Economic Effects by Industry

The Regional Economy Is Dependent on Safe, Reliable, and Cost-Effective Transportation

Transportation underpins the $350 billion economy of Oregon and Washington and the region's 5.5 million jobs.[14] Figure 15 shows the contribution of each major sector to the gross regional product (GRP) of the Oregon-Washington economy. Figure 16 shows the distribution of jobs by sector.

Businesses and employees in all sectors of the Oregon-Washington economy depend on safe, reliable, and cost-effective transportation. Figure 15 also shows the percentage of each sector's contribution to the GRP that is spent on transportation to support that sector. The expenditures range from a high of 7.7 percent in the agricultural sector, which moves heavy, high-bulk products, to a low of 0.6 percent in the finance-insurance-and-real-estate (FIRE) sector, which moves light, high-value products. Compared to other nations, these expenditures are low, reflecting the United States' immense and successful investment in high-quality and cost-efficient transportation systems.

However, the Oregon-Washington economy is more dependent on transportation and spends more proportionally on transportation than the nation as whole. Overall, the Oregon-Washington economy spends 3.35 percent of its GRP on transportation, 6.7 percent more than the national average of 3.14 percent.[15] It is more dependent because five transportation-intensive sectors—agriculture, construction, transportation and utilities, wholesale and retail trade, and manufacturing—make up 54 percent of the Oregon-Washington economy, but only 49 percent of the national economy.

Transportation congestion and delay reduce the productivity and profitability of businesses in the transportation-intensive sectors. These businesses pass along some of the congestion and delay costs to businesses in the service, FIRE, and government sectors that depend on the transportation-intensive sectors. Congestion and delay costs have a multiplier effect that is felt throughout the region's economy. When the transportation-intensive sectors do well, the overall Oregon-Washington economy does well; when productivity in the transportation-intensive sectors drops, so does the health of the region's overall economy.

[14] Bureau of Economic Analysis.

[15] Bureau of Economic Analysis. Gross domestic product is reported in chained 1996 dollars. The percentage transportation expenditures by sector are based on the U.S. Transportation Satellite Accounts for 1996.

Figure 15. Oregon and Washington Gross Regional Product by Industry Sector

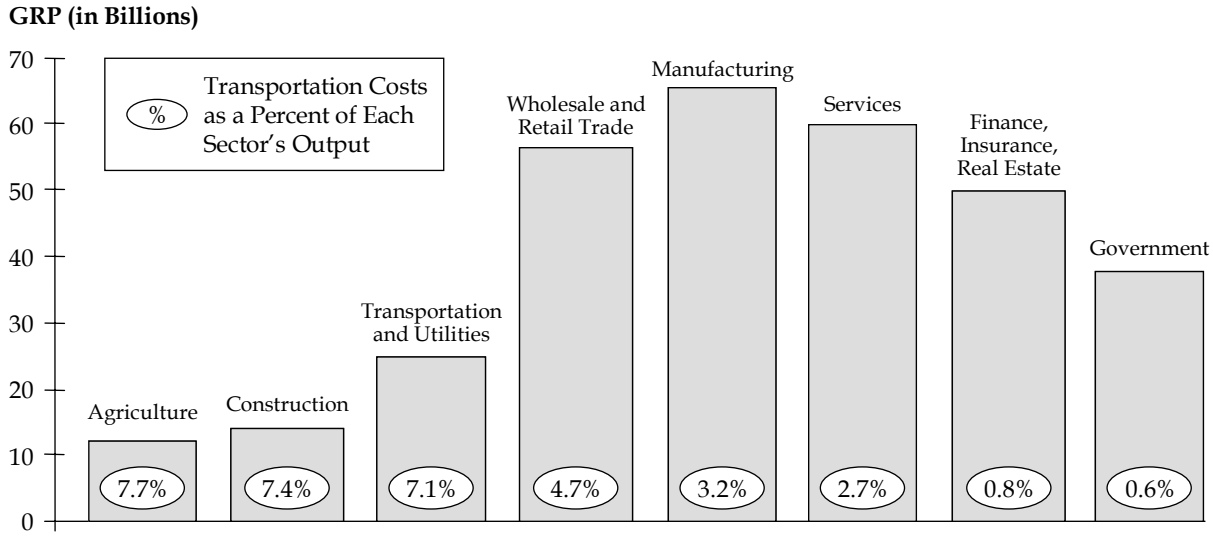
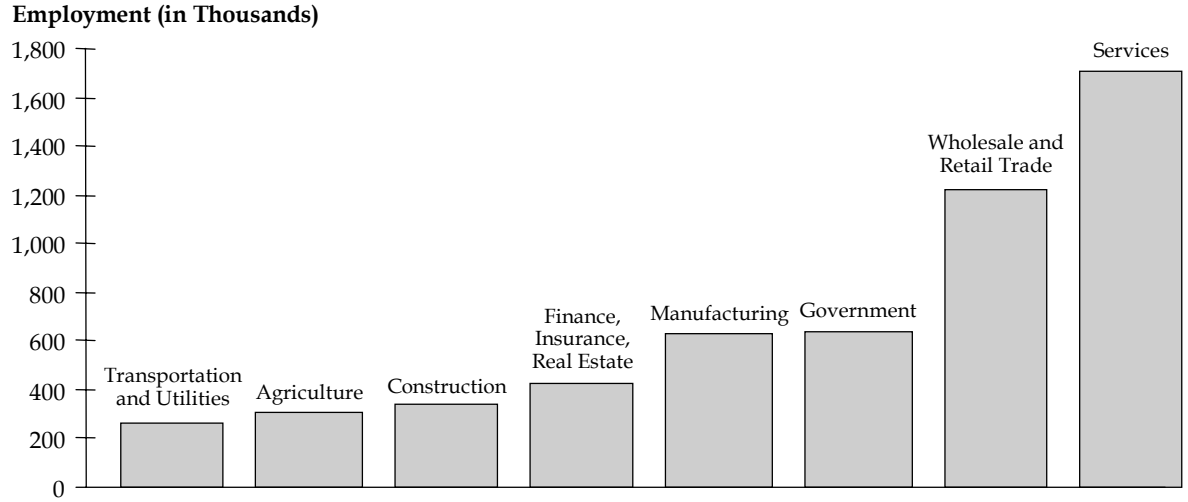


Figure 16. Oregon and Washington Employment by Industry Sector



Within the transportation-intensive sectors, five specific industries are especially sensitive to the Portland-Vancouver highway and rail choke points. These industries are:

- Lumber, wood, and paper products;
- Transportation equipment manufacturing and steel;
- Farm and food products;
- High-technology (electronics and scientific instruments); and
- Distribution and wholesale trade.

These freight-intensive industries account for 30 percent of the Oregon-Washington GRP and 20 percent of the states' employment.[16] Table 2 provides a breakout of contribution of these industries to the GRP. Table 3 provides a breakout of employment by industry.[17]

Table 2. Contribution to Oregon and Washington Gross Regional Product of Five Freight-Intensive Industries

GRP by Industry (in $ Millions)	1990	2000
Lumber/Wood/Paper	10,623	7,293
Distribution/Wholesale Trade	16,074	28,588
Transportation Equipment/Steel	10,937	9,829
Farm and Food Products	12,549	18,983
High-Tech (Electronics and Scientific Instruments)	2,537	34,332
Total	**52,720**	**99,025**
Total as a Percentage of Oregon and Washington GRP	26%	31%

[16] Bureau of Economic Analysis.

[17] American Electronics Association, *Cyberstates 2002*. The high-technology industry numbers shown in the tables cover the electronics industry and the scientific instruments industry, selected because these sectors correspond to the Standard Transportation Commodity Code industry classifications used in analyzing the movement of goods. The American Electronics Association (AEA) uses a broader definition of high-technology that includes high-tech services such as software development. The AEA's classification shows 225,200 high-tech employees in Oregon and Washington in 2001.

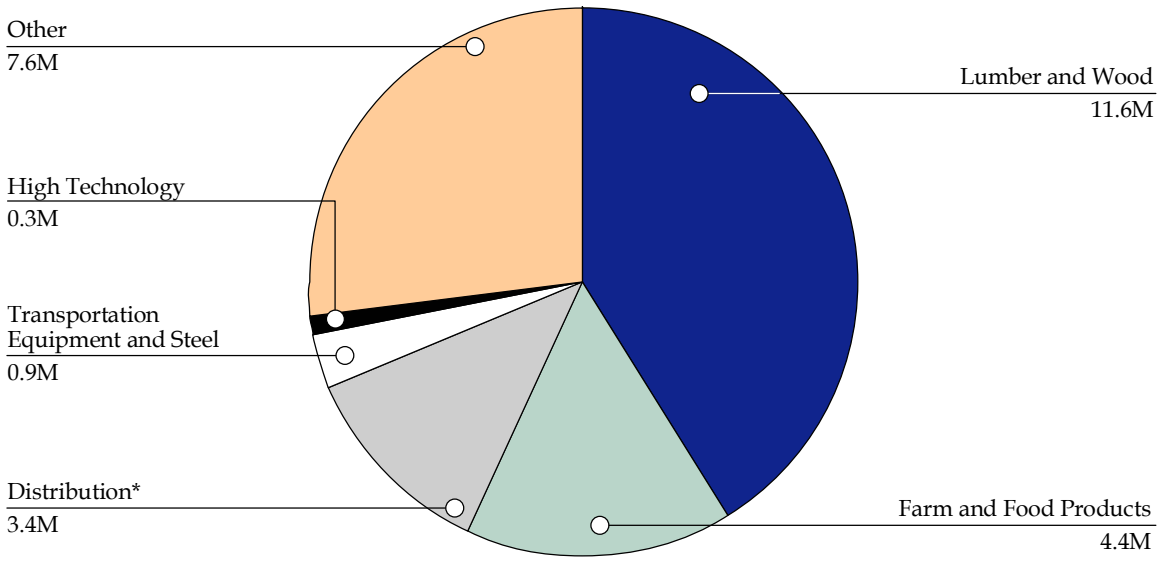
Table 3. Employment in Five Freight-Intensive Industries

Employment by Industry	1990	2000
Lumber/Wood/Paper	143,712	114,331
Distribution/Wholesale Trade	294,668	350,875
Transportation Equipment/Steel	169,254	144,846
Farm and Food Products	208,962	211,655
High-Tech (Electronics and Scientific Instruments)	56,246	85,333
Total	**872,842**	**907,040**
Total as a Percentage of Oregon and Washington GRP	24%	20%

These five industries account for approximately 70 percent of the commodity tonnage crossing the I-5 and I-205/Columbia River bridges by large truck[18] and about 60 percent of the commodity tonnage moving through the Portland-Vancouver rail triangle. Figure 17 shows the distribution of commodity tonnage by industry for the I-5 and I-205/Columbia River bridges. Figure 18 shows the distribution of commodity tonnage by industry for the rail network. (These figures are commodity or net tonnage numbers; they are not gross tonnage numbers, which would include tonnage for truck tractors and trailers or locomotives and cars.)

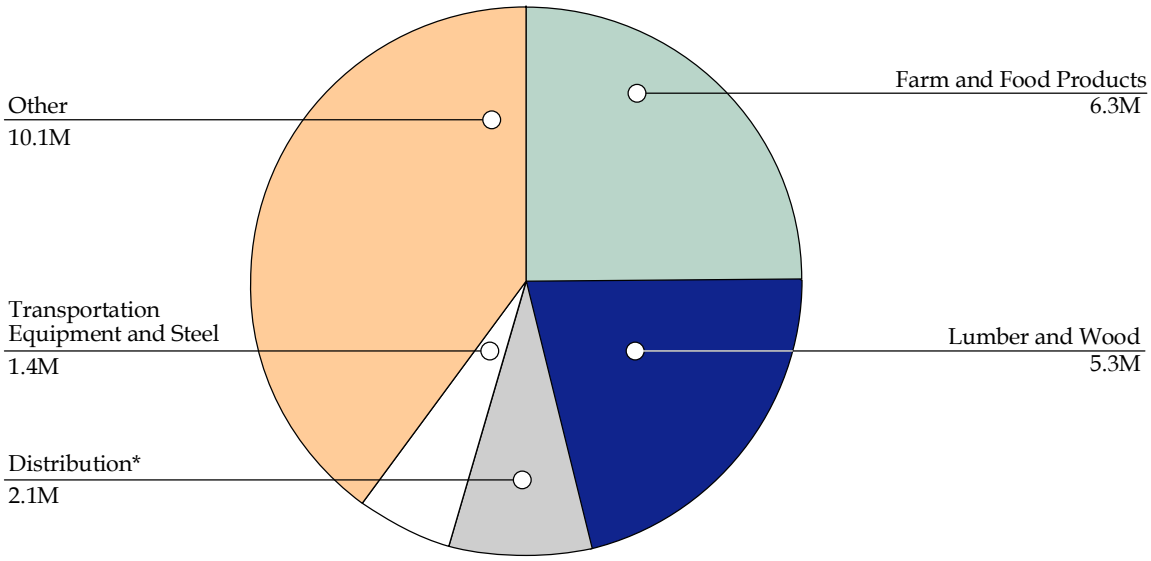
[18]The statistics capture primary and long-haul freight moves (e.g., supplier-to-manufacturer; manufacturer-to-distribution center; and most intermodal moves), but do not capture local distribution-to-retail moves and farm-to-processor moves. The long-haul freight moves are typically made in large over-the-road trucks (e.g., 18-wheel, tractor-semi-trailer trucks or heavy-duty three-axle trucks). The statistics do not capture moves made by smaller trucks and service vehicles. The total of all freight movement by truck will be higher than reported in the figures, but reliable data accounting for all truck moves are not readily available.

Figure 17. Distribution of Freight Tonnage Crossing the I-5 and I-205 /Columbia River Bridges by Industry



* Distribution (or "Miscellaneous Shipments") includes most intermodal shipments.

Figure 18. Distribution of Freight Tonnage Using the Portland-Vancouver Rail Triangle by Industry



* Distribution (or "Miscellaneous Shipments") includes most intermodal shipments.

The five freight-intensive industries represent the Pacific Northwest's:

- Traditional economic strengths—lumber, wood, and paper products; transportation equipment and steel; and farm and food products;

- Key emerging industries that are critical to the region's future growth—high-technology; and

- Goods-moving sectors that supply manufacturers, retailers, and service-sector offices—distribution and warehousing.

These industries place significant demands on the transportation system and are particularly vulnerable to the delays and decreased travel time reliability resulting from roadway and rail congestion in Portland and Vancouver.

The next sections of the report examine each of these five industries, providing an overview of key industry trends, a look at the importance of the Portland-Vancouver choke points to the industry's logistics, and a discussion of the economic effects of the choke points on the industry. Brief case studies of the experience of specific firms are provided for each industry. The industry profiles and case studies were built from interviews with company executives, industry association experts, and regional development economists.

Lumber, Wood, and Paper Products Industry

Standard Industry Classification Codes:	24 and 26
Oregon and Washington Employment (2000):	114,331
Oregon and Washington Value of Production (2000):	$7.3 billion

Industry Trends

Lumber, wood, and paper are traditional pillars of the Pacific Northwest economy. While employment and output in this industry have been declining for years in the region, a shift toward more value-added processing has created new opportunities. This increasing specialization translates to less cost-sensitive export of bulky raw materials and more time-sensitive export of higher-value processed goods. For example, instead of exporting large volumes of logs, more wood is now transformed into high-value items such as structural architectural framings before being shipped to domestic markets or overseas.

Importance of Crossings to Industry

The Pacific Northwest has been a primary source of lumber and wood products for much of the United States market. Lumber and wood products were shipped from the Pacific Northwest to the major United States Midwest and East Coast markets. However, the supplier-market relationship has changed over time. Today, Oregon and Washington continue to be principal suppliers to the large Southern California market, but lumber- and wood-product manufacturers in the South Central states and Ontario now supply the Midwest market, and Southeastern United States and Eastern Canada suppliers serve the East Coast market. This has caused a major reorientation of the industry's shipping patterns—from predominantly west-to-east to predominantly north-to-south today.

Figure 19 presents a western United States picture of rail shipments of lumber, wood, and paper products that move through the Portland-Vancouver rail triangle. The figure shows the counties that ship or receive rail freight moving through the triangle; the darker gray the county, the more tonnage is shipped or received from that county. (Commodities shipped to and from British Columbia are assigned to Whatcom County.) The figure also shows freight-rail tonnage of lumber, wood, and paper products moving on the major rail lines; the wider and redder the bandwidth of the rail line, the greater the commodity tonnage carried on the rail line. (Figure 19 reports net commodities tonnages, not gross tonnages, which would include the weight of the locomotive and railcars.) Oregon and Washington lumber, wood, and paper products moving through the Portland-Vancouver area today is strongly oriented towards the Southern California and Texas markets.

Truck shipments of lumber, wood, and paper products that cross the I-5/Columbia River bridge are even more strongly oriented to the Southern California market. Figure 20 shows West Coast truck shipments of lumber, wood, and paper products that cross the I-5/Columbia River bridge. As in the rail figure, the gray scale indicates the total commodity tonnage shipped and received by county, and the highway bandwidth and color indicate the tonnage of commodities moving by truck along the highways.

Figure 19. Western United States Origins and Destinations for Lumber, Wood, and Paper Products Using the Portland-Vancouver Rail Triangle
With Tonnage of Freight on Rail Lines Used to Access Triangle

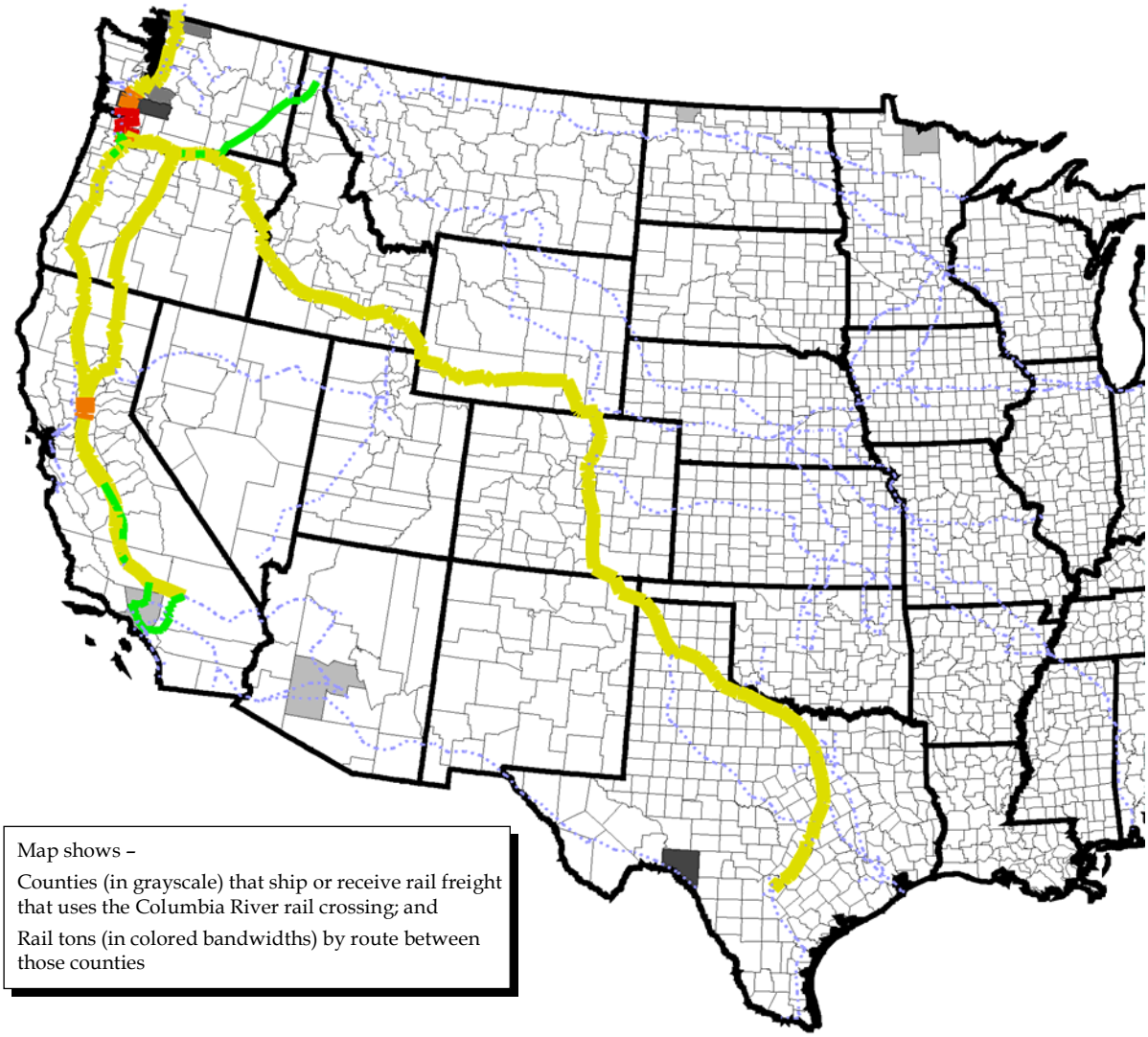


Figure 20. West Coast Origins and Destinations for Lumber, Wood, and Paper Products Crossing the I-5 and I-205 Bridges at Portland-Vancouver
With Tonnage of Freight on Truck Routes Used to Access Bridge

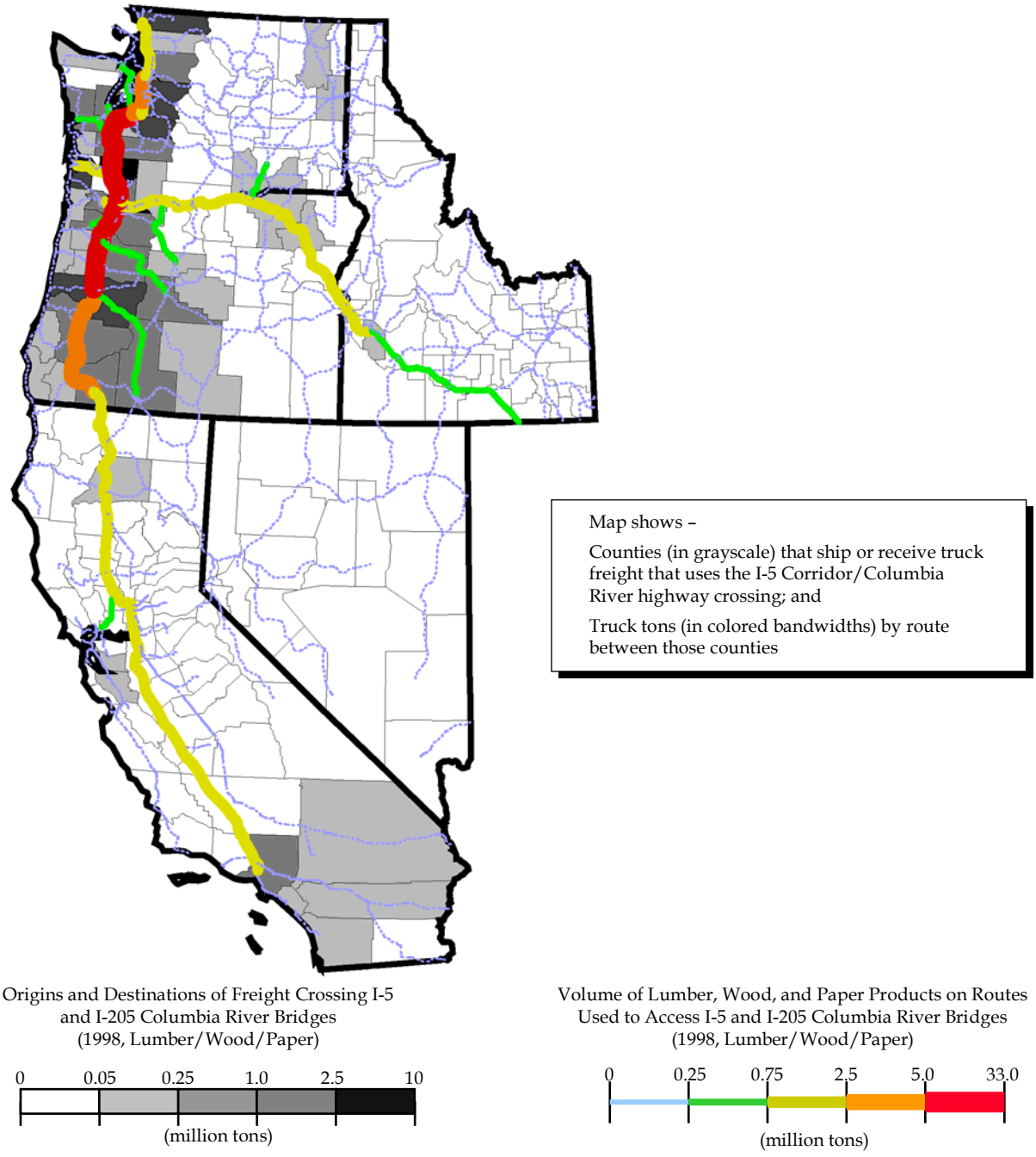


Figure 21 shows more detail of the rail movements of lumber, wood, and paper products through the Portland-Vancouver rail triangle.

Figure 21. Oregon-Washington Origins and Destinations for Lumber, Wood, and Paper Products Using the Portland-Vancouver Rail Triangle
With Tonnage of Freight on Rail Lines Used to Access Triangle

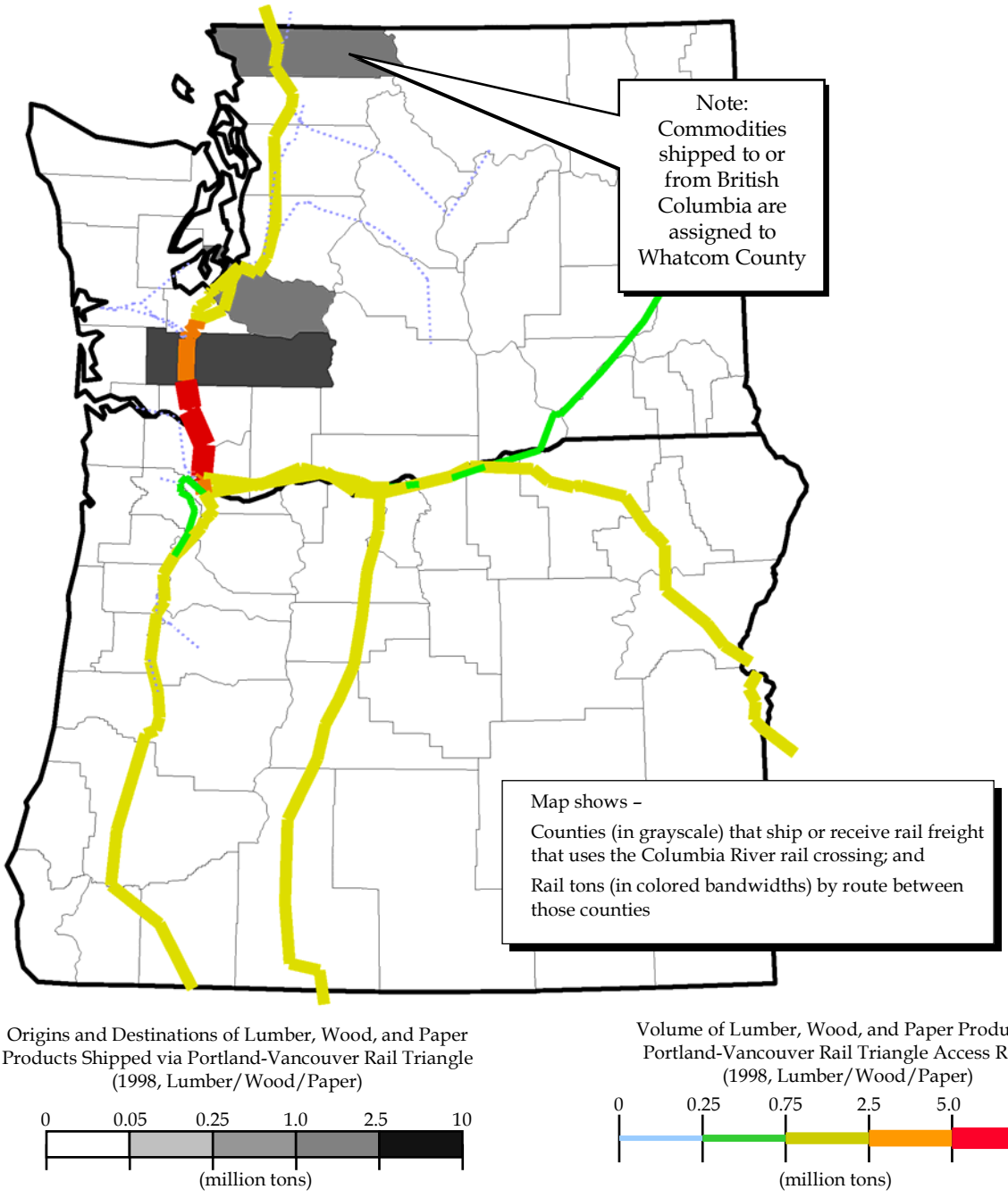


Figure 22 illustrates the pattern of truck movements of lumber, wood, and paper products within Oregon and Washington. It shows that every county in western Oregon and western Washington has a stake in reliable truck movement across the I-5/Columbia River bridge. Again, the figure shows just those truck shipments of lumber, wood, and paper products that cross the I-5/Columbia River bridge, but it includes inter-plant truck moves (described in the case study below) as well as truck moves for export and import. Although North American production accounts for most lumber-related traffic in the region, overseas wood imports are growing. Radiata pine logs from New Zealand arrive at the Port of Portland and then are transported by truck to provide feedstock for Pacific Northwest lumber mills, allowing the mills to be utilized more fully. To reach mills in southwestern Washington, lumber trucks must negotiate port-area congestion exacerbated by I-5 traffic and then cross either the I-5 or I-205 bridges.

Effects of Choke Points on Industry

Highway and rail congestion at the Portland-Vancouver crossings affect the lumber, wood, and paper products industry by:

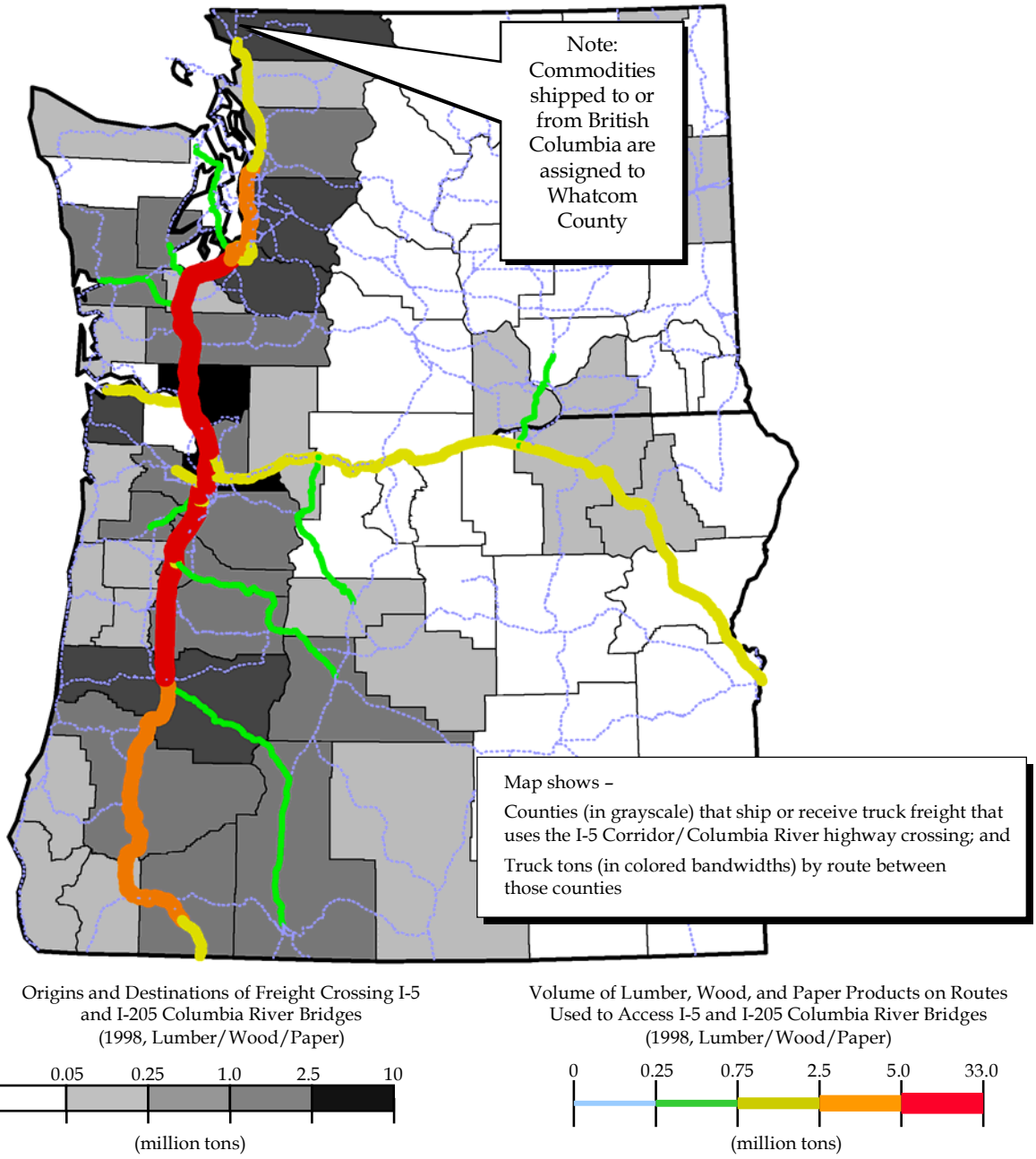
- Shrinking the supply areas that serve mills and reducing manufacturing plant efficiency by making it more costly to move logs, chips, and production materials between mills and manufacturers that are located outside the Portland-Vancouver area;

- Increasing the cost of reaching national markets by raising long-haul trucking and rail costs. Lumber and wood products transported by rail must negotiate congestion in the Portland-Vancouver terminal area before continuing on to more distant domestic markets, including Los Angeles and Dallas-Fort Worth. Congestion leads to longer transit times and deteriorating delivery reliability, making rail less competitive than trucking. However, trucking costs for heavy, bulky lumber and wood products are usually higher than rail costs, especially for long-distance trips. In the long term, increased shipping costs could cause Oregon-Washington businesses to lose market share and profitability.

- Increasing the cost of exports and imports. Exports generate jobs and income for Oregon and Washington, and imports increasingly help keep the region's mills running. Congestion that increases transit times and reduces delivery reliability also undermines the competitiveness of Oregon-Washington businesses in global markets. As trade volumes drop, ports lose economies of scale and may become less cost-efficient and less attractive to shippers.

On a national scale, the delays and costs encountered at the Portland-Vancouver crossings impact the nearly eight percent of United States lumber, wood, and paper production that emanates from Oregon and Washington.

Figure 22. Oregon-Washington Origins and Destinations for Lumber, Wood, and Paper Products Crossing the I-5 and I-205 Bridges at Portland-Vancouver
With Tonnage of Freight on Truck Routes Used to Access Bridge



Lumber, Wood and Paper Products Case Study
Interstate Wood Products

Firm Location: Kelso, Washington.

Products: Hauling of wood chips from lumber mills to processing plants.

Background: Interstate Wood Products is a medium-sized trucking firm that specializes in hauling wood chips from lumber mills to processing plants where the chips are converted to pulp, paper, and board products.

Product Shipping Processes: The company is located 50 miles north of Portland and 125 miles south of Seattle. Serving west-central Washington and northern Oregon, the company uses specialized trucks to pick up scrap wood chips at lumber mills and deliver them to processing plants. The processing plants are capital intensive and require a steady stream of feedstock (wood chips) to keep them operational. Disruptions in production due to a lack of chips are costly.

Effects of I-5/Columbia River Crossing Congestion on Company: Interstate Wood Products has already been priced out of the Seattle market due to congestion. The company formerly linked mills and plants north and south of Seattle, but congestion made round-trip times long, unpredictable, and costly—four-hour round-trips through Seattle frequently extended to six and eight hours due to traffic jams. Now, due to congestion at the I-5/Columbia River and I-205 highway crossings, the company is encountering similar problems in linking clients north and south of Portland.

Impacts on Competitiveness: Congestion has reduced the service area for Interstate Wood Products. Already squeezed out of markets north of Seattle, the company now finds congestion threatening access to clients south of Portland. Fewer and smaller markets translate into less efficient use of the company's capital equipment, resulting in higher costs, possibly fewer jobs, and lower profitability. Poor reliability and increasing delays make the region's lumber, wood, and paper product producers less competitive as costs are either passed on to customers. If costs cannot be passed on due to competition with other regions, the Oregon and Washington companies must absorb the costs themselves, reducing profits and lowering long-term viability.

Farm and Food Products Industry

Standard Industry Classification Codes:	01, 02, 07 and 20
Oregon and Washington Employment (2000):	211,655
Oregon and Washington Value of Production (2000):	$19.0 billion

Industry Trends

The productivity of the Pacific Northwest agricultural industry is growing, with output expanding while overall employment remains steady. The region is a leading grower of grains; grass seed; a wide variety of fruits (including apples, pears, and raspberries), vegetables, and horticultural products (including azaleas and Christmas trees). The region also has a significant food products industry, producing processed items such as wine, pasta, and roasted coffee.

Importance of Portland-Vancouver Crossings to Industry

Washington, Oregon, Montana, Idaho, and portions of the Upper Midwest have some of the most productive agricultural regions in the country. Farm and food products businesses in these areas depend on the Columbia River ports, the Port of Seattle, and the Port of Tacoma to reach export markets.

Rail links to the Port of Portland, the largest grain exporting port on the West Coast, are particularly important. Figure 23 shows the pattern of western United States rail shipments of farm and food products that move through the Portland-Vancouver rail triangle. The figure shows how farm and food export shipments from the entire northwestern tier of the country converge on the Port of Portland and other Columbia River ports. Figure 24 shows the pattern of rail shipments of farm and food products within Oregon and Washington. Rail service provides a vital link between eastern Washington agricultural producers who are exporting farm and food products and the ports of Portland-Vancouver and Seattle-Tacoma.

Rail congestion in Portland-Vancouver would be much worse if it were not for the large volumes—over 12 million tons annually—of grain and other products transported by barge to and from the Port of Portland. Barges can economically ship bulk commodities such as the grains grown in eastern Washington and Oregon that would otherwise be shipped almost entirely by rail or truck. Competition among the three modes generally keeps down the price of shipping farm and foods products although competition varies by location. Figure 25 shows the tonnage and types of commodities moved by barge downriver (inbound) to the Portland-Vancouver ports and upriver (outbound) to eastern Washington and Oregon. Barge shipments within the metropolitan area are not included in this figure.

Figure 23. Western United States Origins and Destinations for Farm and Food Products Using the Portland-Vancouver Rail Triangle
With Tonnage of Freight on Rail Lines Used to Access Triangle

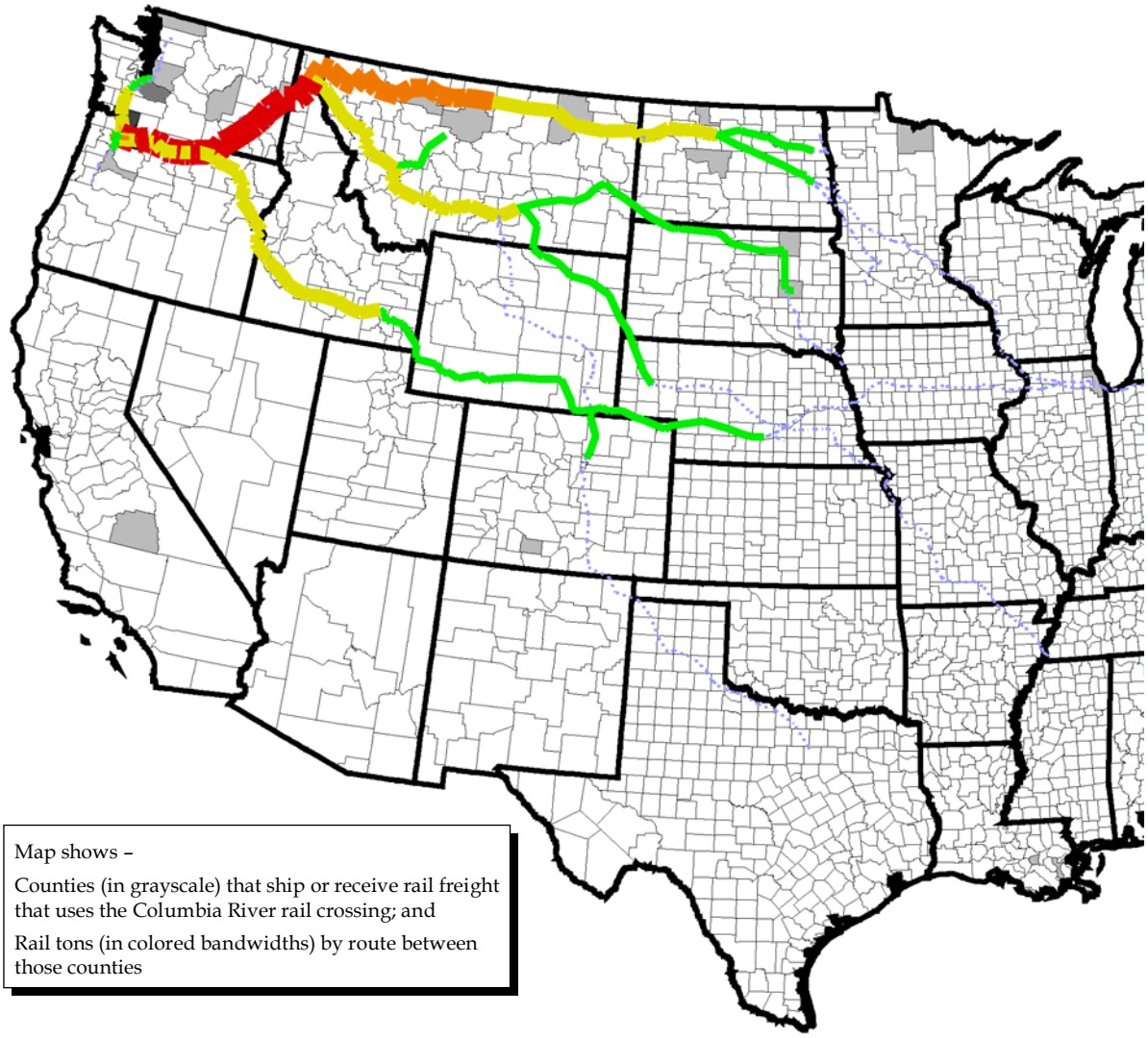


Figure 24. Oregon-Washington Origins and Destinations for Farm and Food Products Using the Portland-Vancouver Rail Triangle
With Tonnage of Freight on Rail Lines Used to Access Triangle

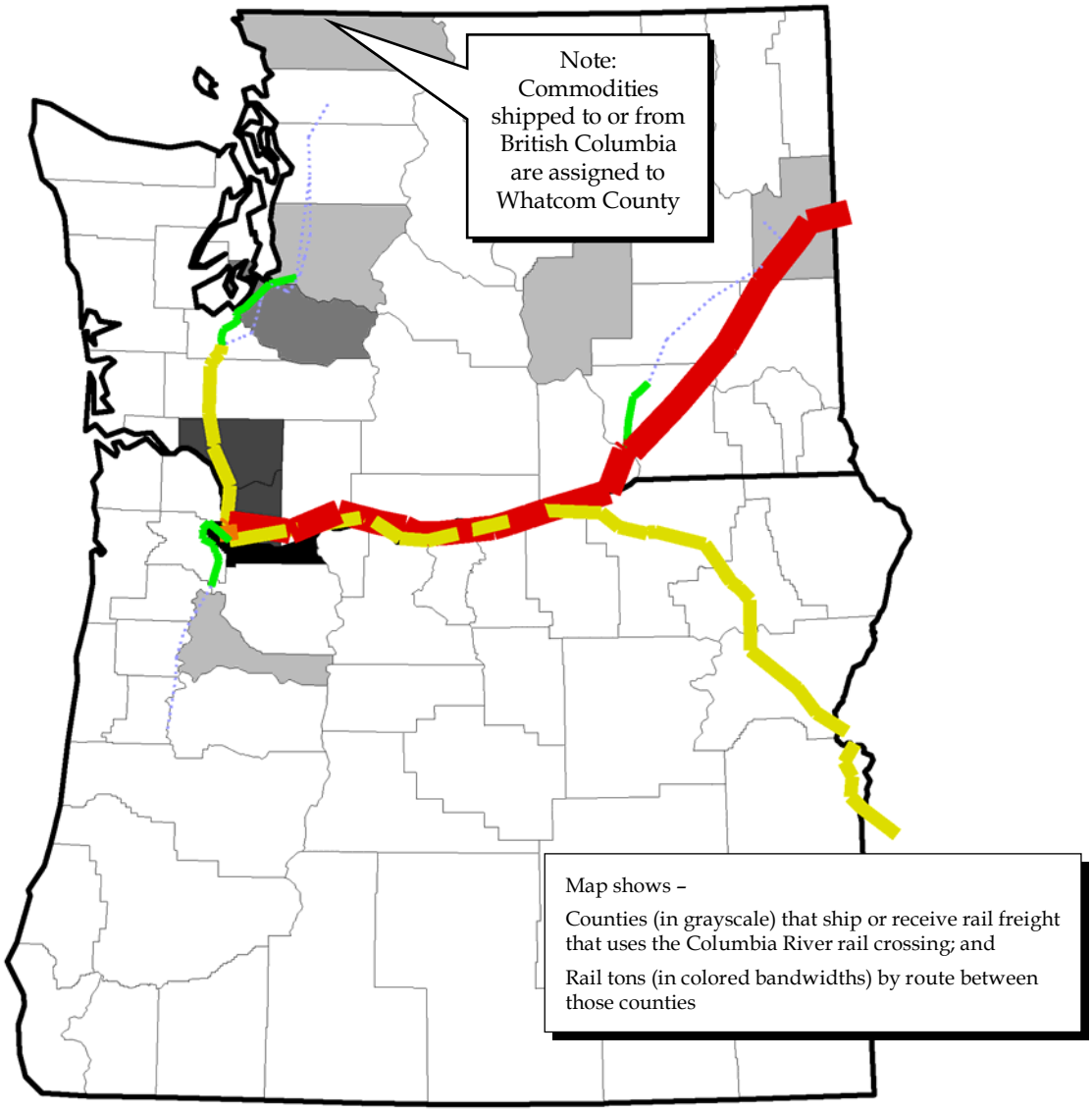
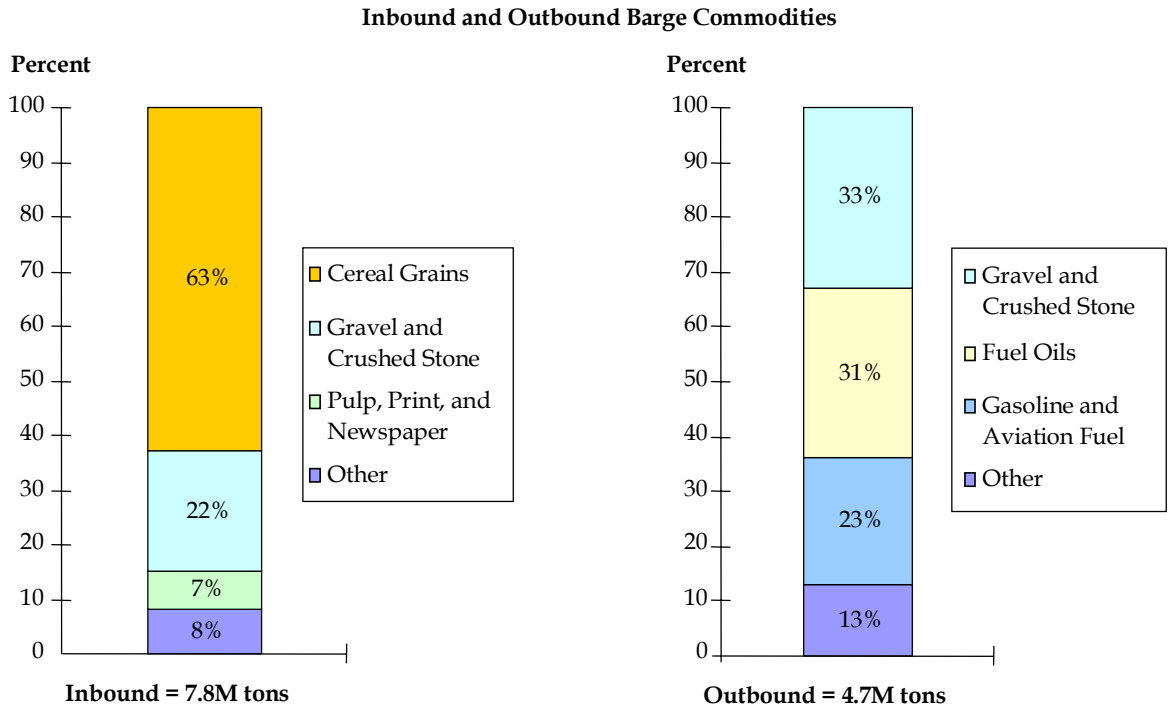


Figure 25. Port of Portland Barge Commodities
Inbound (Downriver) and Outbound (Upriver)

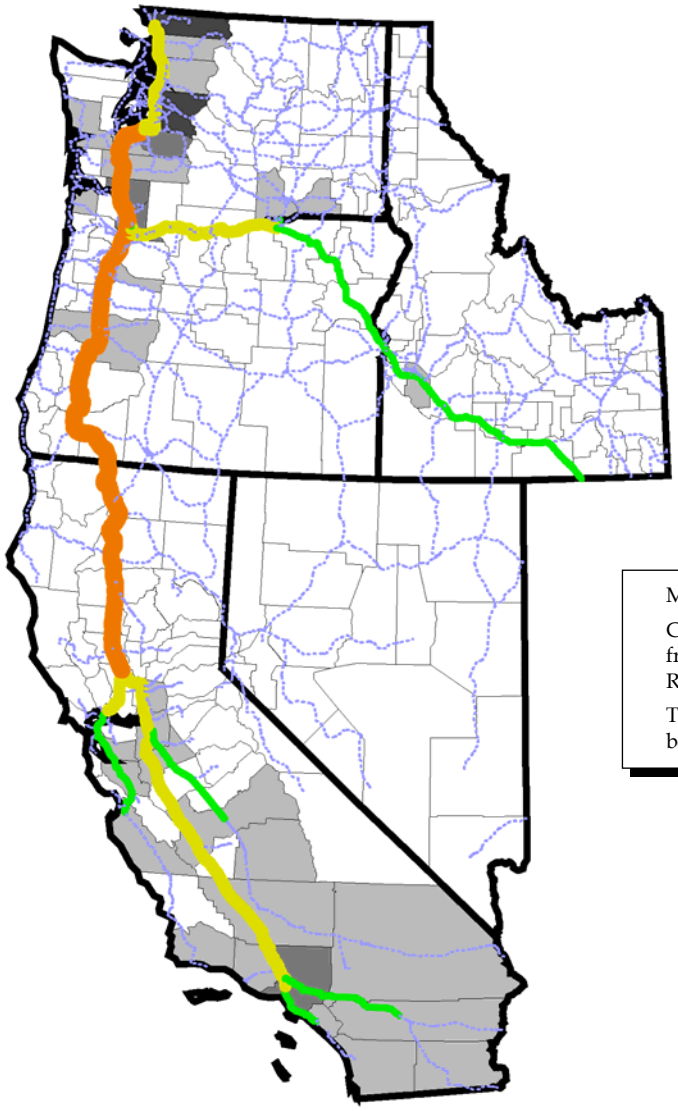


Source: Commodity Flow Database for the Portland Metropolitan Area, 1997.

Trucks, while not used intensively to ship bulk commodities such as grain over long distances, carry large volumes of food products over short distances. Trucks deliver higher value, processed foods to supermarkets and transport highly perishable, time-sensitive food products such as Washington oysters. Figure 26 shows the West Coast movement of farm and food products that cross the I-5/Columbia River bridge by truck. Over 3 million tons of food products are trucked across the I-5/Columbia River bridge annually, with many of these products destined for sale in California markets.

Figure 27 shows the more detailed pattern of truck movements of farm and food products within Oregon and Washington. The gray scale indicates the total commodity tonnage shipped and received by county, and the bandwidth and color of the lines indicate the tonnage of commodities moving by truck along the major highways. The figure makes clear that farm and food products businesses up and down the I-5 corridor, as well as those in central and eastern Oregon and Washington, move products across the I-5/ Columbia River bridge.

Figure 26. West Coast Origins and Destinations for Farm and Food Products Crossing the I-5 and I-205 Bridges at Portland-Vancouver
With Tonnage of Freight on Truck Routes Used to Access Bridge



Map shows –

Counties (in grayscale) that ship or receive truck freight that uses the I-5 Corridor/Columbia River highway crossing; and

Truck tons (in colored bandwidths) by route between those counties

Origins and Destinations of Freight Crossing I-5 and I-205 Columbia River Bridges (1998, Farm and Food Products)

0 0.05 0.25 1.0 2.5 10

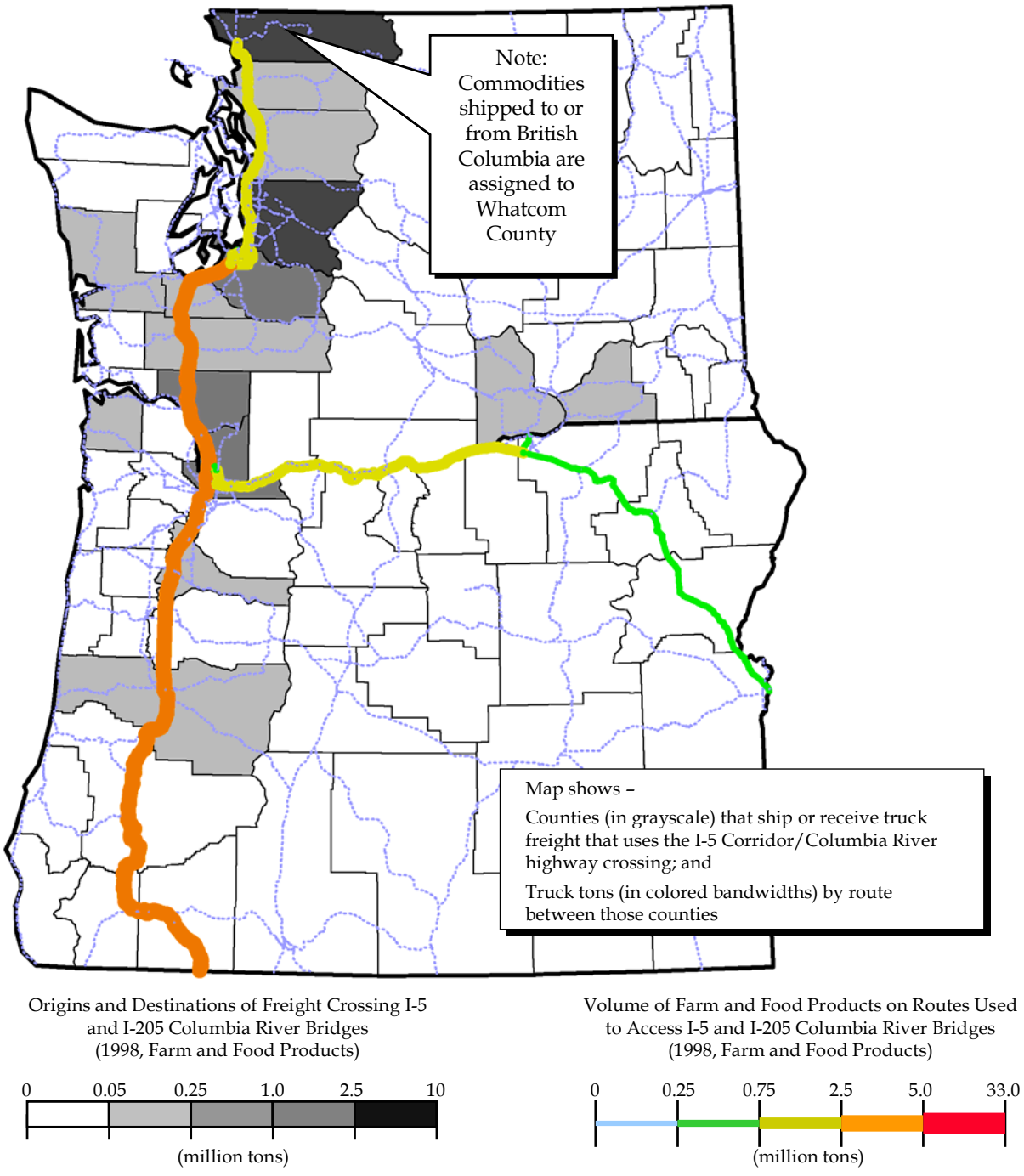
(million tons)

Volume of Farm and Food Products on Routes Used to Access I-5 and I-205 Columbia River Bridges (1998, Farm and Food Products)

0 0.25 0.75 2.5 5.0 33.0

(million tons)

Figure 27. Oregon-Washington Origins and Destinations for Farm and Food Products Crossing the I-5 and I-205 Bridges at Portland-Vancouver
With Tonnage of Freight on Truck Routes Used to Access Bridge



Effects of Portland-Vancouver Choke Points on Industry

Producers of farm and food products face challenges similar to those encountered by the region's lumber, wood, and paper products industry. Congestion raises the cost of inter-plant truck moves for value-added food processors. This sector is forecast to be a long-term growth industry for the region, but rising congestion costs risk dampening the potential for job and revenue growth.

More important for the Oregon-Washington economy, many of the agricultural goods produced in Oregon and Washington are global commodities. The Portland-Vancouver highway and rail choke points raise the cost of exports to worldwide markets where competition is measured in differences of cents to the ton. The railroads have introduced heavier, higher-capacity rail cars and longer trains to gain economies of scale and keep down the cost of transportation, especially for long-haul bulk wheat shipments. But, these improvements to one link of the logistics chain are exacerbating congestion in the Portland-Vancouver rail network, which threatens to increase the cost of all rail movements through the area. If shippers pass through the higher transportation costs in their pricing, Oregon-Washington producers risk losing market share to producers overseas or to competing ports in North America.

A large component of the Pacific Northwest farm and food products industry is wheat. The case study below details how wheat and other grains are dependent on a combination of barge and rail service to the Port of Portland. Given existing demands on the Portland-Vancouver rail infrastructure, a decline in barge service would exacerbate existing rail congestion issues.

Farm and Food Products Case Study

Eastern Washington and Oregon Wheat[19]

Background: The eastern parts of Washington and Oregon are national leaders in wheat production. Overall, Washington ranks 3rd among the states in wheat production and Oregon ranks 13th. Portland and the Columbia River ports of Longview and Kalama are critical export gateways for Washington, Oregon, North Dakota, Montana, Idaho, South Dakota, Colorado, Minnesota, and Nebraska grains.

Wheat Production (in bushels) – Leading States, 2000

1. Kansas	6. South Dakota
2. North Dakota	7. Idaho
3. WASHINGTON	8. Minnesota
4. Montana	9. Colorado
5. Oklahoma	10. Texas
	13. OREGON

[19]United States Department of Agriculture, Statistics Service, 2000 data. County rankings fluctuate from year to year.

In 2000, six Oregon and Washington counties ranked among the top 10 wheat growing counties in the entire nation.

Wheat Production (in bushels) – Top Counties in the United States, 2000

1. **WHITMAN, Washington**
2. **LINCOLN, Washington**
3. **WALLA WALLA, Washington**
4. **ADAMS, Washington**
5. Polk, Minnesota
6. **UMATILLA, Oregon**
7. **GRANT, Washington**
8. Cavalier, North Dakota
9. Bingham, Idaho
10. Ward, North Dakota

Product Shipping Processes: On an annual basis, about 133 million bushels of wheat grown in eastern Washington and Oregon are shipped by rail and barge to the Port of Portland for export to foreign markets. Barges account for 61 percent of this total, rail accounts for 36 percent of shipments, and other modes for 3 percent.

Effects of I-5/Columbia River Crossing Congestion: Farmers in Eastern Washington and Oregon depend on barge and rail service to ensure that grains reach the Columbia ports and critical export markets such as Japan. While barges can transport grains directly to deep-sea vessels, rail shipments must move through the congested Portland-Vancouver terminal area before entering the port. If the Columbia River system were to become non-navigable (e.g., because of breaching of dams or low water), farmers would lose the option to ship by barge and would have to rely on rail and truck. A complete shift from barge to rail would require that the Portland-Vancouver rail triangle accommodate an additional 1,100 65-car train sets per year. This would present an immense challenge given existing constraints.

Impacts on Competitiveness: The Pacific Northwest competes in world grain markets with growers from Australia, Canada, France, and Argentina. Pricing is market-driven. Oregon and Pacific Northwest farmers must be cost-competitive to secure orders and maintain profitability. Rail congestion and deteriorating reliability add to costs and threaten profitability by reducing margins. The Columbia River ports do not have the rail capacity to accommodate the increased rail shipments that would result from a total loss of barge traffic. Additional rail capacity in the Portland-Vancouver area would better insure Eastern Washington and Oregon farmers against any possible reduction in barge service.