmaceuticals about ten percent, office supplies another ten percent, the rest is food supplies and medical equipment.

Because they are so far from vendors, Sacred Heart buffers many critical supplies. They maintain up to five percent additional inventory stores, an inventory valued at about $150,000, to manage the uncertainty caused by closures at I-90 at Snoqualmie Pass in severe weather. They base their choice of vendors upon their ability to reliably deliver in snow.

Southwest Washington Medical Center Case Study
Vancouver's largest medical center, Southwest Washington Medical Center, serves Clark County and the Portland metro area. It is the largest private employer in Clark County, with more than 3,000 employees. Their internal distribution system includes delivery of medical supplies, lab draws and food services between facilities. The primary service requirement is on-time, same-day delivery, which they achieve about 95 percent of the time. Documents are distributed daily from 7:00 am to 4:00 pm; the service requirement is on-time within two hours of order placement. Their primary vendor supplies 70 percent of their medical supplies, and delivers at 1:00 and 6:00 am. Medical products make up 85 percent and office products about 15 percent of deliveries. The service requirement is on-time delivery within a 24-hour window. Southwest representatives recommend local road resurfacing and congestion improvements at the Mill Plain/I-205 intersection.

Swedish Medical Center Case Study
Swedish Medical Center in Seattle, which is the largest nonprofit medical provider in the Pacific Northwest, draws most of its patients from along the I-5 corridor, between Everett and Tacoma. Swedish operates three hospital campuses encompassing 1,196 beds between its First Hill, Providence and Ballard campuses as well as 11 primary-care clinics throughout the greater Seattle area. They plan to open another medical tower and a support tower in the near future. Their inbound deliveries are tightly scheduled for efficient flow through their loading docks, and to avoid peak traffic periods during employee shift changes and local street traffic. The service requirement for all deliveries is on time within a two-hour window. Current performance is 98 percent on time.

Most products enter two main loading bays next to the emergency department on the main campus. Their prime distributor delivers 70 percent of all their medical supplies in a semi-truck that arrives at 10:00 pm, Sunday through Thursday. Other medical supply vendors deliver in large trucks at 3:00 and 5:00 am, daily. Pharmaceuticals accounts for 20 percent of total volume delivered; it arrives at 4:00 am in a 52-foot long-haul trailer, weekly. IV fluid is shipped to Swedish three times a week, and arrives between 2:00 and 3:00 am. Most of their suppliers are in the Kent Valley, and shipments come down I-5.

From 5:00 am to 10:00 pm, all deliveries come in small trucks – no large trucks are allowed on campus. Food product and fresh produce accounts for 10 percent of total volume, and is delivered from 5:30 to 8:30 am, Sunday through Saturday. Office supplies arrive daily in a small truck between 8:00 – 9:00 am. Linen service, business parcels and mail come and go in small trucks. Lab draws are delivered in small passenger vehicles.

Swedish representatives are concerned about emergency disruptions in the supply chain due to weather or earthquakes. They note good planning relationships with the City of Seattle, the Washington State Patrol and WSDOT that's helped them maintain priority plow routes in snowy weather.

The Waste Removal System

In 2002, over four and a half million tons of municipal solid waste moved by truck and truck/rail to twenty landfills in Washington State.[158] Solid waste generation is growing at an even faster pace than population growth, according to the

[158] Washington State Department of Ecology, Solid Waste and Financial Assistance Program. *Solid Waste in Washington State Twelfth Annual Status Report*. (December 2003). Publication #03-07-019. Retrieved as of November 2004 from: <http://www.ecy.wa.gov/pubs/0307019.pdf>. (Page 103)

Washington State Department of Ecology. In 1993, Washingtonians produced about eight million tons of waste (six million tons disposed and two millions tons recycled/ diverted). By 2002, Washington's solid waste had grown to more than twelve million tons (seven million tons disposed and five million tons recycled/ diverted). Generation rates rose from 9.08 pounds per person per day in 1993, to 11.02 pounds per person in 2002.[159]

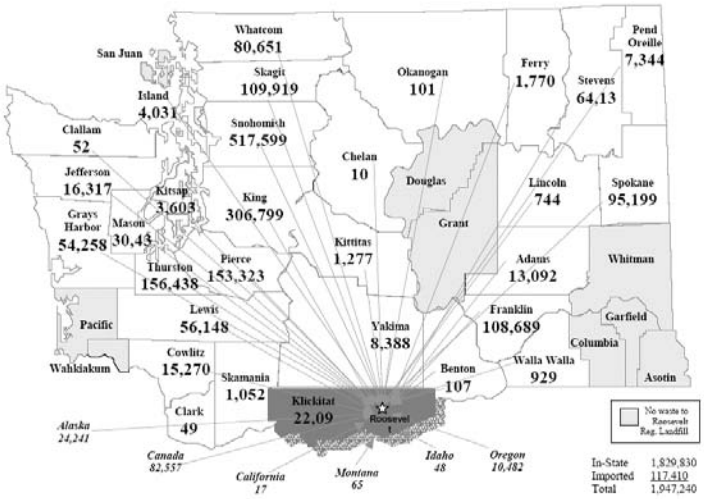
Who's Making All This Waste?

In Seattle, almost one-half of all waste is collected from businesses and nearly a third is collected from single-family residences. Residents of multi-family buildings generate less than a tenth of all waste. The remaining waste, nearly on quarter of the total, comes from self-haulers residents and businesses that bring wastes directly to transfer stations.

Washington's two largest landfills are at Roosevelt Regional Landfill (owned by Rabanco) in Klickitat County and Cedar Hills in King County (owned by King County). In 2002, garbage trucks delivered almost one million tons of King County garbage to Cedar Hills, traveling on I-405 and Highways 18 and 169.[160] Cedar Hills operates from 8:00 am to 3:00 pm, Monday through Friday.

Garbage trucks picked up another 1.8 million tons of solid waste on Washington's streets, trucked it to transfer stations where it was consolidated and loaded into larger trucks. Finally, the waste is transferred to rail cars destined for the Roosevelt landfill, located in Central Washington along the Columbia Gorge mainline. In 2003, Roosevelt took in 2.5 million tons.

Exhibit 49: Municipal Waste to Roosevelt Regional Landfill in



Washington State Department of Ecology, Solid Waste and Financial Assistance Program. *Solid Waste in Washington State Twelfth Annual Status Report.*

[159] Washington State Department of Ecology, Solid Waste and Financial Assistance Program. *Solid Waste and Recycling Data: Washington State Generation and Per Capita Calculations (1993-2002).* Retrieved as of November 2004 from: <http://www.ecy.wa.gov/programs/swfa/solidwastedata/>

In 2002, 1.4 million tons of Washington solid waste was exported to Oregon by rail- almost of this went to the Columbia Ridge landfill in Arlington, Oregon (owned by Waste Management). Six Washington counties send the majority of their solid waste to Oregon and the City of Seattle sent its 465,926 tons of municipal solid waste by rail to the Columbia Ridge Landfill in 2002.[161]

Historically, transfer stations were mostly found in urban areas, but new federal regulations have created incentives for smaller communities to operate transfer stations and long-haul waste to regional landfills.

Landfill Capacity

As of 2003, the state's 18 municipal solid waste landfills have 171 million tons, or about 39 years, of remaining capacity at current rates of disposal. Seventy-seven percent of total statewide capacity is at Roosevelt Regional Landfill. Seven facilities (including Cedar Hills) have less than 10 years of capacity.[162]

Waste Management Case Study

Waste Management (WM) collects and processes more municipal solid waste recyclables than any other company in North America, providing service to more than two million businesses and homes. WM owns all of its equipment nearly one-thousand pieces in Washington State, WM trucks serve two routes per day.

WM serves residential and commercial customers in the State in five market sectors.

Every area requires a number of refuse pick up routes for both residential and commercial customers. For example, in Spokane, WM collects on 47 routes, both commercial and residential. In the Airway Heights section of Spokane County, WM has an additional 15 routes, 70 percent residential, and in Ellensburg/ Klickitat County there are 18 routes, with 60 percent residential. In the Puget Sound, WM uses over 700 pieces of equipment on 600 routes in Skagit, Snohomish, and King Counties.

In Wenatchee, refuse is picked up on 27 commercial and residential routes and taken to the Greater Wenatchee Landfill in Douglas County. The landfill is operated by WM and has 100 years of capacity remaining. In 2002, more than 122,000 tons of municipal solid waste was taken to this landfill from Douglas, Chelan, Kittitas and Grant Counties.

The Company's Kitsap/ Clallam County region has 60 commercial and residential routes, the majority of which are the 600 residential customers visited each day. Refuse is taken to the WM operated transfer station facility in Bremerton, Olympic View waste is transferred to rail containers off to the Columbia Ridge landfill. Two trains of refuse per week travel to Arlington, OR and there is limited capacity to store cans near the facility.

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[160] Washington State Department of Ecology, Solid Waste and Financial Assistance Program. *Solid Waste and Recycling Data: Solid Waste Disposal Data by County (Landfilled and Incinerated:1994-2003)*. Retrieved as of November 2004 from <http://www.ecy.wa.gov/programs/swfa/solidwastedata/>.

[161] Washington State Department of Ecology, Solid Waste and Financial Assistance Program. *Solid Waste in Washington State Twelfth Annual Status Report*. (December 2003).

[162] Washington State Department of Ecology, Solid Waste and Financial Assistance Program. *Solid Waste in Washington State Twelfth Annual Status Report*. (December 2003).

In 2002, 1.4 million tons of Washington's solid waste was exported to Oregon by rail. Almost of this went to the Columbia Ridge landfill in Arlington, Oregon, owned by Waste Management. Six Washington counties send the majority of their solid waste to Oregon. In 2002, Seattle sent 465,926 tons of municipal solid waste by rail to the Arlington Landfill.

Allied Waste-Rabanco Case Study

Rabanco picks up about 10,400 tons of garbage in western Washington and another 1,000 tons in eastern Washington, everyday (6-day week). In 2004, they moved a total of 2.86 million tons.

Rabanco, along with affiliated Allied Waste Companies, operates solid waste collection systems, landfills, recycling centers and portable sanitation services throughout the Pacific Northwest. Their collection companies are located in Seattle, Bellevue, Lynnwood, Kent and Goldendale, Washington. Private transfer stations serve as hubs for commercial garbage haulers and are open during off-peak hours — when it's safer and more efficient for commercial garbage collection, particularly in congested, downtown areas.

Rabanco's Seattle division owns and operates 150 garbage trucks and employs 155 drivers in two shifts, seven days a week. Their garbage trucks each hold 10 to 12 tons of solid waste. The City of Seattle doesn't allow residential pick up before 7:00 am; commercial service begins at 1:30 am. In Seattle, garbage trucks pick up at curbside, deliver waste to city transfer stations located on 2nd Ave. South and on North 34th Street or to the company station at Lander Street, where it's transferred to the UP Argo rail yard in south Seattle. The Eastside division covers Bellevue and other eastside cities and Lynnwood and runs 140 trucks, daily. The Kent/Sea-Tac division runs 105 trucks; the Kitsap division serves Bremerton with 11 trucks. Rabanco also serves Spokane, TriCities and Yakima in eastern Washington. In King County, garbage trucks provide home pick up and deliver waste to either the Third and Lander transfer station or to the Cedar Hills Landfill. Construction debris may be trucked to Black River in Renton, Lander in Seattle, Auburn, Woodinville or Argo yard. Cedar Hills doesn't accept construction debris; it all goes out by rail.

The performance goal for residential pick up is an average of 600 single family and 10 to 20 multifamily units per day, per truck. These trucks end their run at the transfer station, and primarily use local streets, not highways.

Drivers picking up commercial waste begin at 4:00 am and make their first drop to the station by 6:00 am; they average three trips to the transfer station per day. These trucks use freeways, as they're the only route open for longer distances.

Everyday, Rabanco loads fifteen thousand tons of western Washington garbage onto three 60-car trains; the trains load in Everett, Tacoma, and in Seattle's Interbay district and deliver solid waste to the Roosevelt Landfill, 240 miles away. Another 1,000 tons is loaded onto an eastern Washington refuse train, daily. Each train holds the equivalent of 166 truckloads of solid waste. Rabanco builds the unit trains with nothing but garbage, owns the intermodal containers, and transloads waste from truck to rail to gain efficiencies and lower costs. The company's performance goal is a three-day turn by rail; currently it's averaging three and a half days.

Rabanco is experiencing four percent annual growth, statewide, primarily due to population growth. The company also handles waste from Alaska and Hawaii in the Washington State system.

Emerging Issues for Washington's Waste Removal System.

- Congestion on Highway 99 north of Seattle due to unsynchronized lights
- Congestion on I-405 to Cedar Hills
- Alaskan Way Viaduct's poor visibility for merging vehicles at Western Street, and congestion on the exits at Western and Seneca, both safety and throughput problems. Narrow lanes on the Viaduct are also a challenge for garbage trucks.
- With wait time at public transfer station exceeding 10 to 15 minutes, drivers recommend that the City of Seattle separate lanes for refuse companies from lanes for individuals. Also neither King County's or Seattle's facilities were built for today's, larger trucks leaving them without efficient equipment, such as tipping floors.
- Limited rail capacity may cause fewer turns to the landfill
- Bottlenecks at the Port of Seattle's terminal gates cause delays for recycled materials exported to Asia. In 2004, over 20,000 tons per month, 40 containers per day, are shipped from the Lander station.
- Poor repair of City of Seattle streets causes damage to trucks. Spokane Street from Airport Way to East Marginal, and 1st, 4th and 6th Avenues between East Marginal and Royal Brougham must be resurfaced.

King County and the City of Seattle are both considering building new transfer/transload solid waste stations on Harbor Island. Refuse firms and others are concerned that:

- There is not enough space to build 100-car trains at the site.
- The stations will be major freight attractors through congested City streets.
- Freight traffic to the stations will conflict with Port of Seattle container freight shipments.

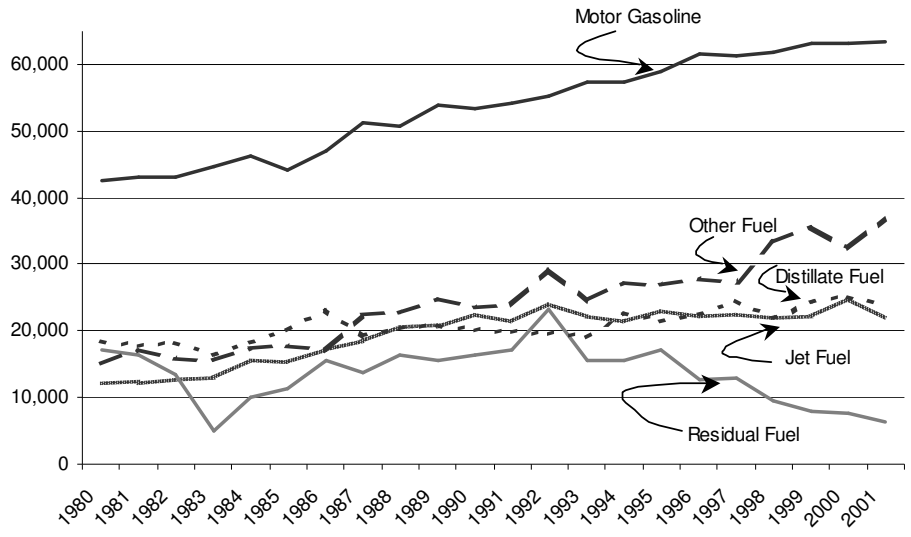
Delivery and Supply of Fuel is a Crucial Element of Distribution in Washington State

The volume of petroleum fuel consumed in Washington is on the rise. As shown in Exhibit 50, motor gasoline consumption has been steadily increasing over the past twenty years.[163] In 2001, Washington's citizens consumed 17.6 million gallons of petroleum per day, making the state's consumption 17th in the United States. Gasoline consumption was 7.3 million gallons per day and jet fuel consumption was 2.5 million gallons per day.[164]

[163] Energy Information Administration. *Total Energy Consumption Estimates by Source, 1960- 2001, Washington.* (Last Updated: 12/15/2004). Retrieved as of November 2004 from: <http://www.eia.doe.gov/emeu/states/sep_use/total/use_tot_wa.html>

[164] Energy Information Administration. *U.S. Petroleum State Data. Petroleum Profile: Washington.* (Released March 2004). Retrieved as of November 2004 from: <http://tonto.eia.doe.gov/oog/info/state/wa.html>

Exhibit 50: Petroleum Consumption is Increasing in Washington State



Energy Information Administration. *Total Energy Consumption Estimates by Source, 1960-2001, Washington.* (Last Updated: 12/15/2004).

Fuel travels to Washington's refineries by oil tanker, and from the refineries through pipelines and trucks to gas stations, homes, and airports. Most of the state's crude oil comes from Alaska and the Canadian Trans Mountain Pipe Line. About a million barrels of Alaskan oil comes into the state from Alaska, although this is forecasted to decrease about 510,000 barrels per day by 2025, just over half of the current production level.[165] About five and half million tons of crude oil also enters Washington by the Trans Mountain Pipe Line from Canada. Crude oil moves on this line through Sumas, Washington to the Anacortes and Cherry Point refineries.

Washington's Oil Refineries Produce Much of the State's Fuel Needs and Demand is Growing.

Crude oil is processed at five refineries in Washington. Although the state is now a net exporter of refined petroleum, in the future it's likely that the state will need to import refined product to meet growing demand. Exhibit

Exhibit 51: Washington Refinery Capacity
Thousand Barrels Per Calendar Day 2003

	Location	Daily Capacity
BP West Coast Products	Ferndale	225
Phillips 66 Co.	Ferndale	89
Shell Oil Products US	Anacortes	140.8
Tesoro West Coast	Anacortes	115
U.S. Oil & Refining Co.	Tacoma	35.15
Total Barrels Produced		607.95

Energy Information Administration. *U.S. Petroleum State Data. Petroleum Profile: Washington.* (Released March 2004).

[165] BST Associates. *2004 Marine Cargo Forecast: Technical Report Final.* (May 19, 2004). U.S. Department of Ecology Economists predict that when Alaska crude imports level off, new sources in Southeast Asia, Papua New Guinea, South America, and Russia will be available to Washington.

51 shows the state's refinery capacity at the five production facilities.

There are two refineries at Cherry Point near Ferndale, two refineries at March Point near Anacortes, and one in Tacoma. The five refineries produce 89 percent of the petroleum needs for Washington State, with the remaining 11 percent coming from the pipeline from Salt Lake City to Spokane. The maximum capacity of these refineries is almost 608 thousand barrels per day; they currently process 607,950 barrels per day. The State's largest refinery, BP Arco in Ferndale (Cherry Point), has a capacity of 225,000 barrels per day, and produces 3.5 million gallons of gasoline per day. Cherry Point was the last refinery built in Washington State, in 1972.[166]

Washington's Pipelines Transport Fuel Across the State.

Once refined into gasoline, diesel and jet fuel products, about half of Washington's fuel moves south by pipeline, and about half is shipped by barge and tanker to points on Puget Sound, the Columbia River, and to Southeast Alaska, Oregon and California. The tidewater barge facility in Vancouver, Washington is also a major pipeline terminal and is used to load barges with refined petroleum products for shipment upriver to Pasco.

Pipelines are the most cost efficient method of transporting oil. Four of Washington's refineries distribute product south via the Olympic Pipe Line, which extends along a 299-mile corridor paralleling Interstate 5 from Blaine, Washington to Portland, Oregon. Smaller pipelines branch off of the Olympic Pipeline, including a spur to Sea-Tac Airport.

Olympic Pipe Line

Constructed in 1965, operated by BP and co-owned by BP and Shell, the Olympic Pipe Line carries 50 to 60 percent of the output of Washington refineries to distribution centers, and is the source of all jet fuel for Sea-Tac Airport.

At 100 percent capacity the Olympic Pipeline can carry up to 115 million barrels per year, equal to more than 2,000 truckloads of fuel per day (assumes one truck can hold 8,000 gallons of fuel). In 2004, the line will transport 105 million barrels of gasoline, diesel fuel, and jet fuel.

The Olympic Pipe Line operates 24 hours a day, seven days a week in a six-day product cycle. About 20 shippers such as BP, Shell, Duke Energy, Chevron and ConocoPhillips use the line. Demand always exceeds Olympic's capacity, as pipeline is the lowest cost mode, so time on the line is allocated to shippers. At any given time, multiple products move on the line, separated only by intermingled product called 'interface.'

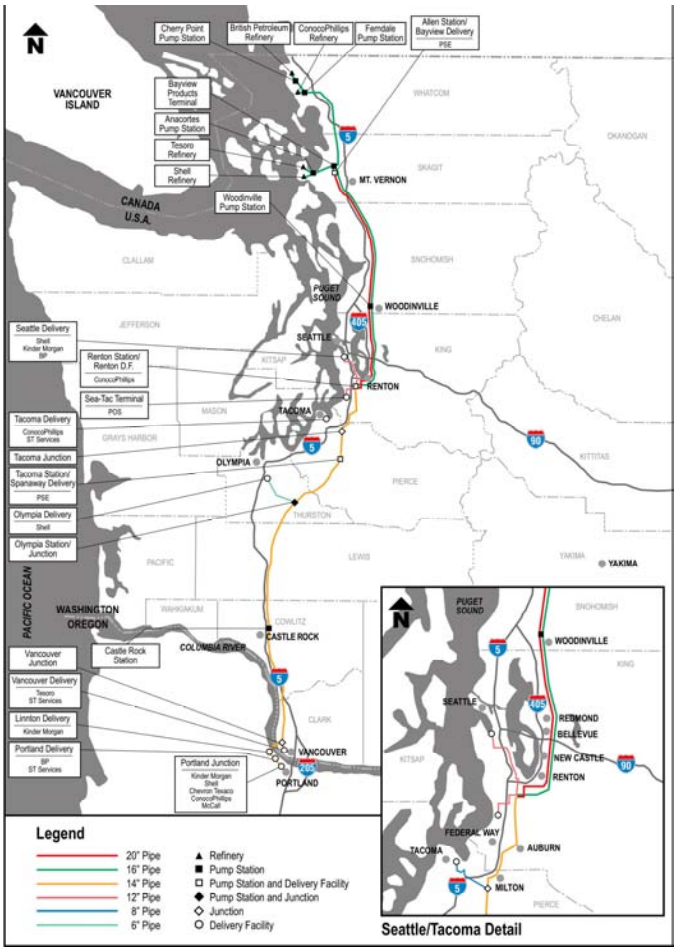
Olympic Pipe Line delivers fuel to third party terminals and distribution terminals located at Bayview in Mount Vernon, Seattle, Renton, Sea-Tac International Airport, Tacoma, Spanaway, Olympia, and Vancouver. Additional terminals are located in Oregon, in Linnton and Portland. Each facility holds from 300,000 to 600,000 barrels, five to six days inventory.

[166] Energy Information Administration. *U.S. Petroleum State Data. Petroleum Profile: Washington.* (Released March 2004).

The Chevron and Yellowstone Pipelines distribute oil and fuel products to eastern Washington. The Chevron Pipeline runs between Salt Lake City and Pasco, with an extension connecting Spokane to Pasco. Refined product is currently transported from a Utah refinery to Boise and Pasco, however Chevron may reverse the flow, supplying Boise from Pasco. If reversed, refined product originating in Portland will be barged to Pasco for shipment by pipeline to Boise. Up to 20,000 barrels a day of gasoline and other products could flow from Pasco to Boise.

The Yellowstone Pipeline runs from Billings, Montana to Spokane and Moses Lake. The Pipeline now supplies about 34 percent of all consumer gasoline and diesel fuel to the Spokane market, as well as 100 percent of the military jet fuel to Fairchild Air Force Base and 100 percent of commercial jet fuel to Grant County and Spokane International Airports.

Exhibit 52: Olympic Pipe Line



U.S. Oil Refinery Distributes by Barge, Rail and Tanker

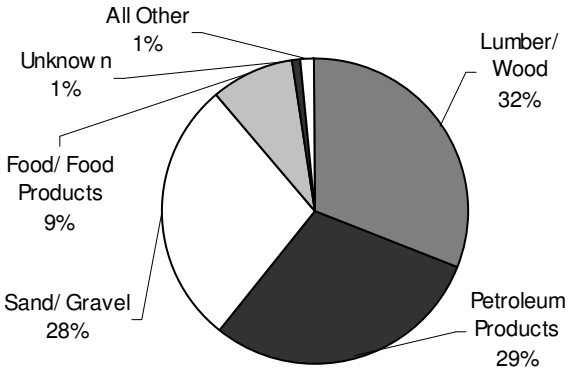
The U.S. Oil refinery, located at the Port of Tacoma, produces gasoline, diesel and jet fuels, residual fuels and asphalt and can receive up to 35,000 barrels of crude per day by barge or tanker. As the only refinery not connected to the Olympic Pipe Line, it distributes fuel and asphalt via truck & trailer, marine vessels and rail, and delivers jet fuel to the military via pipeline. Five pipelines connect the refinery and marine terminal; the refinery also has direct rail access. It can store approximately one million barrels of crude oil and one million barrels of refined petroleum products.

Off the Pipeline: Barges and Tankers.

Fuel that doesn't move by pipeline gets to Washington distribution centers by barge or small tanker, at about double the cost of pipeline transport. For example, it currently costs less than one cent to move one barrel via Olympic Pipe Line to Tacoma, and 1.8 cents by barge.

At this time there is excess capacity in the barge industry. However, the oversupply is expected to correct as the Oil Pollution Act of 1990 (OPA 90) and subsequent modifications of international maritime regulations force firms to retire aging vessels. OPA 90 resulted in a far-reaching change in the design of tank vessels. Double-hull rather than single-hull tankers are now the industry standard, and nearly all ships in the world's maritime oil transportation fleet are expected to have double hulls by 2020.

Exhibit 53: IntraState Waterborne Cargo Movements in Washington State, 2002
By Tonnage, Total = 13 million tons



U.S. Army Corps of Engineers Navigation Data Center-Waterborne Commerce Statistics Center. *2002 Commodity Movements from the Public Domain Database. State to State by Destination and Origin.*

In 2003, 3,007 tanker-barge loads and 588 tank shiploads of oil moved through Puget Sound, 1,530 barge loads of oil were delivered via the Columbia River,

Sea Coast Towing Inc. Case Study

Sea Coast Towing barges gasoline, diesel and jet fuel from northwest Washington refineries to distribution centers in Puget Sound, the Columbia River, Alaska and California. On the West Coast, they operate 13 tugboats, and 14 barges capable of carrying 25,000 to 170,000 barrels of fuel. The larger barges are used for more distant destinations such as Port of Vancouver, WA or Port of Portland. About 15 percent of their moves are to Puget Sound and the Columbia River, 50 percent to Alaska, and 35 percent in California.

Sea Coast averages 12 to 18 trips a month to customers such as Kinder Morgan and Shell at the Harbor Island tanker farm or to ConocoPhillips in Tacoma. Those DCs can receive ships with up to 220,000-barrel capacity. However, as size of loads, known as 'parcels,' and size of vessel must match available DC storage capacity; about 40 percent of Sea Coast's Puget Sound barge trips move in smaller, 25,000 barrel vessels. Their customers highly value barges flexibility and efficiency; according to the company it has 40 percent market share of Puget Sound waterborne deliveries.

Sea Coast moves 10 to 18 barges per month to Vancouver/Portland in 70,000 to 170,000 barrel vessels, and three to five barges to Alaska. Runs to Oregon take two and a half days, to Alaska about four days. Southeast Alaska – Ketchikan, Juneau and Sitka - receives 90 percent of its fuel supply from Washington refineries via barge and tanker.

and 31 tank ships bound for Washington ports entered the Columbia River.[167]

From Pipe Line to Regional Distribution Centers: The Final Trip from Pipeline to Market is Made by Truck.

Most fuel is delivered from distribution centers by truck to gas stations. Today there are about 2,000 gas stations in Washington State, up about 37% from the 1,465 that existed in 194.[168] The quantity of fuel sold at each facility varies greatly. A small neighborhood gas station might receive one truckload of fuel each week. Larger facilities, such as Costco chain, may receive one or two fuel trucks each day.

Fuel deliveries to local markets are made from distribution centers located at the five refineries or at major storage depots, including: Harbor Island in Seattle, Renton, Tukwila, Tumwater; Tacoma, Anacortes, Ferndale, Vancouver, Moses Lake, Pasco and Spokane. The number and storage capacity of the State's fuel distribution centers has decreased substantially in recent years, due to environmental concerns and new regulations. Limited storage capacity means that these facilities are heavily reliant on pipelines to supply fuel just in time for delivery. Recent closures of the Olympic Pipe Line have shown the importance of the pipeline and tested the local distribution network.

The Maritime Industry Depends on Washington's Fuel Distribution System

Several fixed facilities are licensed to dispense large quantities of marine fuel in Washington State; two are located in Seattle's Ballard neighborhood along the Ship Canal, one on Seattle's Harbor Island, and another in Westport.

One of these facilities, Ballard Oil, distributes about 10 million gallons of fuel to vessels each year. Fuel is trucked to Ballard from Harbor Island in tanker trucks that hold 8,000 gallons each. That amounts to more than 2,500 truck trips per year (one trip full with fuel, and the return trip empty) for just this facility. The average fishing vessel takes on about 30,000 gallons of fuel at a time, or about four truckloads of fuel per vessel. Because the Ballard facilities have limited on-site storage, just-in-time deliveries are essential. If adequate fuel supply cannot be maintained - for example if the Alaskan Way Viaduct were out of service - it could significantly affect the marine industry in Washington, including the North Pacific Fishing Fleet headquartered along the Lake Washington Ship Canal.

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[167] Washington State Department of Ecology- Spill Prevention, Preparedness, and Response Program. *Vessel Entries And Transits for Washington Waters VEAT 2003*. WDOE Publication 04-08-002. (March 2004). Retrieved as of November 2004 from: <http://www.ecy.wa.gov/pubs/0408002.pdf>

[168] U.S. Census Bureau. *2002 County Business Patterns (NAICS): Washington State by Industry Code*. Retrieved as of November 2004 from: <http://censtats.census.gov/cgi-bin/cbpnaic/cbpdetl.pl>. Industry code 447, "Gasoline Stations". U.S. Census Bureau. *1994 County Business Patterns (SAIC). Washington State by Industry Code.* Retrieved as of November 2004 from: <http://censtats.census.gov/cgi-bin/cbpsic/cbp1detl.pl>. Industry code 5540 "Gasoline Service Stations".

Home Heating Is Another Major Fuel Use

According to the Pacific Northwest Oil Heat Council, an estimated 90,000 to 100,000 homes in Washington State heated with oil. Homes heating uses between 75 and 80 million gallons of heating oil annually, all of which is delivered by truck. If the average home fueling truck carries 7,500 gallons, this amounts to more than 11,000 truckloads of fuel delivery made each year.

Refinery capacity is also an issue for home heating. Refineries must convert from "summer fuel" to "winter home heating" production. This process can take several days. With limited storage capacity, there is increased pressure for accurately judging the best switch time: switching too soon or too late can result in a fuel shortage.

The Seattle-Tacoma International Airport Jet Fuel Distribution System.

More than 177,000 aircraft landed at Washington's largest airport, Seattle-Tacoma International Airport, in 2002.[169] These airplanes moved more than 26 million passengers, 97,000 tons of mail, and almost 316,000 tons of freight. All of the aircraft flying in and out of Sea-Tac fill their tanks with jet fuel. The fuel distribution system's reliability is essential for airport operations and the state's economy.

Sea-Tac currently requires 1.2 to 1.5 million gallons of jet fuel per day to refuel aircraft. Fuel arrives at Sea-Tac's storage facilities or 'tank farm', which is managed by a consortium and holds 20 million gallons of useable jet fuel.

Sea-Tac is highly and uniquely vulnerable to disruptions in supply caused by pipeline breaks or other problems. All of Sea-Tac's fuel arrives via Olympic Pipe Line – their sole supplier - from refineries in northwest Washington. There is no jet fuel storage facility between Sea-Tac and the refineries. There is a five to twelve day supply of jet fuel stored on site in nine storage tanks. Adding additional storage capacity is not a feasible alternative, due to permitting and environmental concerns.

More than 150 trucks per day would be needed to replace the volume of fuel currently delivered by Olympic Pipe Line. But there is no facility at Sea-Tac capable of receiving fuel by truck. In case of an emergency, rerouting aircraft to Portland International Airport for refueling is problematic as PDX also receives its fuel from the Olympic Pipeline.

In 2004, final delivery of jet fuel moves from Sea-Tac storage by tanker truck to jets waiting on the airfield. By spring of 2005, Sea-Tac will have installed an

[169] Port of Seattle. *Seattle-Tacoma International Airport. Airport Activity Report 2002.* Retrieved as of November 2004 from: <http://www.portseattle.org/downloads/seatac/ArptActvRpt.pdf>

underground hydrant system that will replace 80 percent of current truck tanker moves on the tarmac. They expect to gain reliability, safety and a long-run cost savings.

Major issues for fuel distribution:

Refinery and Distribution Center/Tanker Farm Capacity:

- Washington has added no additional refinery capacity since the 1970s, and there is currently no plan to expand Washington's refinery capacity in the next twenty years. Although the State is currently a net fuel exporter, demand is catching up.
- Encroachment into fuel distribution and storage locations may reduce statewide capacity; industry sources state that the last distribution center was permitted over 30 years ago.
- Some of Washington's refineries are able to produce a more profitable blend of fuel required by California's environmental laws. This is resulting in Washington refineries sending more of their output to California. Four California refineries have recently shut down, and a fifth will close in 2004.
- DNR designated "reserves" means that refineries cannot renew leases or expand docks to improve.

Pipeline Capacity and Safety:

- Olympic Pipe Line has no plans to add pipeline capacity in Washington State. Washington's permitting issues, multiple city franchising, and uncertain public processes may cause infrastructure investment to flow elsewhere.
- Olympic Pipe Line is operating close to 100 percent capacity, and large tankers are restricted in Puget Sound. Given this situation, the state could conduct a risk assessment of fuel transport alternatives to meet long-run demand.
- Olympic Pipe Line's number one safety and security issue is contractors who inadvertently dig near or on top of pipelines. Washington's '1-Call' regulation (RCW 19.122) lacks sufficient penalties and enforcement, according to industry experts.

Gasoline Pricing and Consumption:

- The Attorney General's Office, in an effort to monitor gasoline pricing, recently completed a 2004 Washington State Gasoline Report. The report found that "current high prices appear to be a reflection of a tight supply/ demand balance. Increased demand and limited production capacity have become normal, leaving no room for error in the supply system." The West Coast exceeds the national average for gasoline consumption.[170]
- The whole West Coast supply and demand is closely linked to Washington State's fuel distribution system and future fuel prices. California and Oregon will continue to place increased demand on Washington's refineries and

[170] Attorney General's Office. *WASHINGTON STATE GASOLINE REPORT 2004*. As of November 2004 from: http://www.atg.wa.gov/consumer/gasprices/report.shtml

distribution system, putting pressure on system volatility and fuel prices. As Oregon has no refineries, Washington currently supplies 70 percent of all Oregon's fuel, California supplying the remaining 30.

Sea-Tac Airport Fueling:

- With limited storage capacity and no alternative mode of delivery, the Sea-Tac Airport tank farm consortium is very concerned about risks to the Olympic Pipe Line, and the ability of multiple regulatory agencies to resolve an emergency quickly. Extensive coordination between numerous agencies is necessary to fix problems fast, and a well-defined, fully coordinated emergency plan should be in place. According to consortium representatives, it doesn't currently exist.
- Sea-Tac is also concerned about the limited capacity of Washington's refineries. Currently, the Cherry Point- Arco/ BP refinery is the biggest jet fuel producer in the region. Jet fuel must compete with other forms of fuel such as motor gasoline for refinery capacity. With overall West Coast demand exceeding supply, the cost of jet and other fuels is a major concern.

Summary and Conclusion

Washington's retail and wholesale distribution system delivers the goods to you.
Food, retail goods, medicines, business parcels and fuel follow similar paths from large distribution centers via large numbers of trucks along the state's highways and local roads to stores. Trucks are also used to pick up waste from Washington's homes and businesses, transporting it to the Pacific Northwest's many landfills or to rail heads where the refuse moves by rail to the landfills. Medical and time sensitive goods are one of the most technologically advanced and high pressure parts of the distribution system, as businesses like UPS and FedEx race to meet on-time delivery requirements. Lastly, the state's distribution system links Alaska's crude oil resources to Washington's consumers via tankers and barges, refineries and pipelines, and tanker trucks.

> "These [urban truck] movements are crucial to the functioning of the economy, since without them the population of the region would have nothing to eat, nothing to wear, nothing to read, no spare parts, no fuel for their autos and no heat for their homes. In other words, the economy of the regional would no longer function."
>
> Planning for Freight Movements in the Puget Sound Region, Puget Sound Regional Council, January 1995.

As technology changes, the distribution system continues to evolve. Growing urban economies and the rising cost of gas and shipping may increase the cost of distributing goods, but consumers demand timeliness and quality at ever lower prices. Effective and efficient freight transportation balances convenience and the cost of living for Washington's residents.

Conclusion (To Come)

In Summary

The three components of Washington's freight system are integrated and support our state's economy:

- International goods enter Washington State gateways and become part of Washington's manufactured output, or are distributed in our retail system. Washington's global gateways also carry national and international goods to and from the larger U.S. market.
- Washington manufacturers and farmers ship products directly to customers and to wholesalers in national and international markets. These industries support hundreds of thousands of jobs and contribute billions of dollars to the gross state product.
- Washington wholesalers and retailers supply consumers with goods from all over the U.S. and the world. They sustain our modern economy.

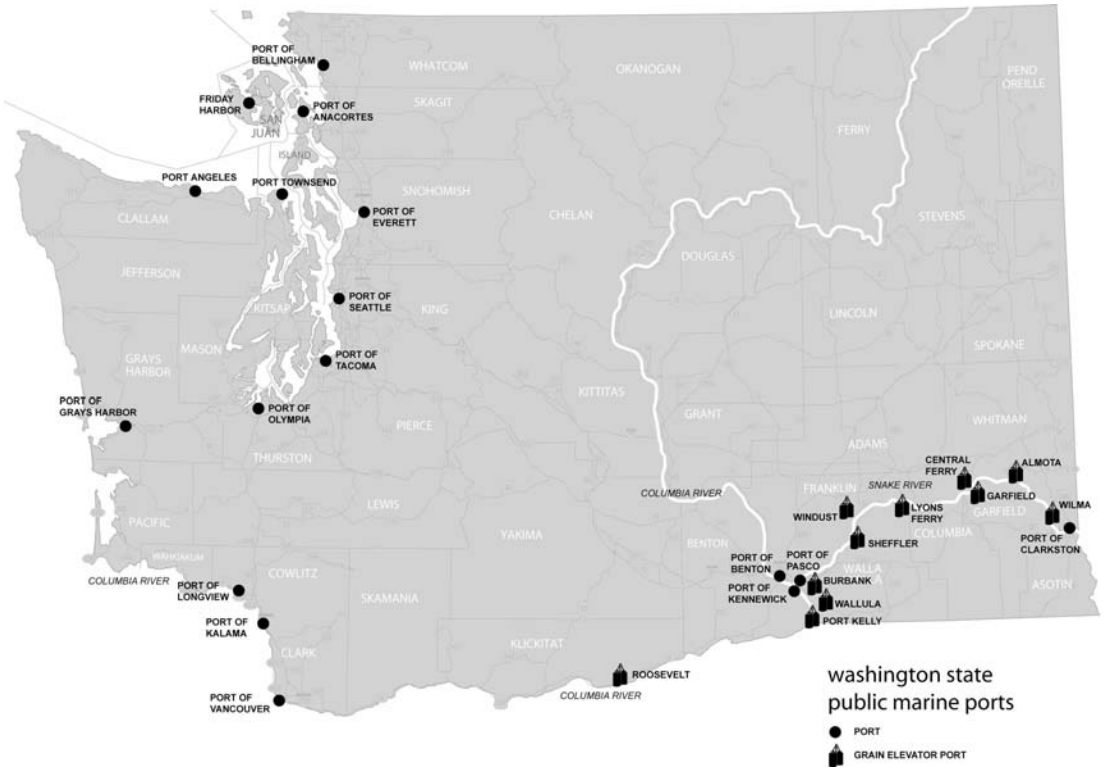
Freight related issues such as security, safety and the environment are being considered in other parts of the update of the Washington Transportation Plan.

Where Will We Go From Here?

What ideas did we miss?
We want the conversation about freight strategy to involve all parties. We need your help to make good investment choices that will address the needs of freight movement on our state's transportation systems and facilities. Especially when there isn't nearly enough money to do everything that clearly needs to be done.

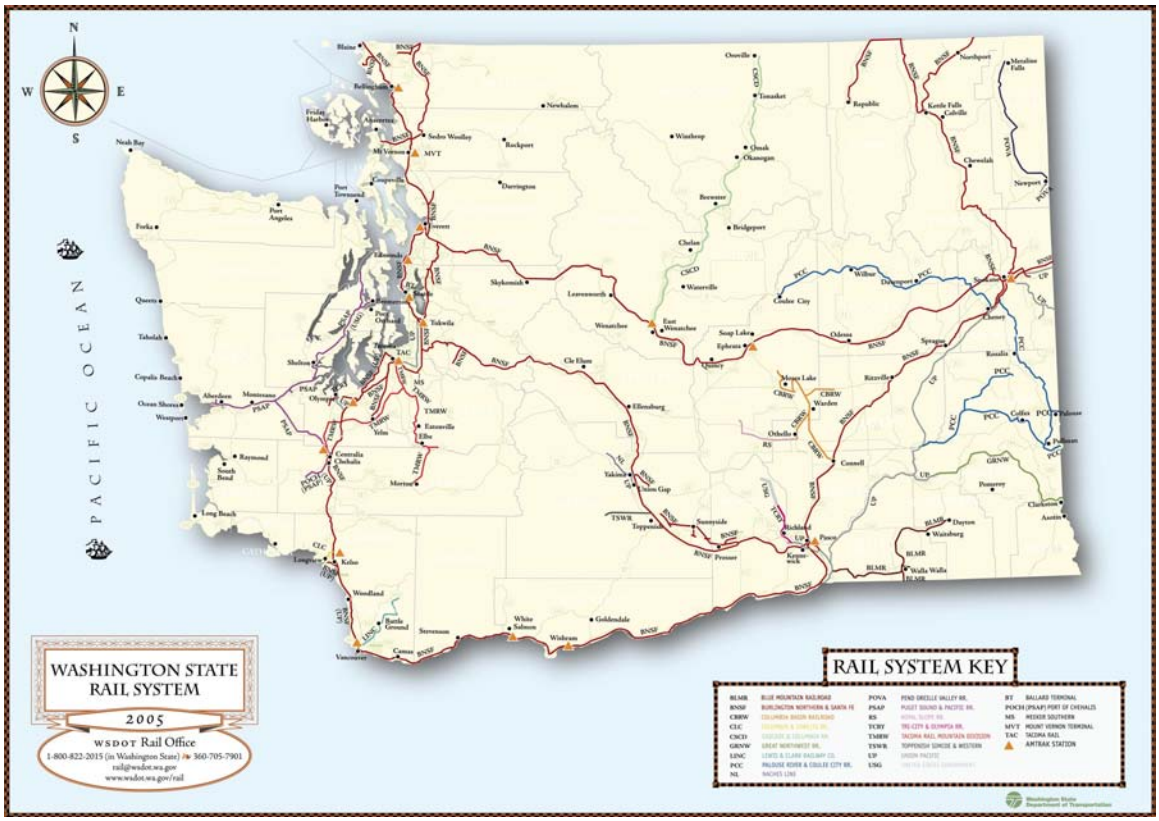
Appendix

Appendix A- Map: Washington State Public Marine Ports Handling Cargo

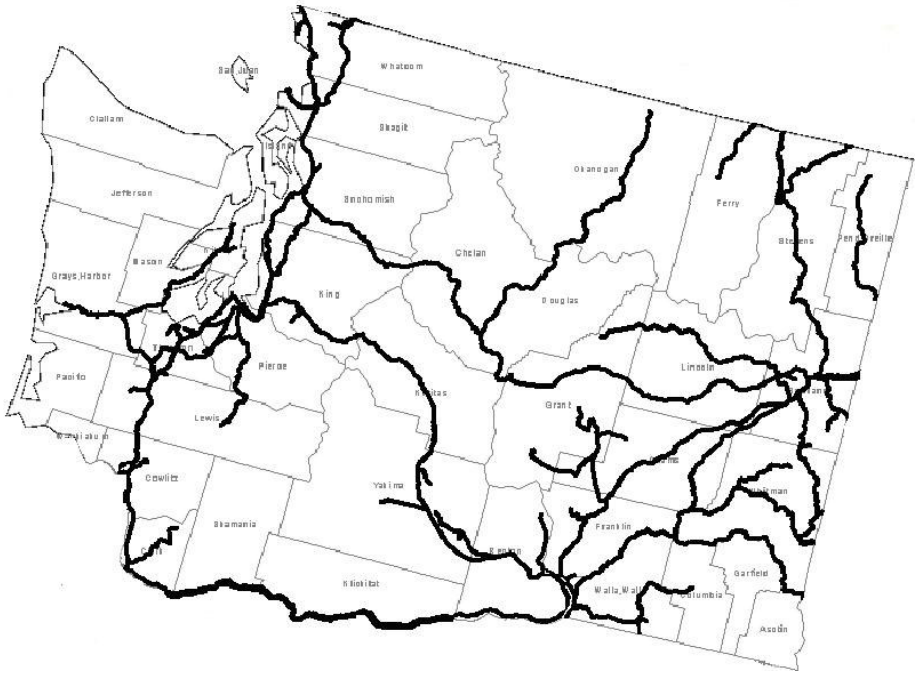


Map developed by Stephen Riddle, Washington State Department of Transportation Graphics Division. Original sources:
U.S. Army Corps of Engineers Navigation Data Center- Waterborne Commerce Statistics Center. *2002 Waterborne Commerce of the United States (WCUS), Waterways and Harbors on the: Part 4 - Pacific Coast, Alaska and Hawaii.* Retrieved as of November 2004 from: < http://www.iwr.usace.army.mil/ndc/wcsc/pdf/wcuspac02.pdf>.
Washington Public Ports Association. *2004 Washington State Port Directory*. Retrieved as of November 2004 from: <http://www.washingtonports.org/port_information/port_directory.htm>.

Appendix B- Map: Washington State Freight Rail System

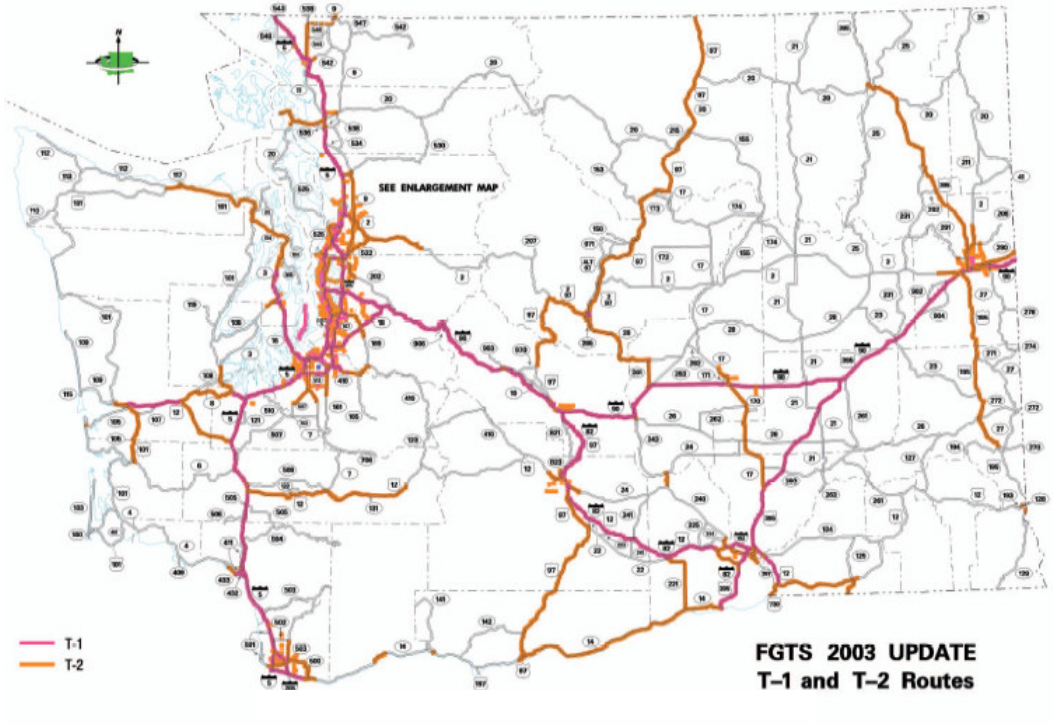


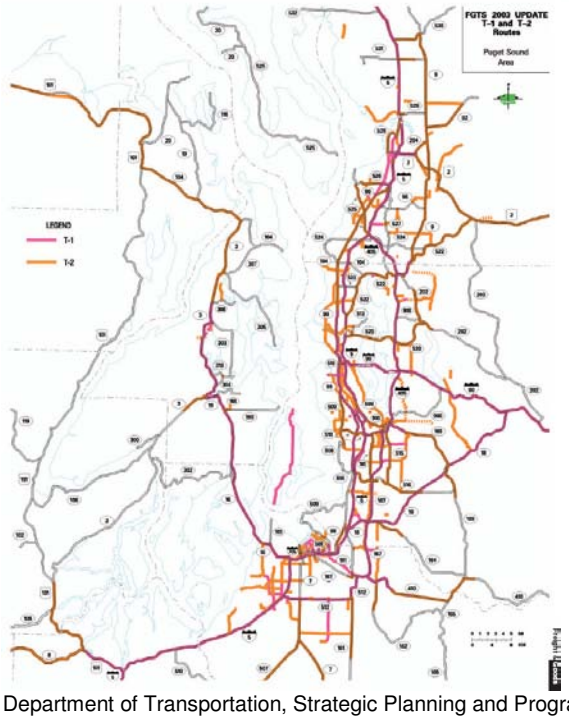
Washington State Department of Transportation, Rail Office. *Washington State Rail System Map.* As of January 2005.



U.S. Department of Transportation, Bureau of Transportation Statistics (BTS), Federal Highway Administration (FHWA) and Office of Secretary. *GeoFreight Intermodal Freight Display Tool* (Version 1.0.2). "Thematic Map: Transportation Facilities: Railroad". Accessed and edited November 2004.

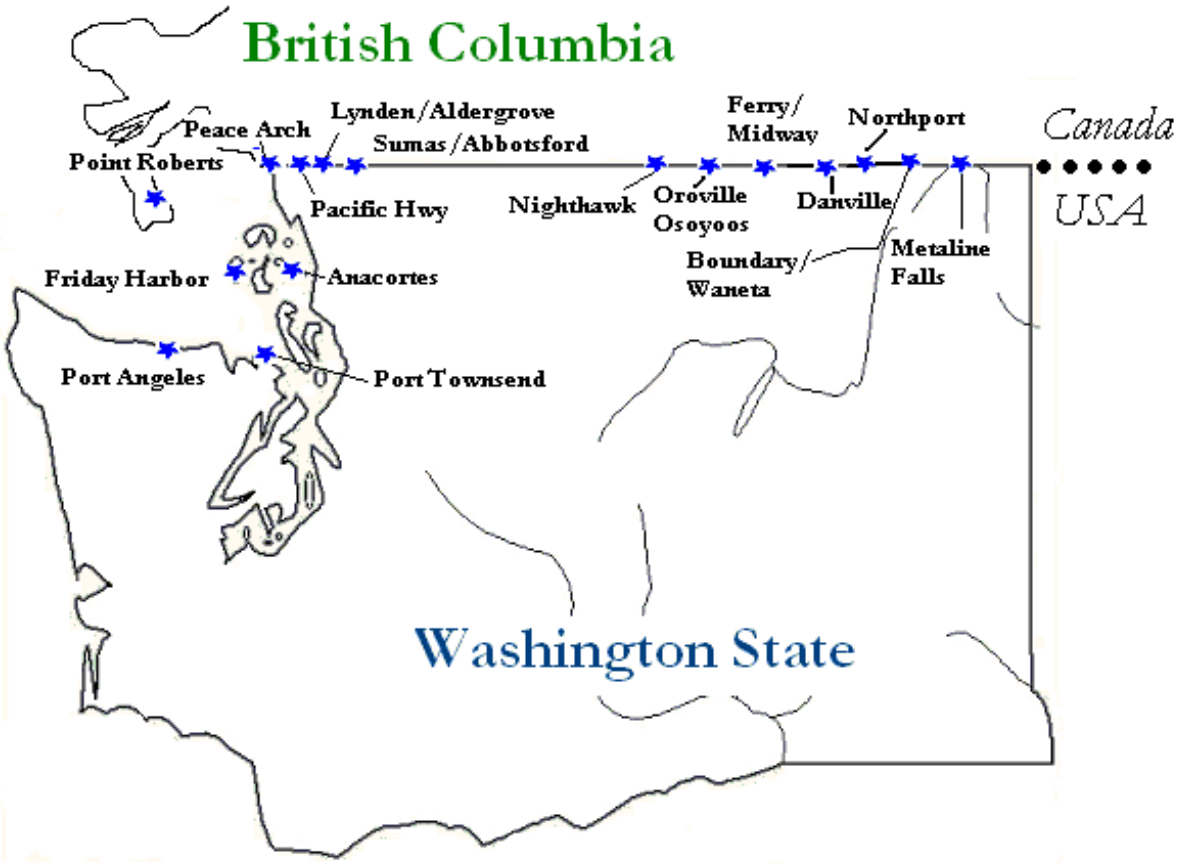
Appendix C- Map: Washington State Highway Freight Routes





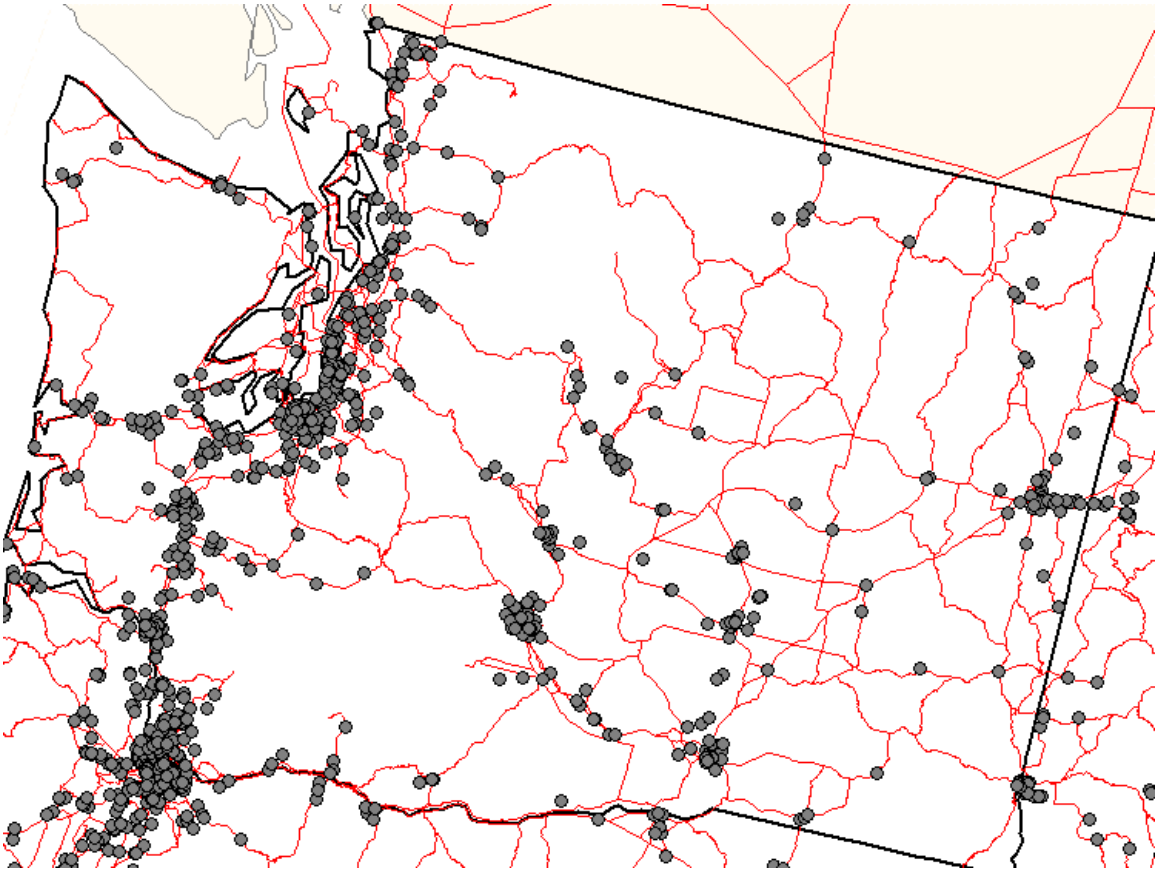
Washington State Department of Transportation, Strategic Planning and Programming Office. *Freight and Goods Transportation System (FGTS) 2003 Update.* (March, 2004). Available as of November 2004 from: <http://www.wsdot.wa.gov/ppsc/planning/fgts_cd.htm>.

Appendix D- Map: U.S./ Canadian Border Crossings in Washington State



Washington State Department of Transportation. *WA State Border Crossing Map.* Retrieved as of January, 2005 from: <http://www.wsdot.wa.gov/freight/images/WACANBordermap.gif>

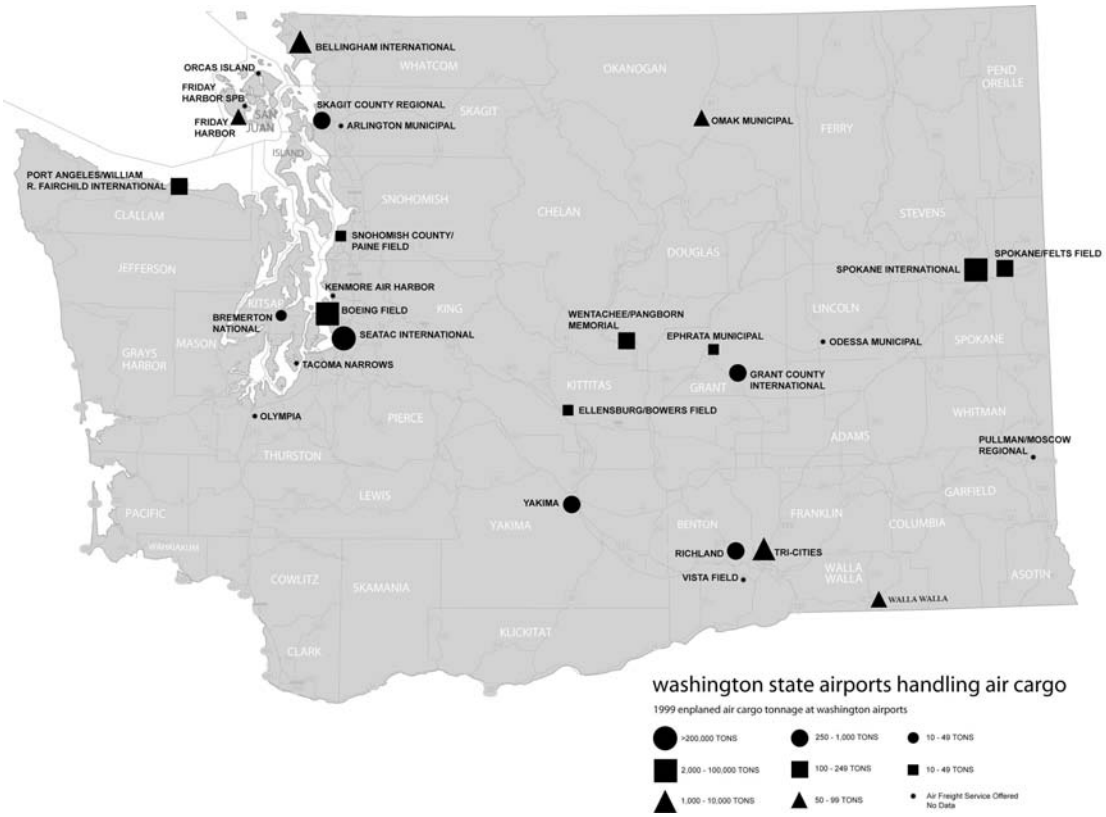
Appendix E- Map: Intermodal Facilities and Highway Network in Washington State



U.S. Department of Transportation, Bureau of Transportation Statistics (BTS), Federal Highway Administration (FHWA) and Office of Secretary. GeoFreight Intermodal Freight Display Tool (Version 1.0.2). "Thematic Map: Transportation Facilities: Intermodal Facility and Highway". Accessed and edited November 2004.

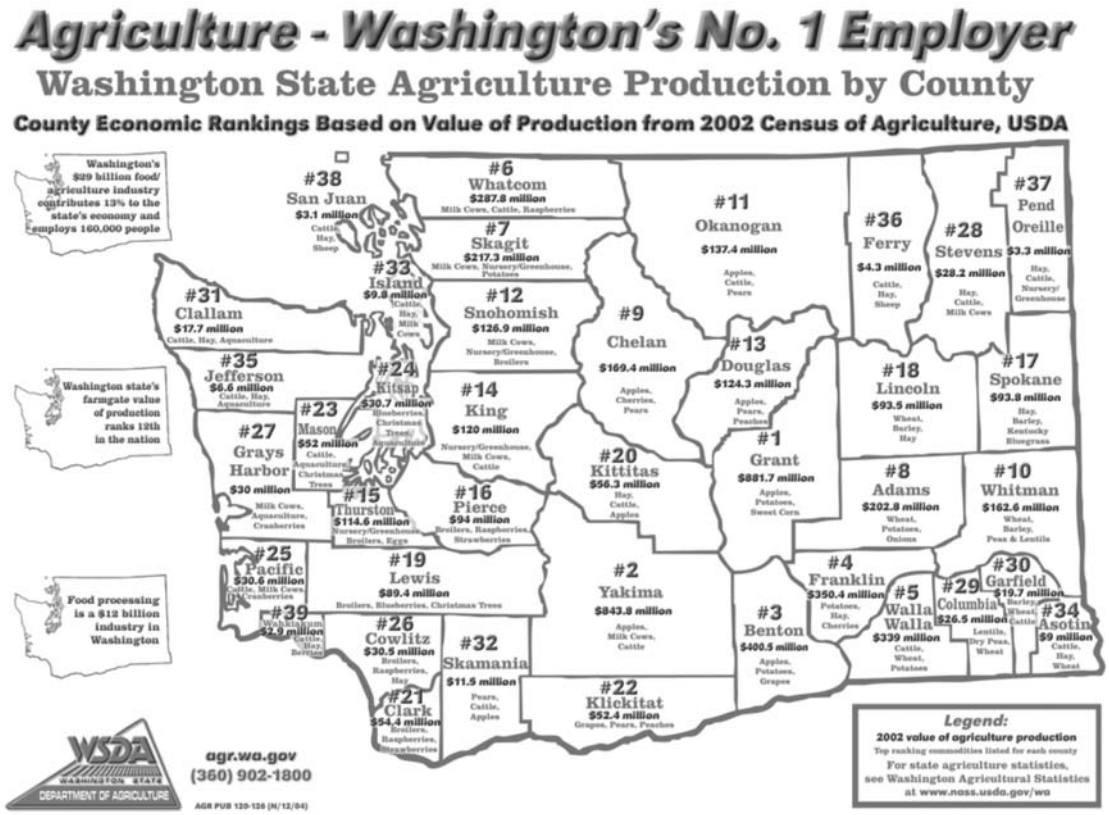
* Intermodal facilities are based on the Bureau of Transportation Statistics, NTAD 2003 Shapefiles for Selected State CD. Highway network is based on a modification of the National Highway Planning Network developed for the USDOT Commodity Flow Survey. Intermodal facilities are locations where freight is transferred from one mode to another.

Appendix F- Map: Airports Handling Cargo in Washington State



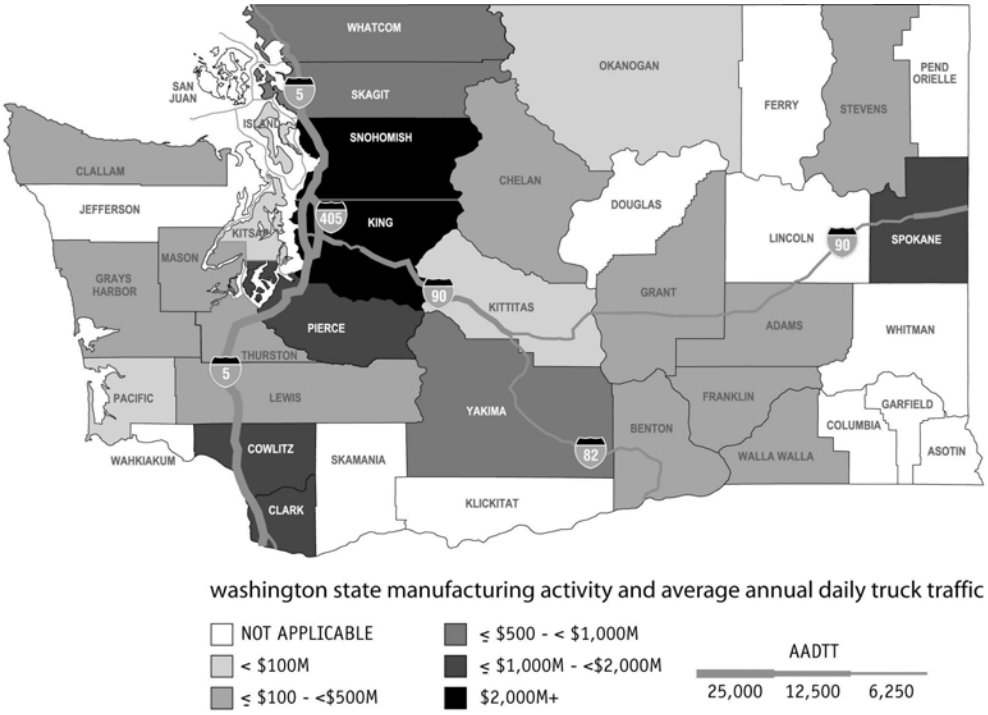
Map developed by Stephen Riddle, Washington State Department of Transportation Graphics Division. Original source: Washington State Department of Transportation Aviation Division. *Aviation System Plan - Forecast and Economic Analysis Study.* (2001).

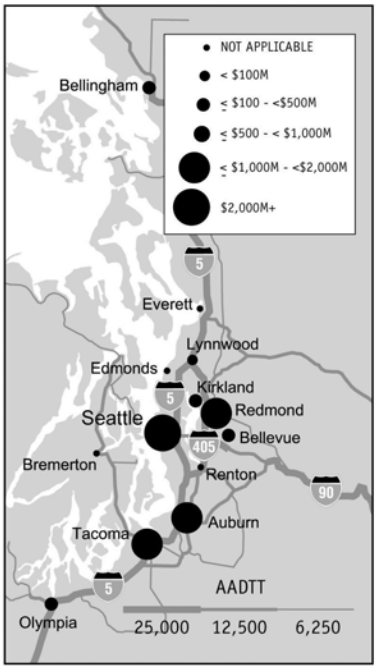
Appendix G- Map: Washington State Agriculture Production by County, 2002



Washington State Department of Agriculture. *Washington State Agriculture Production by County*. AGR PUB 120-126 (N/12/04).

Appendix H- Map: Manufacturing Activity and Average Daily Truck Traffic in Washington State

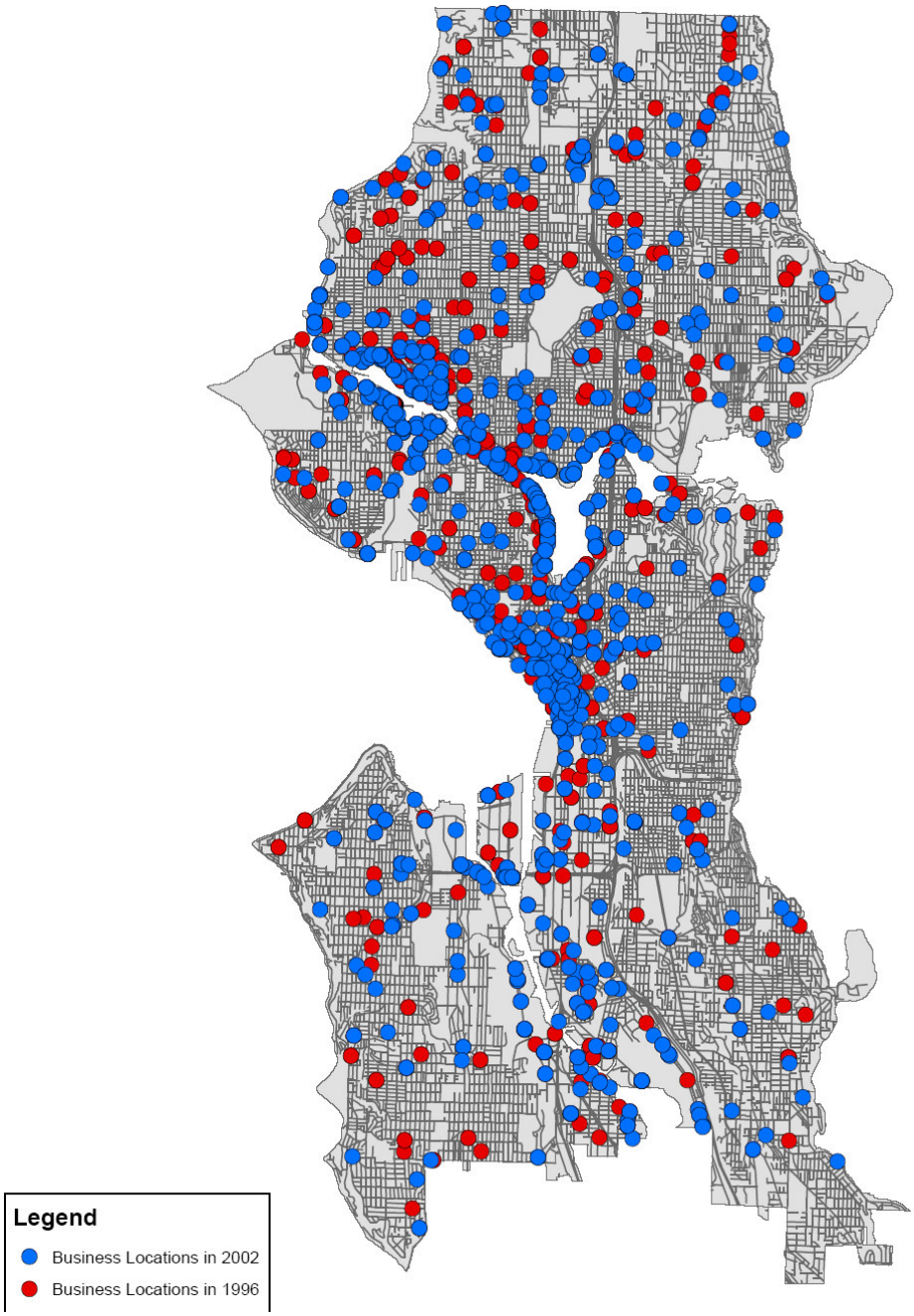




puget sound manufacturing activity

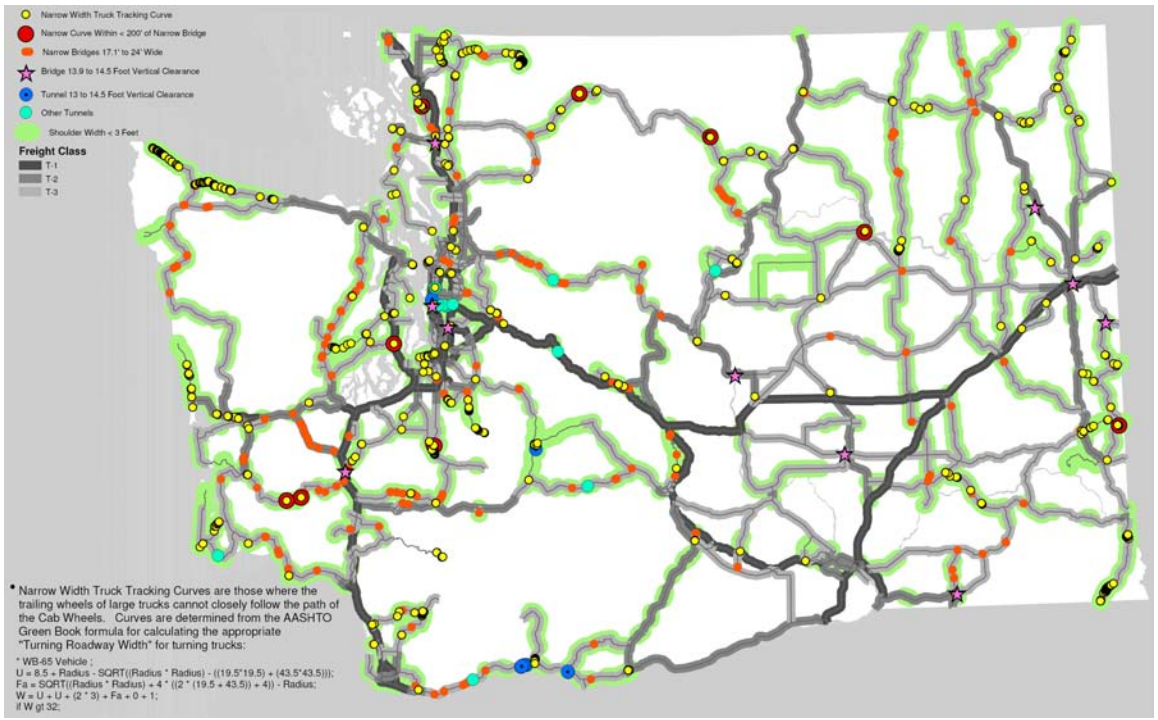
Map developed by Stephen Riddle, Washington State Department of Transportation Graphics Division.
Original source:

Appendix I- Map: Marine Specific and Marine Related Business Locations Seattle, 1996 and 2002



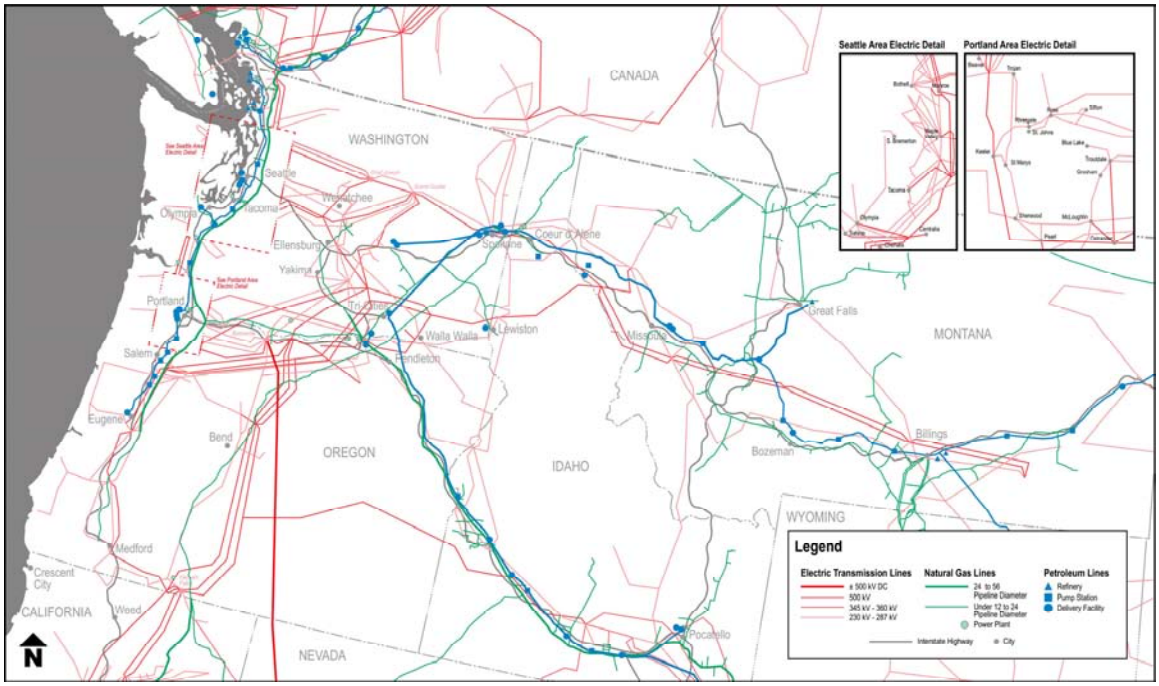
Sommers, Paul and Derik Andreoli, University of Washington. *Seattle's Maritime Cluster: Characteristics, Trends and Policy Issues*. (April 28, 2004). Prepared for the Seattle Office of Economic Development. Map source: Economic Security, 1996 and 2002.

Appendix J- Map: Highway Features That May Impede Truck Movement



Washington State Department of Transportation, Strategic Analysis & Program Development. Al-Memar, Faris. (September 28, 2004).

Appendix K- Map: Pacific Northwest Energy Corridors

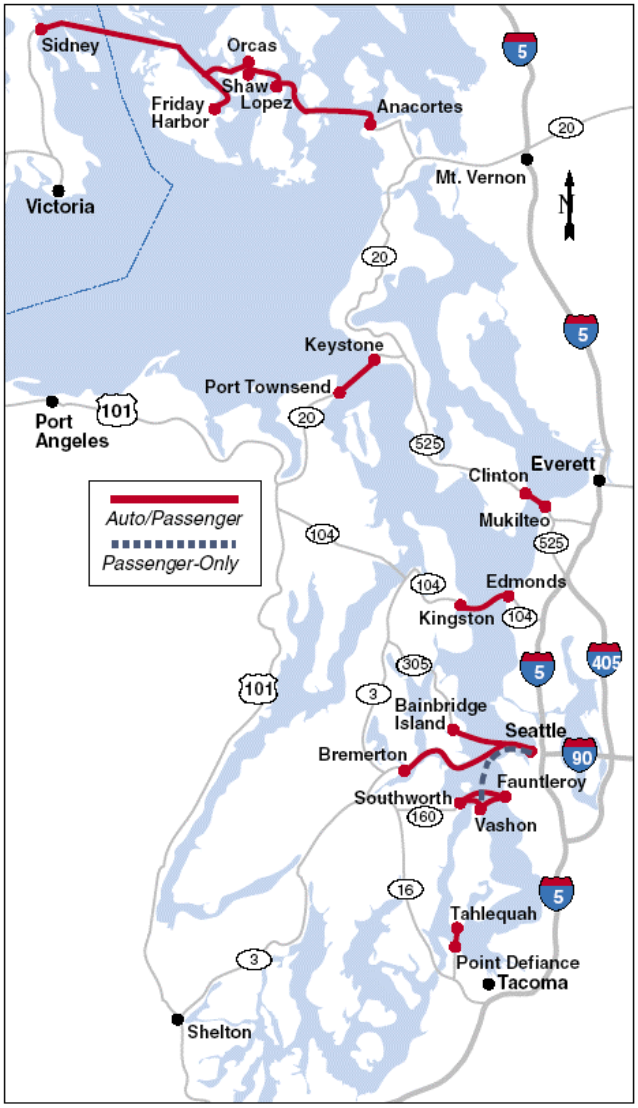


Appendix L- Map: Western U.S. Petroleum Pipelines

Appendix M- Washington State Ferries and Freight

Due to physical, tidal and schedule constraints, Washington State Ferries (WSF) must closely manage its freight traffic. Trucks with high gross vehicle weight, wide loads, low ground clearance or high loads must be evaluated before being allowed to sail in order to prevent damage to the truck itself, the vessel or the terminal. Trucks that exceed weight (80,000 lbs) width or clearance limits must have prior approval from WSF to travel aboard the Ferries.[171]

Within the WSF fleet, vessel clearances range from just over 13 feet to 16 feet. Therefore, ferry system has determined that 15' 6" is the maximum height allowable. Because their interior heights range from 13'3" to 13'6", the Steel Electric class ferries; the Illahee, Klickitat, Nisqually and the Quinalt, pose the most challenges for truck traffic. In addition, terminals such as Vashon, Port Townsend, Keystone and Friday Harbor are subject to tide conditions that further restrict the space making it difficult for trucks with low ground clearance or taller loads to get on and off the ferries.



Washington State Ferries Route Map

WSF has identified major freight routes to be the Anacortes-San Juan domestic run as well as the Edmonds-Kingston and Mukilteo-Clinton routes.

In addition, the Seattle-Bainbridge route experiences a high percentage of truck traffic in the early mornings, Monday through Friday. On a sample day in January 2003, oversized vehicles were nearly 80 percent of the 5:30 am sailing traffic (truck traffic is normally less than 20 percent of all ferry traffic). As with Edmonds/Kingston and

[171] Washington State Department of Transportation. *Washington State Ferries: Trucks, Modulars or Oversized Vehicles.* Retrieved as of November 2004 from: < http://www.wsdot.wa.gov/ferries/info_desk/faq/index.cfm?faq_id=33>.

Washington State Ferries Traffic Statistics for Oversize Vehicles, 2003				
Route	Oversize Vehicles (20' +)	Route % of Total Oversize Vehicles	Total Vehicles on Route	Oversize % of Total Vehicles
Total	317,291	100.0%	10,819,196	2.93%
Seattle- Bremerton	6,274	1.98%	678,977	0.92%
Seattle- Bainbridge	**38,499**	**12.13%**	**2,122,441**	**1.81%**
Fauntleroy- Vashon	29,322	9.24%	1,165,284	2.52%
Fauntleroy- Southworth	3,449	1.09%	540,139	0.64%
Southworth- Vashon	7,064	2.23%	136,566	5.17%
Tahlequah- Pt. Defiance	14,420	4.54%	417,364	3.46%
Edmonds- Kingston	**69,865**	**22.02%**	**2,306,553**	**3.03%**
Mukilteo- Clinton	**64,323**	**20.27%**	**2,180,524**	**2.95%**
Pt. Townsend- Keystone	23,734	7.48%	371,570	6.39%
Anacortes- Lopez	7,626	2.40%	141,666	5.38%
Anacortes- Shaw	718	0.23%	14,656	4.90%
Anacortes- Orcas	19,180	6.04%	276,728	6.93%
Anacortes- Friday Harbor	24,878	7.84%	314,014	7.92%
Interisland	6,884	2.17%	105,308	6.54%
Anacortes- San Juans Total	**59,286**	**18.69%**	**852,372**	**6.96%**
Anacortes- Sidney BC	825	0.26%	39,806	2.07%
Interisland- Sidney	230	0.07%	7,600	3.03%

Washington State Department of Transportation, Washington State Ferries Tariff Technical Committee. *Tariff Review 2004- 05 Oversize Traffic. Discussion Draft*. (August 2004).

Mukilteo/Clinton routes, trucks travel west in the morning to deliver to island communities and return to the mainland before the busy afternoon commute.

The highest percentage of oversized vehicle travel happens between Anacortes and the San Juan Islands.[172] This traffic has to compete with tourism activity in the summertime. To accommodate the high demand, WSF utilizes a reservation system for commercial vehicles that travel regularly (at least twice a week), throughout the sailing season. Recognizing that deliveries are vital to the way of life in the islands, WSF allocates most of its available tall space in the early morning runs to the islands and also the return trips back to Anacortes. Demand is highest on those trips and supply is relatively fixed. On occasion, some companies are forced to utilize a later sailing or to arrive earlier at the terminal in hopes of securing space allocated for first-come, first-serve or from a cancellation or no-show.

[172] Washington State Department of Transportation, Washington State Ferries. *Washington State Ferries Traffic Statistics Rider Segment Report January 01, 2003 thru December 31, 2003*. Retrieved as of November 2004 from: <http://www.wsdot.wa.gov/ferries/traffic_stats/annualpdf/2003.pdf>

Appendix N- Washington State Railroads

There are twenty railroad companies in the State (nineteen private and one publicly owned) that operate 3,198 route miles of track. This is 93 percent of the total rail track within the State. WSDOT owns the remaining 7 percent or approximately 214 miles of track (this figure does not include the anticipated acquisition of the Palouse River & Coulee City's 108-mile "CW" line from Cheney to Coulee City in the 2005-07 biennium). Short line rail companies operate approximately 1051 miles of track, one-third of the total track in the State.[173]

Railroads in Washington State

Railroad	Route miles in Washington	Type of Freight
Ballard Terminal	3	Cement, frozen seafood
Camas Prairie	69	Grain, forest products
Cascade and Columbia River	131	Forest products, minerals, perishables
Columbia and Cowlitz	8	Forest products
Columbia Basin	84	Perishables, frozen potatoes, grain, agricultural fertilizers
Lewis and Clark	34	Plastic pellets, sheet rock
Meeker Southern	5	Forest products, pipe, coil steel, wax
Mount Vernon Terminal	3	Fertilizers, recycled oil
Palouse River and Coulee City - Privately-owned	108	Grain, fertilizers, forest products, perishables
Palouse River and Coulee City - State-owned right of way	188	Grain, fertilizers, forest products, perishables
Palouse River and Coulee City/Blue Mountain - owned by Port of Columbia	39	Grain, fertilizers, forest products, perishables
Palouse River and Coulee City/Blue Mountain - UP-owned track Wallula - Walla Walla - OR line	35	Grain, fertilizers, forest products, perishables
Pend Oreille Valley	61	Forest products, minerals
Puget Sound and Pacific	93	Forest Products, grain, military shipments, urban waste
Royal Slope -State-owned right of way	26	(inactive) perishables, dairy feed & products
Tacoma Rail (Port operations)	11	Steamship containers
Tacoma Rail Mountain Division	124	Forest Products, rock, airplane components
Toppenish Simcoe and Western	21	Forest products, agricultural fertilizers
Tri-Cities and Olympia	67	Perishables, vegetable oil, minerals, recycled glass, forest products, aluminium ingots
Western rail Switching (Geiger Spur)	5	Metal products
Yakima Valley Transportation	11	(inactive) forest products, perishables
Total Miles of Rail not Owned by Class I railroad	**1126**	
BNSF	1723	Class 1 railroad, freight and passenger
UP	349	Class 1 railroad, freight only in WA
Montana Rail Link (use of BNSF track rights into Spokane)	0	Class 1 railroad, freight only in WA
Total Miles of Rail Lines in Washington	**3198**	

[173] Information quoted from the Washington Transportation Plan Update: Transportation System Preservation White Paper as of December 13, 2004 (pages 69-70).

Appendix O- Tribal Freight Needs[174]

More than half of the tribes do not have ports, rail service, or ferry terminals available; nor do they have any multi-modal exchange facilities. This is an area that deserves more attention, perhaps with a focus on economic development. Future needs indicate plans for development in this area.

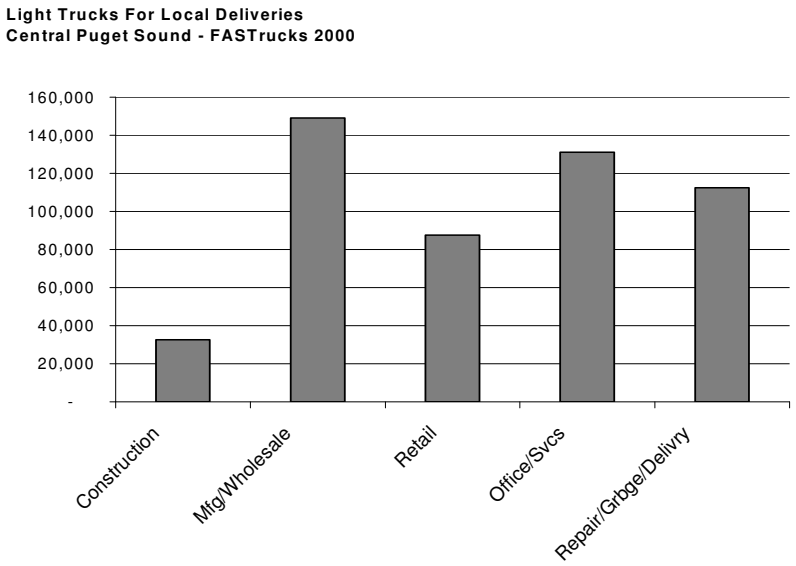
Ten tribes have rail identified on the reservations. Six have ports. Of those, one needs replacement, three are in poor condition, and two are in good condition. Future needs include the following: Five will need rail freight, six anticipate marine ports and seven will need airport facilities.

Regarding safety, seventeen tribes do not receive sufficient notification of hazardous material shipments through their reservations.

Freight Inventory Management – the Northwest Region Bureau of Indian Affairs (Portland) is currently designing a "roaming portable scale" program. With that effort it will be possible to develop a fundamental database inventory of freight mobility. Attention to trucking as a primary freight mover was not addressed in this survey, but should be considered in future efforts.

Appendix P- Light Trucks for Local Delivery

More than 65 percent of all local delivery light-truck trips in Central Puget Sound are part of the distribution system, supplying retailers, restaurants and offices, and provide waste removal and other services. Other trips get contractors' supplies to the job sites, support regional manufacturing, and pick up and deliver to wholesalers.



[174] Tribal Transportation Planning Organization, Washington State Department of Transportation, and GO-ON ~ Camas Institute. *Washington State Tribal Transportation Survey.* (November, 2004). Prepared for the Annual Tribal/ State Transportation Conference: October 12, 14 and 14, 2004. The need for better tribal information to be included in the statewide transportation plan prompted WSDOT and Tribal Transportation Planning Organization (TTPO) to conduct this survey. The response rate was excellent, 24 of the 29 Tribes participated (83%), and efforts continue to gain full tribal input. The Camas Institute, chartered by the Kalispel Tribe, assisted throughout the process.

Appendix Q- WSDOT Freight Office Research Methodology

From February to October 2004, the freight office completed over 150 one-on-one interviews with high-volume shippers and carriers across the state to identify their requirements of the freight system. Key partners such as WSDOT commissioners and region administrators, regional and local elected officials, MPO/RTC/RTPOs, FMSIB, the ports, chambers of commerce & industry associations, EDCs and Oregon transportation agencies also participated in focus groups.

To confirm initial findings, WSDOT commissioned Hebert Research, Inc. to conduct a statewide phone survey. Hebert Research interviewed 347 businesses during the month of May 2004. Firms included represented high-volume business users of the Washington State freight transportation system. A range of different industries were selected, all of which are directly or indirectly involved in making or receiving regular shipments of freight using the state transportation system. Companies were selected from the following industry groupings:

- Manufacturing Firms (with at least 20 employees)
- Common Carrier Trucking Companies (with at least 10 employees)
- Distribution Centers (large retail distribution points supplying regional chains of stores)
- Wheat Growers (Southeast Washington wheat farms with at least $1 million in annual revenue)
- Grain Associations and Grain Warehouses in SE Washington
- Columbia Basin/North Central Washington Agriculture (fruit/produce growers and processors)

The geographic scope of the study included the following major regions:

- Central Puget Sound Metro Area (King and Pierce Counties; in the case of manufacturing firms, it is split into Eastside King and South Sound sub-regions)
- Vancouver/Southwest Washington Metro Area (Portland MSA incl. Vancouver WA)
- Northwest Washington Metro Area (Whatcom County)
- Spokane Metro Area (Spokane County)
- Columbia Basin/North Central Washington (growers and processors located throughout the Columbia Basin and North Central WA area)
- Southeast Washington (large wheat farms and grain associations in counties south of Spokane and east of the Central Washington/Columbia Basin farming area)

The decision to include Portland firms in the Southwest Washington sample cell was based on the interconnectedness of the Portland and Vancouver/Southwest Washington economies; the Census Bureau considers them one metro area (Portland MSA).

Companies were randomly selected both from among industry lists provided by the Washington State Department of Transportation and from available business databases maintained by InfoUSA. Emphasis was placed on obtaining representative samples of the high-volume freight users. Quotas were established by industry cluster in order to obtain sufficient minimum sample cell sizes for analysis purposes. Within each cell, the interviews were conducted randomly and each individual sample is thus representative of the larger grouping of qualified businesses specified earlier. The response rate, which represents the proportion of individuals who agreed to participate in the research, was 82.4 percent. The overall incidence rate, which represents the proportion of respondents who qualified to participate in the research, was 86.8 percent.

Statistical weighting was used for overall reporting of data. In cases where clusters are grouped together in the reporting of data, a statistically weighted data set was used, which was adjusted so that the influence of each industry cluster was proportionate to its approximate share of *freight volume*. This was accomplished by taking into account both the size of the universe of firms (i.e. total number of qualifying businesses in the databases) for each industry/geographic cluster as well as the average number of truck or container loads shipped for each cluster (based on survey data). Statistical procedures produced a 0.95 confidence level.

SUPPLY CHAIN REQUIREMENTS AND PERFORMANCE
WSDOT Freight Survey of High-Volume Shippers and Carriers, 2004

Industry Satisfaction Ratings: Current Freight System Performance

Satisfaction Ratings of Current Performance with the Most Important Supply Chain Requirement	Not Satisfied (0-3 rating)	Moderately Satisfied (4-7 rating)	Satisfied (8-10 rating)	Mean
Eastern Washington				
Spokane Manufact.	0.0%	20.8%	79.2%	**8.33**
SE WA wheat growers	7.1%	42.9%	50.0%	**7.43**
Columbia Basin/N. Central WA Ag.	3.4%	31.0%	65.5%	**7.72**
Spokane Trucking	7.7%	30.8%	61.5%	**7.38**
Grain associations/Warehouses	10.0%	55.0%	35.0%	**6.90**
Vancouver: SW Washington				
Vancouver: SW WA Manuf.	3.3%	25.0%	71.7%	**8.23**
Vancouver: SW WA Trucking	3.6%	42.9%	53.6%	**7.43**
Puget Sound/NW Washington				
Eastside/Central Puget Sound Manuf.	0.0%	37.5%	62.5%	**7.73**
South Puget Sound Manuf.	5.0%	30.0%	65.0%	**7.58**
Puget Sound Trucking	10.7%	39.3%	50.0%	**6.89**
Northwest Washington WA Manufacturing	3.2%	25.8%	71.0%	**7.94**
Distribution Centers				
Distribution Centers	0.0%	25.0%	75.0%	**7.50**

Statewide Freight System: Industry's Single Most Important Requirement

Industry Cluster	Cost per move	On time delivery w/in a specified time window	Predict-able travel time	Average speed of the move being at a certain level	Flex-ibility	All weather freight system accessible all yr round	Capacity in refrig-erated trucks all yr round	Capacity in refriger-ated trucks during peak shipping season	General rail capacity	Adequate storage at the right location
Eastern Washington										
Spokane Manufact.	25.9%	55.6%	0.0%	0.0%	3.7%	7.4%	0.0%	0.0%	0.0%	0.0%
SE WA wheat growers	53.3%	6.7%	6.7%	0.0%	0.0%	0.0%	0.0%	6.7%	0.0%	20.0%
Columbia Basin/ N. Central WA Ag.	16.7%	13.3%	6.7%	3.3%	6.7%	0.0%	26.7%	23.3%	0.0%	0.0%
Spokane Trucking	35.7%	50.0%	0.0%	0.0%	0.0%	14.3%	0.0%	0.0%	0.0%	0.0%
Grain associations/ Warehouses	50.0%	25.0%	5.0%	0.0%	5.0%	10.0%	0.0%	0.0%	0.0%	5.0%
Vancouver: SW Washington										
Vancouver: SW WA Manuf.	30.0%	51.7%	6.7%	3.3%	3.3%	1.7%	0.0%	1.7%	1.7%	0.0%
Vancouver: SW WA Trucking	30.0%	36.7%	16.7%	3.3%	3.3%	3.3%	0.0%	0.0%	0.0%	0.0%
Puget Sound/NW Washington										
Eastside/Central Puget Sound Manuf.	17.1%	56.1%	19.5%	0.0%	0.0%	2.4%	0.0%	0.0%	0.0%	2.4%
South Puget Sound Manuf.	31.0%	52.4%	7.1%	0.0%	0.0%	2.4%	0.0%	0.0%	0.0%	4.8%
Puget Sound Trucking	32.1%	46.4%	17.9%	3.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Northwest WA Manufacturing	31.3%	50.0%	3.1%	0.0%	6.3%	0.0%	6.3%	0.0%	0.0%	0.0%
Distribution Centers										
Distribution Centers	37.5%	50.0%	12.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Washington Industry Definitions of 'ON-TIME'

Every industry sets on-time delivery windows according to their business needs. Performance in on-time delivery relates to the way 'on time' is defined in shipping contracts and customer expectations. Firms such as manufacturers who have wider delivery windows are able to keep shipments 'in time' easier than common carrier trucking firms. A company may be able to satisfy customers with on-time deliveries in a congested area like Central Puget Sound if the standards are loose enough to allow flexibility in shipping times, even though cost increases may negatively affect the bottom line.

Washington Industry Definitions of 'ON-TIME'

What is Considered "on-time"?	Less than 30 min	30-59 minutes	1 - 1.9 hours	2 - 2.9 hours	3 - 7.9 hours	8 - 11.9 hours	12 - 23.9 hours	24 hours	More than 24 hours	Median Hours
Eastern Washington										
Spokane manufact-urers	4.0%	0.0%	16.0%	4.0%	16.0%	0.0%	8.0%	44.0%	8.0%	**24.0**
SE WA wheat growers	9.1%	0.0%	18.2%	18.2%	18.2%	0.0%	18.2%	9.1%	9.1%	**4.0**
Columbia Basin/N. Central WA Ag.	12.5%	16.7%	16.7%	4.2%	4.2%	4.2%	0.0%	29.2%	12.5%	**2.5**
Spokane Trucking	9.1%	0.0%	27.3%	9.1%	9.1%	0.0%	9.1%	27.3%	9.1%	**4.0**
Grain associations/Warehouses	5.9%	0.0%	5.9%	17.6%	5.9%	0.00%	5.9%	35.3%	23.5%	**24.0**
Vancouver: SW Washington										
Vancouver: SW WA Manufacturing	1.9%	1.9%	24.5%	3.8%	7.5%	0.0%	1.9%	54.7%	3.8%	**24.0**
Vancouver: SW WA Trucking	31.0%	13.8%	27.6%	3.4%	0.0%	6.9%	0.0%	17.2%	0.0%	**1.0**
Puget Sound/NW Washington										
Eastside/Central Puget Sound Manufacturing	12.5%	3.1%	12.5%	6.3%	9.4%	0.0%	3.1%	46.9%	6.3%	**24.0**
South Puget Sound Manufacturing	11.8%	2.9%	14.7%	5.9%	0.0%	5.9%	0.0%	52.9%	5.9%	**24.0**
Puget Sound Trucking	23.1%	15.4%	26.9%	3.8%	3.8%	3.8%	0.0%	19.2%	3.8%	**1.0**
Northwest WA Manufacturing	3.6%	0.0%	17.9%	10.7%	0.0%	0.0%	0.0%	57.1%	10.7%	**24.0**
Distribution Centers										
Distribution Centers	0.0%	25.0%	62.5%	12.5%	0.0%	0.0%	0.0%	0.0%	0.0%	**1.0**

Percent of Time Industry Incurs Additional Expense Due to Freight System

Percent of Time Spend Incurring Additional Expenses to Recover from Shipping Problems	0%	1-4%	5-9%	10-19%	20-49%	50-100%	*Mean*
Eastern Washington							
Spokane Manufact.	36.4%	22.7%	13.6%	18.2%	4.5%	4.5%	***7.23%***
SE WA wheat growers	33.3%	0.0%	0.0%	16.7%	50.0%	0.0%	***15.00%***
Columbia Basin/N. Central WA Ag.	30.4%	13.0%	8.7%	21.7%	8.7%	17.4%	***17.22%***
Spokane Trucking	0.0%	20.0%	20.0%	30.0%	30.0%	0.0%	***12.20%***
Grain associations/Warehouses	16.7%	11.1%	0.0%	44.4%	27.8%	0.0%	***12.50%***
Vancouver: SW Washington							
Vancouver: SW WA Manuf.	40.4%	23.4%	14.9%	10.6%	8.5%	2.1%	***5.51%***
Vancouver: SW WA Trucking	11.1%	33.3%	11.1%	22.2%	11.1%	11.1%	***12.11%***
Puget Sound/NW Washington							
Eastside/Central Puget Sound Manuf.	16.1%	32.3%	25.8%	12.9%	9.7%	3.2%	***8.29%***
South Puget Sound Manuf.	20.0%	36.7%	3.3%	20.0%	16.7%	3.3%	***8.77%***
Puget Sound Trucking	4.8%	23.8%	9.5%	19.0%	23.8%	19.0%	***23.90%***
NW Washington Manufacturing	23.8%	33.3%	14.3%	4.8%	14.3%	9.5%	***10.43%***
Distribution Centers							
Distribution Centers	25.0%	0.0%	25.0%	0.0%	25.0%	25.0%	***26.25%***

Methods of Product Transportation to Final Market

Method of Transport for Products getting to the Final Market	Truck to customer or destination	Truck to rail	Truck to barge or ship	Truck to air	Truck to truck	Rail to truck	Other
Eastern Washington							
Spokane Manufact.	74.1%	0.0%	0.0%	7.4%	11.1%	0.0%	7.4%
SE WA wheat growers	33.3%	20.0%	40.0%	0.0%	0.0%	0.0%	6.7%
Columbia Basin/N. Central WA Ag.	86.7%	0.0%	6.7%	3.3%	3.3%	0.0%	0.0%
Spokane Trucking	78.6%	0.0%	7.1%	0.0%	14.3%	0.0%	0.0%
Grain associations/Warehouses	25.0%	55.0%	0.0%	0.0%	5.0%	5.0%	10.0%
Vancouver: SW Washington							
Vancouver: SW Washington Manuf.	96.7%	0.0%	0.0%	1.7%	0.0%	0.0%	1.7%
Puget Sound/NW Washington							
Eastside/Central Puget Sound Manuf.	78.0%	0.0%	2.4%	4.9%	7.3%	0.0%	7.3%
South Puget Sound Manuf.	83.3%	0.0%	2.4%	4.8%	2.4%	0.0%	7.1%
Northwest WA Manufacturing	84.4%	0.0%	6.3%	3.1%	0.0%	3.1%	0.0%
Distribution Centers/Warehouses							
Distribution Centers	0.0%	0.0%	60.0%	0.0%	0.0%	20.0%	20.0%

Methods of Receiving Inputs/Components/Raw Materials

Receiving Methods for Inputs/Components/Raw materials	Truck	Air	Barge or ship	Rail	Combination of modes	Other
Vancouver: SW Washington						
Vancouver: SW Washington Manuf.	93.3%	1.7%	0.0%	1.7%	3.3%	0.0%
Puget Sound/NW Washington						
Eastside/Central Puget Sound Manuf.	73.2%	0.0%	4.9%	4.9%	14.6%	2.4%
South Puget Sound Manuf.	88.1%	0.0%	4.8%	2.4%	4.8%	0.0%
Northwest WA Manufacturing	90.6%	0.0%	3.1%	0.0%	0.0%	3.1%

Glossary of Terms (Under Construction)

AASHTO – American Association of State Highway & Transportation Officials
BAX-
BC – British Columbia
BCS – Bellingham Cold Storage
BNSF – Burlington Northern Santa Fe
DC – Distribution Center
DPS – Dispatch Planning System
EDC – Economic Development Council
FAA – Federal Aviation Administration
FAST - Freight Action Strategy
FMSIB – Freight Mobility Strategic Investment Board
FSA – Food Services of America
GDP – Gross Domestic Product
GPS – Global Positioning System
HACCP – Hazard Area Critical Control Points
HOV – High Occupancy Vehicle
IMTC – International Mobility & Trade Corridor
LAX – Los Angeles International Airport
LTL – Less Than Truckload
MPO – Metropolitan Planning Organization
NAFTA – North American Free Trade Agreement
NMFS – National Marine Fisheries Service
NOAA – National Oceanic and Atmospheric Administration
N-S – North, South
ODOT – Oregon Department of Transportation
OPA 90 – Oil Pollution Act of 1990
PAS – Preload Assist System
PDX – Portland International Airport
PHC – Providence Health Care
Portland MSA -
POS – Point of Sale
RTC – Regional Transportation Council
RTPO – Regional Transportation Planning Organization
SFO – San Francisco International Airport
SFTA – Strategic Freight Transportation Analysis
SODO District – Business area in Seattle, WA
SR – State Route
TEU – Twenty foot Equivalent Unit
TOTE – Totem Ocean Trailer Express
TSA – Transportation Security Administration
UP – Union Pacific
UPS – United Parcel Service
USDOT – United States Department of Transportation
WFI – Washington Food Industry

WIM – Weigh in Motion
WPPA – Washington Public Ports Association
WSDOT – Washington State Department of Transportation
WSF – Washington State Ferries
WSU – Washington State University
YVR – Vancouver International Airport

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