Local Economic Effects

The Columbia River Highway and Rail Crossings Are Transportation Choke Points for Portland-Vancouver

The Columbia River highway and rail crossings connect the communities of Portland and Vancouver for work, recreation, shopping, and entertainment. They provide critical freight connections to the area's two major ports for deep-water shipping and up-river barging, link its two transcontinental rail lines, and connect much of the region's industrial land.

The crossings are transportation choke points because the Portland-Vancouver area has only two highway bridges and one rail bridge over the Columbia River. Figure 1 shows the location of the I-5 and I-205 Columbia River highway bridges and the Burlington Northern Santa Fe's (BNSF) rail bridge crossing the Columbia River. Figure 2 is an aerial photograph of the I-5/Columbia River highway bridge. The area has fewer crossings than river cities of similar size across the United States. Table 1 compares the number of highway and rail crossings serving the Portland-Vancouver area with the number of crossings serving other river cities. With limited bridge capacity, few alternative routes, and growing travel demand, the Portland-Vancouver crossings have become major traffic bottlenecks. See Figure 3, a photograph of peak-travel period traffic on I-5 southbound, approaching the I-5/Columbia River bridge.

Table 1. Comparison of River Crossings in Selected U.S. Metropolitan Areas of Similar Size

Metro Area	Population	Body of Water	Highway Crossings	Rail Crossings
Norfolk	1.57 million	Hampton Roads/Chesapeake Bay	4	0
Cincinnati	1.65 million	Ohio River	7	2
Kansas City	1.78 million	Missouri River	10	3
Portland-Vancouver	**1.92 million**	**Columbia River**	**2**	**1**
Pittsburgh	2.36 million	Three Rivers	>30	3
St. Louis	2.60 million	Mississippi River	8	2

Figure 1. Map of Columbia River Crossings in Portland-Vancouver Area

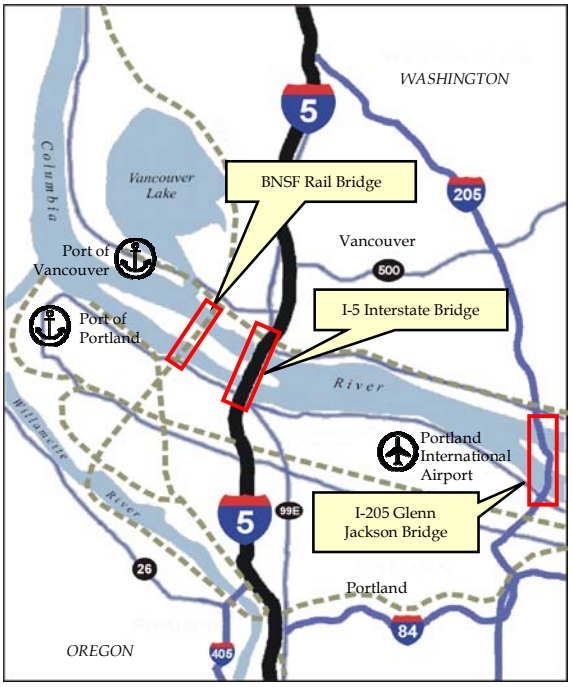


Figure 2. I-5/Columbia River Bridge

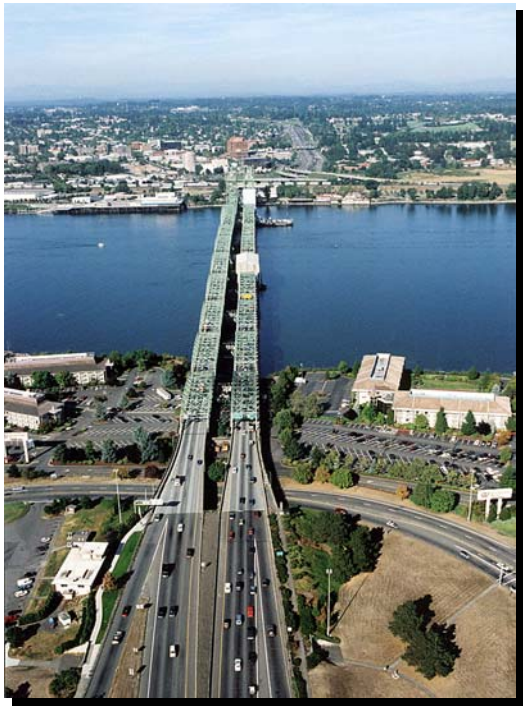


Figure 3. Peak-Travel Period Traffic on I-5 Southbound Approaching the I-5/Columbia River Bridge

The I-5/Columbia River Highway Crossing Is Severely Congested

Interstate 5, with its bridge crossing the Columbia River, is the backbone of the Portland-Vancouver area transportation system. On an average day more than 125,000 vehicles, including 10,000 trucks, cross the I-5/Columbia River bridge.[2]

"The bridge crossing is the worst bottleneck between Los Angeles and Seattle."
Vancouver economic development official, Regional Economic Effects Study interviews

Today the Portland-Vancouver metropolitan area population is about 1.9 million. By 2020, the population is expected to increase to 2.4 million. As the region grows, traffic volume on the bridge is expected to grow proportionally to 180,000 vehicles per day, an increase of 44 percent. Vehicle travel times between downtown Portland and north Vancouver will increase 22 percent, from 38 minutes in 2000 to 44 minutes in 2020.

"We are at the brink of either keeping our economy strong or allowing the kind of disastrous gridlock that is going on in California and Seattle."
Margaret Carter, Urban League

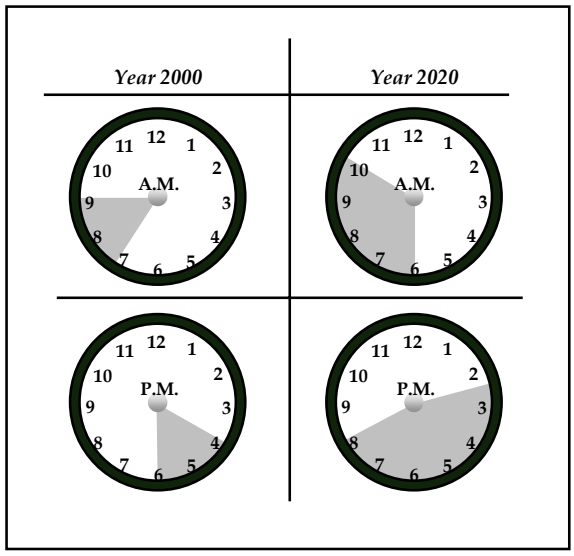
The I-5/Columbia River highway crossing operates at capacity for two hours during the morning peak-travel period and another two hours during the evening peak-travel period. Unless capacity is added, no additional vehicle trips can be squeezed into those hours. Additional trips will be made earlier or later, more than doubling the duration of the peak-travel periods by 2020. The morning congestion period will spread from two to four hours, and the evening congestion period will expand from two hours to over five and one-half hours. The quiet midday period will largely disappear. Instead of a total of four hours of congested travel along the I-5/Columbia River crossing corridor, Portland-Vancouver drivers can anticipate almost 10 hours of congested travel a day by 2020. Figure 4 compares the duration of the morning and evening peak periods in 2000 and 2020 if crossing capacity is not increased.

The congestion is caused by limited vehicle through-put capacity on the bridge itself and by the complex traffic patterns on the Oregon and Washington sides of the river:

- The six traffic lanes on the I-5/Columbia River bridge are inadequate for the volume of traffic crossing the river during peak-travel periods;
- Close interchange spacing north and south of bridge does not allow for adequate merging and weaving sections, effectively reducing the capacity available for through traffic;

[2] Oregon Department of Transportation. *2001 Transportation Volume Tables*.

Figure 4. Duration of Morning and Evening Peak-Period Traffic on the I-5/Columbia River Bridge and Approaches in 2000 and 2020



- Short entrance and exit ramps force trucks to accelerate and decelerate on the freeway, further slowing traffic; and

- The bridge's low-level lift span, one of the last remaining on the national Interstate highway system, opens for 10 minutes for barge traffic 20 to 30 times per month in off-peak periods, closing the highway and bringing traffic to a halt for periods of 30 minutes.

The eight-lane Glenn Jackson bridge, which carries I-205 across the Columbia River six miles up river of the I-5/Columbia River bridge, provides an alternate route to the I-5/Columbia River crossing. But the Glenn Jackson bridge, which carries 132,000 vehicles, including 7,800 trucks, across the river each day, also operates near capacity. Growing congestion, due in part to diverted traffic from I-5, is diminishing travel reliability and predictability on I-205 and the Glenn Jackson bridge. As the Glenn Jackson bridge reaches capacity it will discourage diversion of I-5 traffic resulting in increased peak-period spreading within the I-5 corridor. The next closest Columbia River highway crossing is the two-lane bridge between Rainier, Oregon, and Longview, Washington, 53 miles downstream; it provides little relief to the metropolitan area.

With few alternative routes, congestion on I-5 spills onto other roadways in the Portland-Vancouver area. Some drivers heading to the I-5/Columbia River bridge use the arterial roadways paralleling I-5 rather than grind through the traffic on the I-5 approaches to the bridge. During the peak-travel periods, this diverted traffic fills the local north-south streets and jams the interchanges near the bridge, blocking the east-west arterial streets as well.

Freight traffic is disproportionately affected by this congestion:

- Congestion is spreading into the midday period, which is the peak-travel period for trucks. Most truck deliveries are made in the mid-morning after businesses open, and most pick-ups are made in the mid-afternoon before businesses close. Congestion spilling over from the morning and evening commuter peaks into the midday will entangle truck operations, increasing trucking costs, and making pick-up-and-delivery times less reliable;

- Trucks enter and leave the highway at the closely spaced interchanges north and south of the bridge to access the ports, intermodal rail yards, industrial areas, and commercial areas near the Columbia and Willamette Rivers, but the interchanges and ramps cannot safely and efficiently handle the large volumes of truck traffic;

- Bridge openings are limited to off-peak hours to reduce delays for commuters, but bridge lifts during midday and off-peak hours coincide with the heaviest volumes of trucks on I-5. A 10-minute bridge lift during the midday creates a traffic queue that takes 25 to 30 minutes to dissipate. By 2020 it will take 30 to 35 minutes for the northbound queue to clear and 50 to 60 minutes for the southbound queue to clear;

- Traffic congestion increases truck travel times to and from the Ports of Portland and Vancouver, and to and from the BNSF and Union Pacific intermodal rail terminals; and

- Congestion delays trucks moving among the manufacturing plants, warehouses, and distribution centers in the Columbia Corridor on the Portland side of the river and along SR 14 on the Vancouver side of the river.

When an incident on I-5 reduces capacity or temporarily closes the highway during peak-travel periods, the high volume of traffic using the I-5/Columbia River highway crossing and the lack of alternate routes results in gridlock across the Portland-Vancouver area. This happens almost daily.

The Portland-Vancouver Rail Network and the Columbia River Rail Crossing Also Are Severely Congested

The two-track BNSF rail bridge, adjacent to the I-5/Columbia River bridge, is the only rail crossing connecting Portland and Vancouver. The rail bridge carries 63 freight trains and 10 Amtrak passenger trains across the river each day.[3] The next major rail crossing of the Columbia River is 92 miles upstream near The Dalles, Oregon.

Figure 5 shows the Portland-Vancouver rail network. On the Vancouver side of the river, rail lines run north to Seattle and east along the north side of Columbia River Gorge toward the Midwest. On the Portland side of the river, rail lines run west to the port terminals, south to California, and east along the south side of the Columbia River Gorge toward the Midwest and the Gulf.

[3] I-5 Trade and Transportation Partnership. *Final Strategic Plan,* June 2002.

Figure 5. Portland-Vancouver Rail "Triangle"

The primary cause of congestion in the rail system is inadequate capacity within the overall Portland-Vancouver terminal and junction "triangle." On each side of the Columbia River, trains crossing the bridge compete for track space with local and long-distance trains moving to rail yards and terminals. Single tracks connect most junctions, and yard capacity is inadequate for the volume of rail traffic traveling to and from rail yards and port terminals in Portland and Vancouver. Local operations—the movement of locomotives and cars between yards and the movement of trains into and out of port and railroad terminals—must share track time and space with long-distance, through trains, including intermodal trains traveling from Seattle and Tacoma to the Midwest and California through the Portland-Vancouver area.

When measured in terms of delay per train, rail congestion in the Portland-Vancouver area is about twice that of Chicago, the nation's largest rail hub. An analysis of the Portland-Vancouver rail system found that over a typical 96-hour (four-day) period the terminal area handled 600 freight and passenger trains. The average speed of those trains

through the Portland-Vancouver network was 12.3 mph and they accrued 402 hours of delay (about 41 minutes of delay per train). By comparison, over the same period the Chicago rail network handled about 3,500 freight and passenger trains. The average speed was 12.5 mph, and the trains accrued 813 hours of delay. With less than one-fifth the number of trains as Chicago, the Portland-Vancouver rail network experiences nearly half the delay hours of Chicago.

These rail delays affect freight service across the Pacific Northwest, limit opportunities for growth at the ports of Portland, Vancouver, Kalama, Longview, and other Columbia River ports, and make it difficult to expand intercity passenger service along the Seattle-Portland-Eugene corridor.

To relieve rail congestion and provide new capacity, the railroads must invest heavily in new yard capacity, sidings, bypass tracks, switches, and dispatching systems within the Portland-Vancouver rail triangle. And within 10 to 20 years, the railroads also may need to look at investing in an expanded rail bridge across the Columbia River or a rail bypass of the Portland-Vancouver area for through trains.

This will be a challenge for the railroads. The railroad industry today is stable, productive, and competitive, with enough business and profit to operate, but it does not have the resources to replenish its infrastructure quickly or grow rapidly. Most of the benefits of railroad reorganization and productivity over the last 20 years have accrued to shippers and the economy in the form of rate cuts, rather than to the railroads and their investors. The industry's rate of return on investment has improved from about four percent in 1980 to about eight percent in 2000; however, it is still below the cost of capital, which is about 10 percent.

This is a problem for the railroad industry because it is extraordinarily capital-intensive. Railroads spend about five times more to maintain rail lines and equipment than the average United States manufacturing industry spends on plant and equipment. Wary of the gap between the railroads' capital needs and their income, investors have backed away from railroad stocks. This has reduced the amount of money available to invest in the freight-rail system, forcing the railroads either to borrow money to maintain and expand infrastructure or defer maintenance and improvements. The possibility that the railroads may not grow apace with the economy and might shed freight to trucks, adding to already congested highways, has prompted some states to think about investing to correct rail choke points such as the Portland-Vancouver triangle.[4]

[4] American Association of State Highway and Transportation Officials, *Freight-Rail Bottom Line Report*, Washington, DC, January 2003. For additional detail see http://transportation.org/committee/freight/doc/rail_bottomline.pdf.

Transportation Congestion Has Significant Costs for the Portland-Vancouver Area

The Portland-Vancouver metropolitan area as a whole suffered an estimated 34.4 million road-traveler hours of delay in 2000. This is equivalent to 47 hours per road-traveler per year or an entire weekend stuck in traffic. The economic cost to Portland-Vancouver area road-travelers was estimated at $670 million per year, or about $910 per road-traveler.[5]

"Businesses in the Puget Sound area are leaving, citing transportation issues. We will only know we've failed when companies stop moving to or expanding in the Portland region." Vancouver economic development official

Congestion at the Columbia River crossings accounted for a portion of this delay and congestion at the crossings will grow over the next 20 years. If no significant capacity is added to the I-5/Columbia River crossing, total vehicle hours of delay during the peak periods will increase 74 percent from 31,000 hours per day in 2000 to 54,000 hours per day in 2020.

Because the I-5/Columbia River crossing serves the industrial core of the region, trucks and the businesses they serve will see significant increases in congestion and delay costs:

- Annual vehicle hours of delay on truck routes in the I-5 corridor will increase by 93 percent from 13,400 hours in 2000 to 25,800 hours by 2020;
- Congested lane-miles on truck routes will increase by 58 percent; and
- The cost of truck delay will increase by 140 percent to nearly $34 million.

Delays at the crossings affect a wide range of transportation users, including employees commuting to work, customers traveling to stores and business meetings, shippers meeting schedules, trucks picking up and delivering goods, and trains moving freight to and from ports and intermodal terminals. The costs of delay are passed on to businesses, either directly or indirectly, by:

[5] Texas Transportation Institute, *2002 Urban Mobility Study*, Mobility Data for Portland-Vancouver, Oregon-Washington for 2000. For additional detail and comparative rankings with other major metropolitan areas see http://mobility.tamu.edu/ums/studymobility_data/tables/portland.pdf.

- **Increasing Production Costs –** Congestion leads to higher transportation costs for businesses due to delay, unreliable travel times, and increased logistics and inventory costs. Freight carriers must adjust schedules and routes, hire more drivers, and purchase additional vehicles to serve the same customers. Firms must accommodate larger inventories of parts, supplies, and products, causing inventory and operating costs to increase unless they can find savings elsewhere.

> *"As moving goods becomes more difficult, it is the smaller businesses that will suffer most."*
> Phil Kalberer, Kalberer Food Service Equipment

- **Shrinking Labor Pools –** Congestion effectively reduces the geographical area in which potential employees can afford to work (or are willing to work) by increasing the time and cost of commuting. As a region's quality of life deteriorates and the cost of living increases, the area also becomes less attractive to new workers. Business productivity declines as the number of workers with specialized skills decreases.

- **Reducing Access to Business Inputs and Markets –** Congestion shrinks business market areas and reduces the economies of scale that can be realized by operating in large urban areas near concentrations of similar firms or concentrations of competing suppliers.

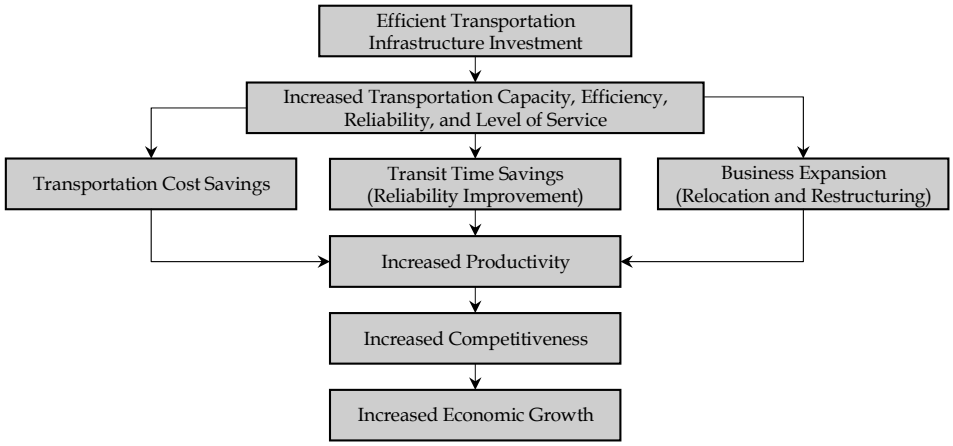
Congestion is one of the costs of doing business, but if it becomes severe, businesses may respond by moving away, going out of business, or adjusting to smaller market areas for workers, suppliers, and customers. All of these lead to a reduction in productivity, which in turn limits economic competitiveness and curtails economic expansion.

Economic Benefits of Investment in Transportation

The economic benefits of investment in transportation include:[6]

- For almost all industry sectors, transportation investments reduce the cost of producing a given level of output. The cost savings can be used by companies to increase profit, make new investments, or expand market share.
- Since lower production costs can lead to lower product prices and increased sales, transportation investments also generate an "output effect" that grows the economy. Expanding output can stimulate increases in employment.
- Investments in roadways accounted for about 15 percent of U.S. productivity growth between 1950 and 1991.
- Transportation investments allow manufacturers and retailers to maintain smaller inventories, resulting in significant business cost savings, but just-in-time operations depend on reliable transportation.
- Transportation investments reduce the per-mile cost of transporting goods, allowing production and distribution facilities to serve larger market areas. By serving larger markets, businesses can more efficiently use labor, equipment, and capital.
- Improvements in the freight transportation system allow businesses to draw supplies from a wider area, potentially yielding savings in material costs and improvements in quality.

Transportation and the Economy



The exhibit above shows how investments in transportation infrastructure can lead to growth in the Oregon-Washington economy. Freight transportation enhancements that reduce the costs of moving goods (and services) to and from local, regional, national, and international markets are critical to economic expansion. This is because the movement of goods is a "factor input" in the production of goods. (Other factor inputs include labor, materials and capital equipment.) Like labor and capital, transportation costs directly affect the price of goods and services and the profits of producers. Consequently, investments that reduce the cost of moving goods to and from markets (via improvements in reliability and reductions in transit times) can help to increase and sustain economic growth. The efficiency and reliability of the freight transportation system affects economic productivity, and productivity is a key determinant to overall economic performance.[7]

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[6] Federal Highway Administration, Office of Policy, 2003.

[7] ICF Consulting and HLB Decision Economics, *Economic Effects of Transportation: The Freight Story*, for the Federal Highway Administration, January 2002.