CAMBRIDGE SYSTEMATICS

Freight Rail and the Oregon Economy

A Background Paper

final

report

prepared for

Port of Portland

prepared by

Cambridge Systematics, Inc.

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Executive Summary

The objective of this paper is to provide a starting point for discussions about the public sector's role in Oregon's freight-rail system and strategies for ensuring that freight rail can keep pace with economic growth and meet the needs of Oregon's business and industry.

Economic growth over the next 20 years will double the demand for freight transportation, straining the capacity of Oregon's highway and freight-rail systems. Additional capacity and new operational strategies must be found to meet demand and satisfy economic development, social, and environmental goals. This will be a challenge because while the railroad industry today is stable, productive and competitive, with enough business and profit to operate, it does not have the resources to replenish its infrastructure quickly or grow rapidly. Railroads are extraordinarily capital-intensive. On average, railroads reinvest 18 percent of their revenues back into capital improvements, spending about five times more to maintain rail lines and equipment than the average U.S. manufacturing industry spends on plant and equipment.

Railroads have increased productivity and decreased rates significantly since the economic deregulation of the industry in 1980; however, the benefits have accrued to shippers and the economy in the form of rate cuts rather than to the railroads and their investors. The railroads today are not earning their cost of capital. A recent study for the American Association of State Highway and Transportation Officials (AASHTO), the *Freight-Rail Bottom Line Report*, suggests that the railroads may not be able to keep pace with economic growth at the current level of investment.

If the freight railroads cannot maintain their current share of national freight, then rail freight will be shed to trucks on an already congested highway system. This will impose greater costs on state and local highway agencies, which must maintain roads; on highway users, who will experience increasingly congested roads; and on shippers, who will pay higher rates for truck service than they did for rail service. The net effect will be less competitive industries, slower economic growth, and in the worst case, fewer jobs if industries chose to cut back or relocate instead of absorbing higher transportation costs.

A dozen major Oregon industries depend on affordable freight-rail service, especially the lumber, wood, and paper products industry, the transportation equipment industry, the wholesale trade industry, and the Port of Portland's marine terminal business. There are current and emerging rail capacity problems in five corridors that serve these industries: Portland-Seattle corridor, Willamette Valley corridor, Klamath/West Coast "I-5" corridor, the Columbia Gorge corridor, and the Portland Triangle. The most pressing congestion and capacity problems are in the Portland Triangle, the interchange between Oregon's north-south and east-west rail corridors in the center of Portland. However, if freight-rail tonnage doubles within the next 20 years, the Portland-Seattle corridor and Klamath/West Coast "I-5" corridor will experience significant capacity problems; and in the longer-term, the

region may face congestion problems along the Columbia Gorge corridor. These capacity constraints will impact all Oregon industries that use freight-rail, but the most vulnerable to increasing congestion and declining service performance will be the lumber, wood, and paper products industry, the Portland-centered transportation equipment and wholesale trade industries, and the Port of Portland's marine terminal business.

Public investment in the rail system has historically treated the bottom of the system: grade crossings, branch lines, and commuter rail services. The present need is to treat the top: major corridors, intermodal terminals and connectors, and urban rail interchanges such as the Portland Triangle. The public sector has two broad policy choices in dealing with these new needs. It can opt for market-drive evolution of the freight rail system or it can push for policy-driven expansion of capacity.

Opting for market-driven evolution of the freight-rail system means minimizing state involvement, betting that the rail industry will continue to be stable, productive, and competitive with enough business and profit to operate. This means that the railroads may not be able to replenish their infrastructure as quickly or as grow rapidly as the demand for freight, but it means lower state investment and financial risk at a time when the state's budget is tight. It also means accepting a somewhat higher risk that the freight-rail system may not support state economic development goals.

Opting for a policy-driven expansion of the freight-rail system means building a new public-private partnership with the railroads. It means increasing state involvement and investment to achieve a freight-rail system that provides the cost-effective transport needed to serve national and global markets, helps relieve truck pressure on highways, and supports Oregon's economic development. This approach also carries risk. The public sector can facilitate or invest in rail improvements, but it cannot provide effective and cost-competitive services that will attract and retain shippers. The railroads must deliver those services and do so in a very difficult business environment. And there is always the possibility that market will not respond to the public sector's or the railroad's vision of the state's freight transportation needs.

In either case, but especially if the public sector opts to build a new partnership with the railroads and expand the capacity of the freight-rail system, the Oregon Department of Transportation, the Portland metropolitan community, and the Port of Portland may wish to consider the following initiatives:

- Define state and local freight and economic development policies by enunciating clear public policies to address freight-rail needs and link public initiatives in the freight-rail system to Oregon and Pacific Northwest economic development goals.

- Clarify public roles and responsibilities by convening a Pacific Northwest Freight Advisory Committee, including railroads and rail shippers; focusing metropolitan, state, and Pacific Northwest freight-advisory committees on freight-rail issues and opportunities; and designating a state freight coordinator (as is likely to be required under the pending SAFETEA reauthorization of the Federal surface transportation legislation).

- Strengthen decision-making procedures by improving state, metropolitan, and Port freight-rail planning and analytical capabilities to better understand business logistics and freight-rail services and better identify and assess opportunities for public initiatives; and work with the railroads to develop a regional rail network model sufficient to identify major mid- and longer-term capacity constraints.

- Leverage resources (especially emerging SAFETEA program provisions) such as the proposed intermodal connector grants (NHS funds); intermodal transfer facility development grants (STP); the anticipated 'freight gateways' or 'projects of national significance' program; funding for multi-state corridor planning, project development, and decision-making program (e.g., the revamped Borders and Corridors program); and state and local tax incentives for investment in freight rail improvements (e.g., tax-exempt private activity bonds, etc.).

A successful program will require a bottoms-up approach of carefully considered projects tested against a state- and regional-level understanding of economic growth patterns, shipper needs, and freight-rail capabilities.

The problems of the freight transportation sector, especially the freight-rail system, and the consequences of not addressing them are clearer today than they were a few years ago, and they will sharpen in the coming years. The public sector, business, and the railroads will benefit from closer attention to the capacity of the freight-rail system and its contribution to the Oregon economy.

1.0 Introduction

The Port of Portland and the Oregon Department of Transportation (DOT) are concerned about the viability and competitiveness of Oregon's freight-rail system to meet future business needs. When Oregon's rail system was built in the late 19th and early 20th centuries, it provided extensive and cost-effective service to shippers. But highways and trucking have displaced rail as the carrier of choice for many industries, and development has crowded out rail lines, industrial sidings, and terminals.

Economic growth over the next 20 years will double the demand for freight transportation, straining the capacity of the highway and freight rail systems. Additional capacity and new operational strategies must be found to meet demand and satisfy economic development, social, and environmental goals.

This paper provides a starting point for discussions about the public sector's role in the freight-rail system and strategies for ensuring that freight-rail can keep pace with economic growth and meet the needs of Oregon's business and industry. The paper provides background information on the following topics:

- Freight demand and the state of the rail industry;
- Oregon's rail network and railroads;
- Rail's role in the economy of Oregon, the Portland metropolitan region, and the Port of Portland's marine terminals;
- Rail use by key industries;
- Corridor-level rail capacity issues;
- Economic implications of these rail capacity issues by industry; and
- Public role in freight rail transportation.

2.0 Freight Demand and the State of the Rail Industry

Rail transportation is a vital part of the nation's economy, carrying long-distance shipments cost-effectively. Freight-rail is critical to shippers of heavy, bulky commodities such as grain, farm products, autos, and coal. It also is important to shippers of high-value, time-sensitive merchandise, industrial parts, mail, and parcels moving in intermodal containers and truck trailers. Less recognized, but equally important, freight railroads provide and maintain the track for many of our commuter railroads and provide the rail lines and dispatching for our intercity passenger-rail services. The freight railroads also are the backbone of the strategic defense network (STRACNET), which provides mobility and access to ports for military goods and equipment.

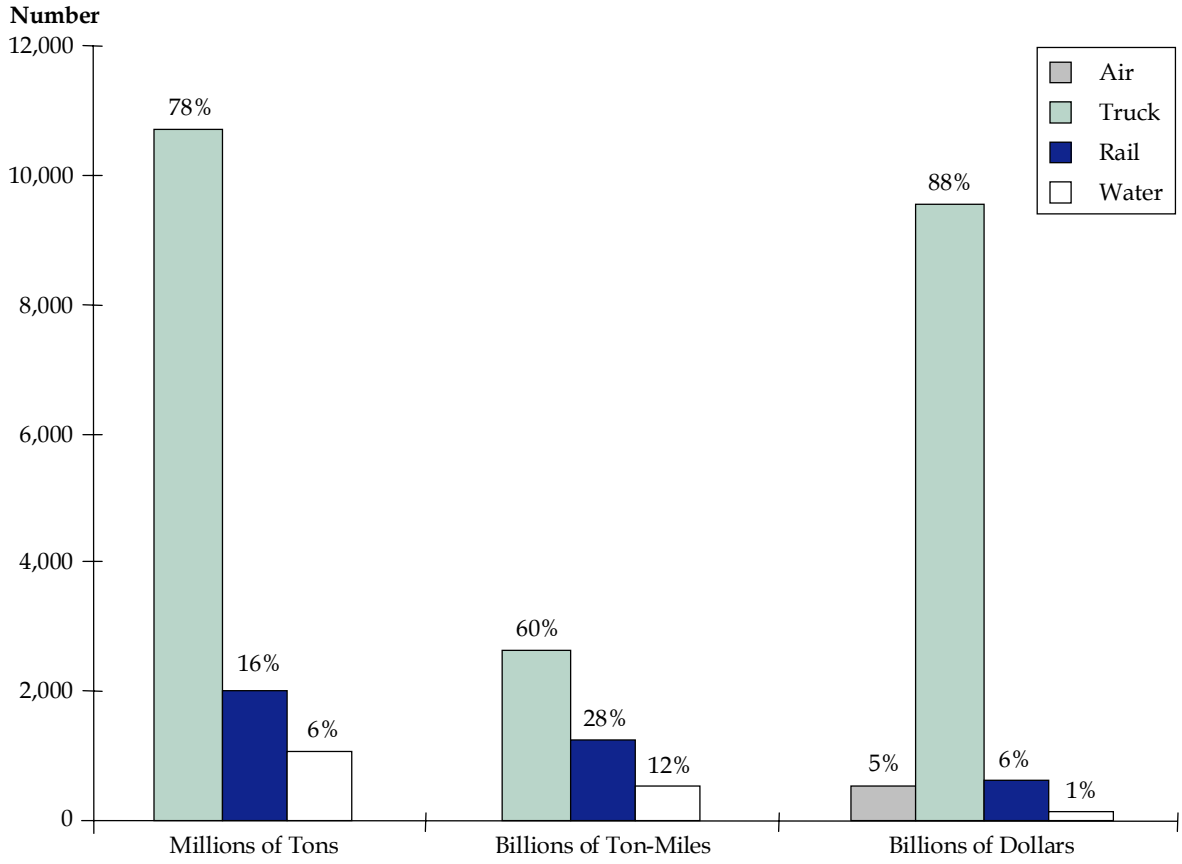
Rail is needed to handle future freight demand, which will nearly double over the next 20 years. The U.S. economy is growing and with it the demand for freight transportation services. With moderate growth in the economy – between 2.5 and 3.0 percent per year – the U.S. Department of Transportation estimates that domestic freight tonnage will increase by 65 percent by 2020 and import-export tonnage will increase by 85 percent.[1] Today, trucks and the highway system carry 78 percent of domestic tonnage. The freight-rail system carries 16 percent of domestic tonnage, accounting for 28 percent of ton-miles, 40 percent of intercity ton-miles, and six percent of freight revenues.[2] See Figure 2.1. By 2020, the highway system must carry an additional 6,600 million tons (an increase of 62 percent) and the freight-rail system must carry an additional 888 million tons (an increase of 44 percent).

[1] U.S. Department of Transportation, Federal Highway Administration, Office of Freight. Freight Analysis Framework estimates, 2002. For further details see http://www.ops.fhwa.dot.gov/freight/publications/state_profiles/faf-overview.pdf.

[2] Cambridge Systematics, Inc., *Freight-Rail Bottom Line Report*, prepared for the American Association of State Highway and Transportation Officials, Washington, D.C., January 2003. For additional detail see http://transportation.org/committee/freight/doc/rail_bottomline.pdf.

Figure 2.1 Goods Movement Today

Truck, Rail, Water, and Air Modal Shares of Freight Tonnage, Ton-Miles, and Revenues



Source: Reebie TRANSEARCH and FHWA Freight Analysis Framework Project.

But until recently the railroads have been shedding capacity. Rail system mileage peaked in the 1920s with approximately 380,000 miles of track. By the 1950s the system was deteriorating rapidly and much of the rail industry was bankrupt, unable to compete with trucking and the rapidly expanding highway system. Since the 1960s, and especially since the economic deregulation of the industry in the 1980s, the railroads have downsized, rationalized, and modernized the rail system to a core network that is half the size of the 1920s system – about the same system mileage that existed in the 1870s.[3] In this process,

[3] Stover, John F., "The Routledge Historical Atlas of the American Railroads," Routledge, New York, 1999.

Oregon lost nearly one-third of its rail mileage, declining from approximately 3,300 miles in 1920 to 2,572 in 1995 to 2,400 today.[4]

Economic growth over the last decade has absorbed much of the underutilized capacity of this downsized system and created increasing congestion at major network choke points. The major freight-rail gateways and corridors thought to be most at risk because of congestion are:[5]

- Chicago rail hub, which is critically important for freight-rail traffic moving from the Pacific Northwest to Midwest and East Coast markets;
- Mid-Atlantic rail network, which connects the South and Southeast to the Washington D.C.-New York-Boston megalopolis;
- Alameda Corridor East, the second leg of the rail corridor connecting the Ports of Los Angeles and Long Beach to the transnational rail network; and
- Pacific Northwest West Coast ("I-5") rail corridor, which connects British Columbia, Washington State, and Oregon to the large Southern California markets.

New freight-rail capacity is needed to keep pace with the expected growth in the economy and relieve congestion at these major network choke points, but 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 improvements since deregulation in 1980 have accrued to shippers and the economy in the form of rate cuts rather than to the railroads and their investors. Rail productivity has increased significantly and rail rates have dropped. On average, it costs 29 percent less to move freight by rail today than it did in 1981. But competitive pricing has forced rail revenues down and sapped the profitability of railroads. The industry's rate of return on investment dropped as low as two percent in the early 1980s. It improved to about eight percent in 2000, but it is still below the cost of capital at about 10 percent.[6]

This is a problem for the railroad industry because railroads are extraordinarily capital-intensive. On average, railroads reinvest 18 percent of their revenues back in to capital improvements, spending about five times more to maintain rail lines and equipment than the average U.S. manufacturing industry spends on plant and equipment. Moreover, the railroads have few public incentives, such as investment tax credits, that encourage private investor spending on capital infrastructure.

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[4] Oregon State Railroad Annual Report data.

[5] Background discussions with railroad and federal transportation officials in preparation of the *Freight-Rail Bottom Line Report* for AASHTO.

[6] American Association of Railroads data.

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 expand infrastructure or defer improvements. But despite the financial pressures, the railroads are investing in their systems. The Class I railroads committed $6.1 billion to capital improvements in 2000 and another $5.4 billion in 2001. However, shareholder pressure forces them to focus primarily on improvements that show a positive and near-term return to the bottom line.

This level of investment falls well short of the level needed to maintain and expand the rail system to meet expected national demand. The recent *Freight-Rail Bottom Line Report*, commissioned by the American Association of State Highway and Transportation Officials (AASHTO), estimated that $175 to $195 billion of investment is needed over the next 20 years just to address the worst bottlenecks and maintain rail's current mode share – that is, simply to keep pace with the growth of the economy.[7] In their current, financially constrained condition, the freight railroads are capable of funding about $142 billion of that program, leaving a budget shortfall of up to $53 billion (or $2.65 billion annually). This shortfall must be made up through other sources or the rail freight system will not be able to accommodate fully the growth in freight traffic. Absent this funding, the pressure of the market will continue to streamline and downsize the rail system.

If the freight railroads cannot maintain their current share of national freight, then rail freight will be shed to trucks on an already congested highway system. This will impose greater costs on state and local highway agencies, which must maintain roads; on highway users, who will experience increasingly congested roads; and on shippers, who will pay higher rates for truck service than they did for rail service. The net effect will be less competitive industries, slower economic growth, and in the worst case, fewer jobs if industries chose to cut back or relocate instead of absorbing higher transportation costs.

States – including Oregon – have recognized the need for investment in freight rail to retain and grow business. Many states have made major investments in short lines and passenger rail service, but state resources are severely limited and heavily committed to the maintenance and preservation of existing highway systems. Overall, current public-sector rail programs are not sufficient. They were designed in an era when the consensus was that public investment should be made in highways, not private infrastructure such as railroads, and when the railroads were moving away from public regulation, not toward public-private partnerships. Current programs address real needs, such as safer highway-rail grade crossings, but reflect an underfunded, patchwork approach to rail network improvement.

The Port of Portland and Oregon DOT have recognized the need for new strategies and new partnerships with the railroads that will meet the needs of Oregon businesses and communities. And the market and financial pressures have induced the railroads to explore – albeit cautiously and on a project-by-project basis – partnerships with the public sector.

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[7] *Freight-Rail Bottom Line Report.*

There is much to be gained from new strategies. There is considerable unused potential in the rail system – rail lines that could be rebuilt and corridors that could be expanded to strengthen the freight transportation system. In some areas and some markets, investing in rail will be more feasible and cost-effective than investing in highway capacity. These opportunities will help meet freight demand and sustain the economy.

However, new strategies and new partnerships are not without risk. The public sector can invest in freight-rail infrastructure, but it cannot provide effective and cost-competitive services that will attract and retain shippers. The railroads must do that. Conversely, the railroads can provide freight-rail services, but they may not be able to assemble the capital, public-policy support, and tax incentives to make improvements that benefit the public. The public sector must do that. And neither the public nor the private sector can make business and industry use freight-rail services. Many shippers have moved away from freight rail, seeking the greater flexibility, reliability, and visibility of door-to-door trucking. There is no guarantee that the railroads and the public sector, even working together, will quickly reverse this trend.

Behind the immediate issues of infrastructure and service improvements are longer-running concerns. The railroads are anxious that public participation in financing railroad improvements may mean onerous requirements, a loss of flexibility in meeting rapidly changing market demands, and perhaps re-regulation and a return to the bankruptcies of the 1950s. The public sector enters discussions with the railroads anxious that investments may be pilloried as corporate welfare and resisted by shippers who want ever-cheaper transportation to compete in global markets and see any movement toward railroad mergers as monopolistic.

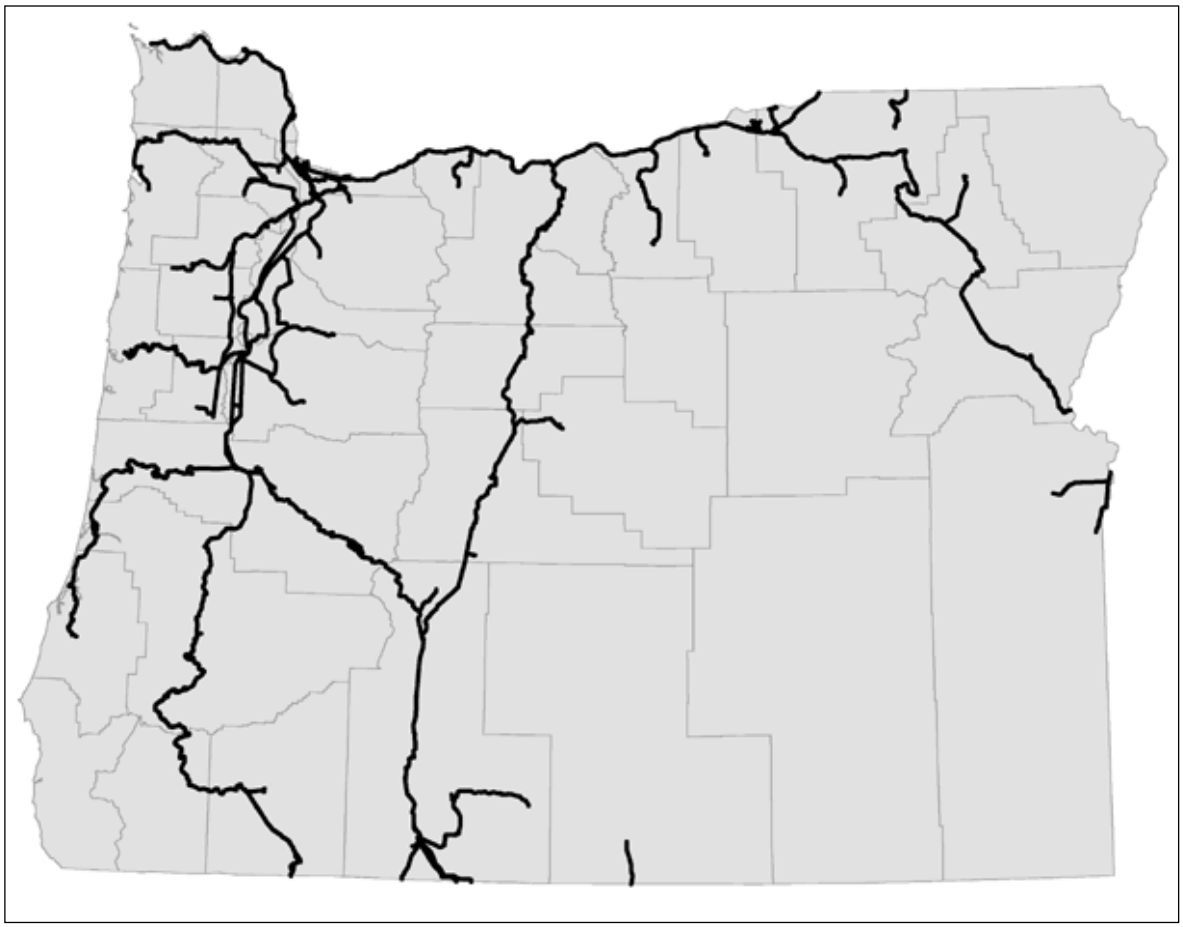
But even with these risks – which are known and recognized – there is a need to keep freight-rail capacity moving apace with economic growth. New strategies and new partnerships must be developed, but they must be based on a clear understanding of Oregon's freight rail system, the role it plays in the Oregon and Portland metropolitan economies, its choke points, and the benefits, costs, and risks of investments to improve and expand the freight-rail system. The next sections of the paper provide background information to support initial discussions about new strategies and partnerships.

3.0 Oregon's Rail System

3.1 Rail Network

Oregon's rail network has 2,413 miles of operated track, shown Figure 3.1. The Oregon rail network accounts for 1.63 percent of the national rail system.[1]

Figure 3.1 Oregon Rail Network



Source: Oregon Department of Transportation.

[1] Association of American Railroads, "U.S. Freight Railroad Statistics," used to obtain total U.S. miles of road.

The network has eight major corridors, shown in Figure 3.2. Five of the corridors serve north-south rail movements:

1. Portland-Seattle corridor parallels I-5 west of the Cascades, connecting Portland to Seattle;

2. Willamette Valley corridor also parallels I-5, connecting Portland to Eugene and Roseburg;

3. Klamath corridor follows OR-58 over the Cascades, then parallels U.S. 97, connecting Eugene and the Willamette Valley corridor to Klamath Falls, the major rail gateway between Oregon and California;

4. Grants Pass corridor follows I-5 over Grant's Pass, connecting Roseburg and Medford to the Mt. Shasta area and providing a secondary rail gateway between Oregon and California; and

5. Bend corridor runs north-south along U.S. 97 east of the Cascades, connecting the Dalles region on the Columbia River with Bend and Klamath Falls.

The Portland-Seattle, Willamette Valley, and Klamath corridors form the major West Coast "I-5" rail corridor.

Three of the corridors serve east-west rail movements:

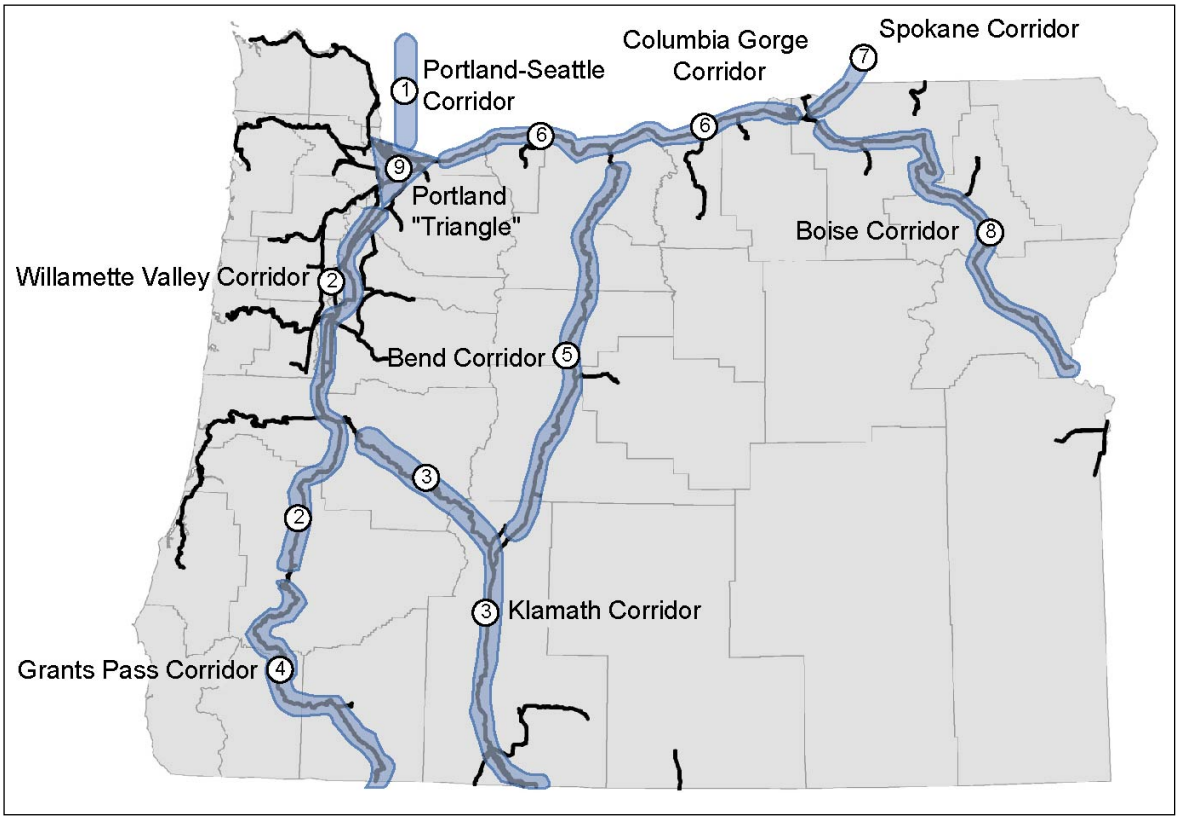
1. Columbia Gorge corridor parallels the Columbia River and I-84, connecting Portland and the Hermiston area, where it branches northeast and southeast;

2. Spokane corridor connects the Columbia Gorge corridor to the Spokane area and points east; and

3. The Boise corridor in Northeast Oregon connects the Columbia Gorge corridor to the Boise area and points southeast.

The Portland Triangle, in the center of the Portland metropolitan region, is the major interchange between Oregon's north-south and east-west rail corridors.

Figure 3.2 Major Oregon Rail Corridors



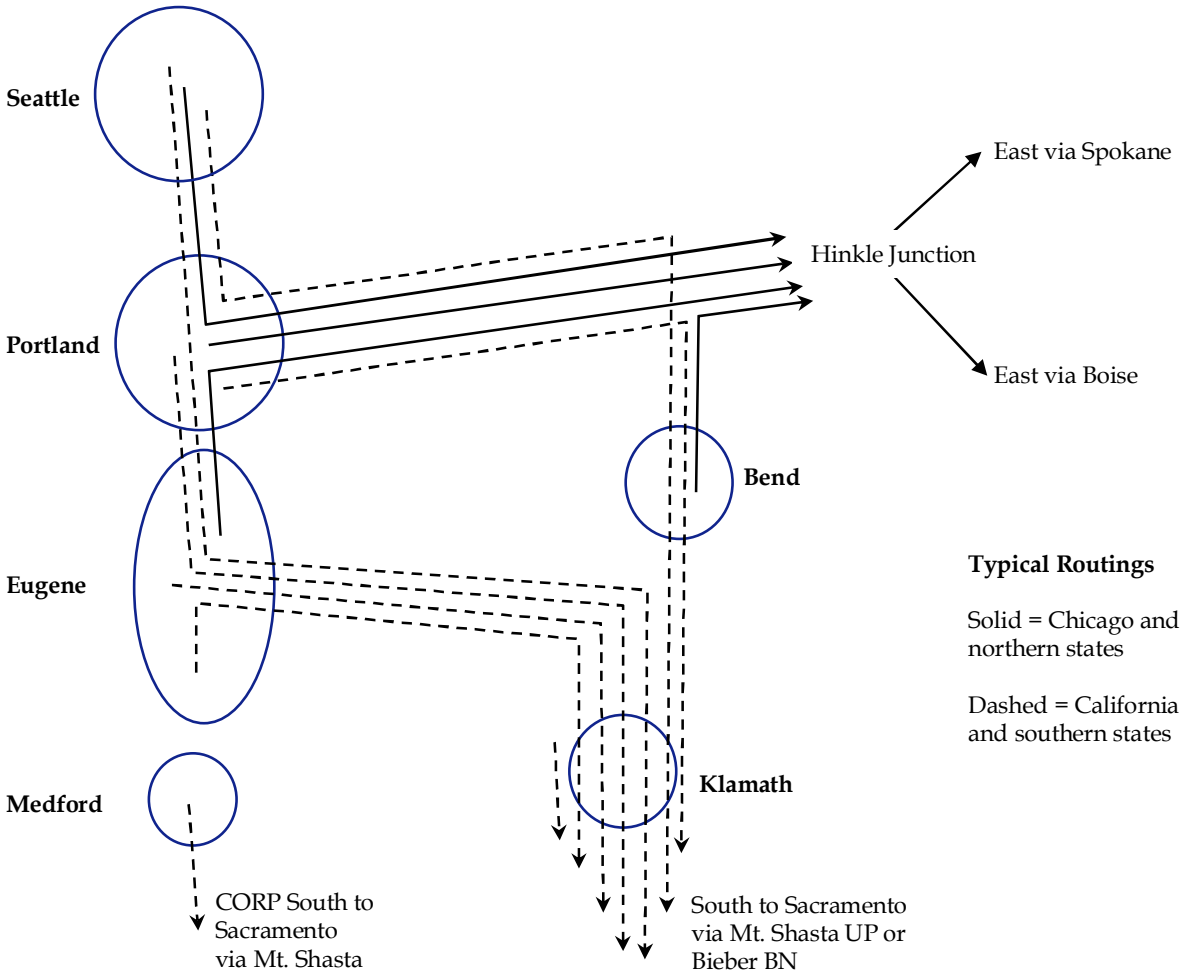
The major Oregon freight "railsheds" and routes are shown in Figure 3.3. The primary flow patterns are as follows:

- Rail traffic eastbound from Seattle, Portland, and Eugene uses the Columbia Gorge corridor.

- Traffic southbound from Seattle, Portland, and Eugene uses the Willamette Valley corridor, crosses the Cascades to the Klamath Falls gateway, and then follows the main West Coast corridor to Sacramento and points south.

- Traffic from the Medford area tends to move south over the Central Oregon and Pacific Railroad's line paralleling I-5, while traffic from the Bend region is served by Burlington Northern Santa Fe Railroad's (BNSF) line parallel U.S. 97. The Bend line allows BNSF to offer competitive, if less direct, service between Seattle, Portland and California.

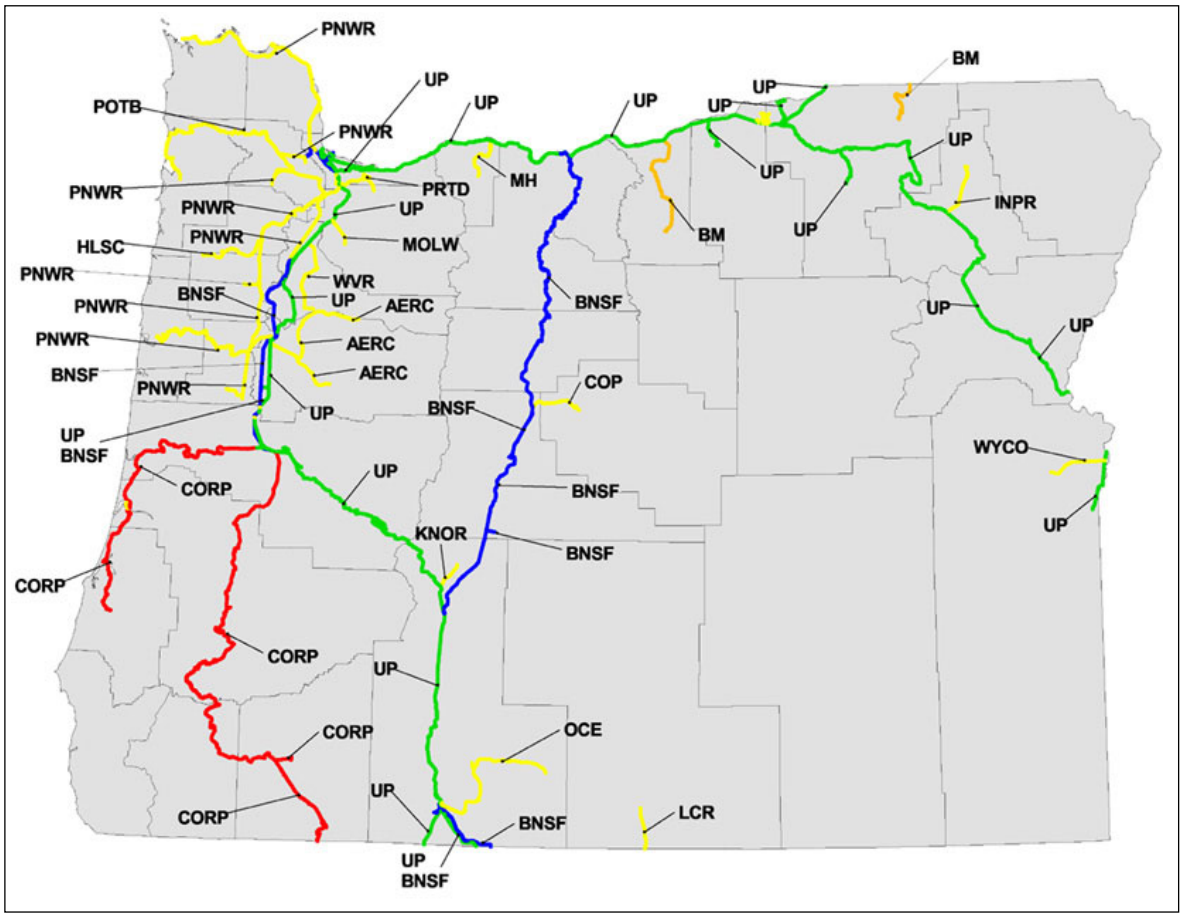
Figure 3.3 Major Oregon Freight "Railsheds" and Routes



Railroads

There are two Class I railroads operating in Oregon. They own 1,136 miles of track or 53 percent of the state total. Union Pacific Railroad (UP) owns 881 miles of track, and the Burlington Northern Santa Fe Railroad (BNSF) owns 255 miles. Twenty short-line, regional, and terminal railroads own 1,277 miles of track, accounting for the 47 percent of the state total. Figure 3.4 shows the rail lines and their owners. Table 3.1 lists the railroads and the mileage of track owned or leased by each railroads.

Figure 3.4 Oregon Railroads



Oregon has fewer Class I railroads today than it did prior to the economic deregulation of the industry in 1980. The Burlington Northern merged with the Atchison, Topeka, and Santa Fe in 1995, creating the 33,500 mile BNSF system. Also in 1995, the Union Pacific took control of the Chicago and North Western Railroad, improving service between the Pacific Northwest and Chicago. And then in 1996, the UP acquired the Southern Pacific Railroad. This merger reduced the number of Class I railroads in Oregon from three to two, but created competitive freight-rail service throughout the western U.S., especially along the north-south rail corridor paralleling I-5. The Class I railroads and the short lines share track in many areas in Oregon, reflecting access rights mandated by the Surface Transportation Board (the successor to the Interstate Commerce Commission and a part of the U.S. Department of Transportation) and business agreements among the railroads.

Table 3.1 Oregon Railroads and Track Mileage

Railroad	Mileage			
	Track-Owned or Leased	Percent of State Total	Trackage Rights	Total
Union Pacific Railroad	881.35	36.524%	228.30	1,109.65
Portland & Western Railroad	471.27	19.530%	45.90	517.17
Central Oregon & Pacific Railroad	378.00	15.665%	9.00	387.00
Burlington Northern & Santa Fe Railway	254.94	10.565%	152.58	407.52
Port of Tillamook Bay Railroad	83.80	3.473%	8.50	92.30
Albany & Eastern Railroad	65.56	2.717%	2.50	68.06
Wallowa Union Railroad	63.30	2.623%		63.30
Willamette Valley Railway	34.40	1.426%		34.40
Wyoming Colorado RR, Oregon Eastern Div.	23.00	0.953%		23.00
Mount Hood Railroad	21.14	0.876%		21.14
Idaho Northern & Pacific Railroad	20.30	0.841%		20.30
Blue Mountain Railroad	20.10	0.833%		20.10
City of Prineville Railway	18.35	0.760%		18.35
Lake County Railroad	15.24	0.632%		15.24
Oregon Pacific Railroad	14.73	0.610%		14.73
WCTU Railway	12.20	0.506%		12.20
Palouse River & Coulee City Railroad	11.50	0.477%		11.50
Klamath Northern Railway	11.00	0.456%		11.00
Hampton Railway	5.20	0.215%		5.20
Longview Portland & Northern Railway	3.39	0.140%		3.39
Portland Terminal Railroad	2.41	0.100%	2.45	4.86
Peninsula Terminal Company	1.91	0.079%		1.91
Total	**2,413.09**	**100%**	**449.23**	**2,862.32**
Summary by Class of Railroad				
Class I Railroads	1,136	53%		
Short Lines	1,277	47%		
Total	**2,413**	**100%**		

Rail Services

The railroads provide four basic types of services:

1. Bulk unit trains made up of specially designed cars coupled together as a "unit," which haul a single commodity such as grain, coal, or minerals (e.g., a 100-car unit train made up exclusively of hopper cars carrying grain);

2. Carload trains made up of box cars, tank cars, and flatcars, which haul lumber, paper, refrigerated and non-refrigerated food products, chemicals, etc.;

3. Intermodal trains made up of domestic and international containers loaded onto flat-cars (container-on-flat-car [COFC]) or conventional truck trailers loaded onto flat cars (trailer-on-flat-car [TOFC]), which haul merchandise and other freight; and

4. Auto trains, which carry new automobiles in specially designed multi-level rail cars.

Since the economic deregulation of the rail industry in 1980, Class I railroads have consolidated and focused on long-haul operations; regional and local railroads have focused on intrastate freight moves and "pick-up and delivery" operations linking shippers and receivers to the Class I railroads' longer-distance and transcontinental services.

Freight Trains

Table 3.2 provides rough estimates of the number of trains operated by the Class I railroads and Amtrak on five of the major rail corridors today and forecasts of the number of trains likely to be operated in 2010 and 2020. The forecast are based on an extrapolation of train frequency data from I-5 Transportation and Trade Partnership studies.[2]

Table 3.2 Trains per Day by Major Rail Corridor (Approximation)

	Average Trains per Day (Approximation)					
	2001				2010	2020
Corridor	UP Trains	BNSF Trains	Amtrak Trains	Total	Estimated Trains	Estimated Trains
Portland-Seattle	38	~35	10	~83	~115	~165
Portland-Willamette Valley	21	~1	8	~30	~45	~65
Columbia Gorge	23	25-30	2	~55	~75	~105
Bend (BNSF)	8	6	0	~14	~20	~25
Klamath Gateway	26	6	2	~34	~45	~65

Source: Cambridge Systematics approximations based on I-5 Transportation and Trade Partnership data.

[2] I-5 Transportation and Trade Partnership, I-5 Rail Capacity Study data, 2003, as reported in the Portland Regional Rail Infrastructure Reconfiguration Analysis prepared by DKS and TranSystems Corporation, September 12, 2003. The extrapolations assume a 3.16 percent average annual growth in the number of freight trains and a 5.71 percent average annual growth rate in the number of Amtrak passenger trains. Numbers for 2010 and 2020 were rounded to the nearest five trains. These are preliminary estimates not based on detailed demand forecasts or analysis of railroad operating plans.

Statewide Rail Tonnage and Commodities

Rail Tonnage and Commodities

The railroads carried 55.2 million tons of freight into, out of, within, and through Oregon in 1997.[3] This was 14.3 percent of the 385 million tons of freight moved by truck and rail freight in Oregon.

Table 3.3 shows the top 10 Oregon rail commodities by tonnage. These commodities accounted for 91 percent of all rail commodity tonnage in 1997.

Table 3.3 Top 10 Rail Commodities in Oregon by Tonnage, 1997

STCC[4]	Commodity Name	Rail Tons	Percent
1	Farm Products	11,204,654	20.3%
24	Lumber or Wood Products	10,078,785	18.3%
28	Chemicals or Allied Products	7,397,113	13.4%
46	Misc. Mixed Shipments	6,493,123	11.8%
26	Pulp, Paper or Allied Products	4,618,195	8.4%
20	Food or Kindred Products	3,942,430	7.1%
40	Waste or Scrap Materials	1,929,383	3.5%
32	Clay, Concrete, Glass, or Stone	1,846,816	3.3%
33	Primary Metal Products	1,443,706	2.6%
37	Transportation Equipment	1,125,471	2.0%
	All Other Commodities	5,145,577	9.3%
	Total	**55,225,253**	**100.0%**

Source: Oregon DOT 1997 Commodity Flow Database.

Originating and Terminating Rail Tonnage and Commodities

If through traffic – the 20.6 million tons of freight shipments originating and terminating with shippers and receivers outside Oregon – is excluded from the 55.2 million tons, then the railroads carried 34.6 million tons of originating and terminating freight in 1997 for Oregon shippers and receivers. This includes freight that was:

[3] Oregon DOT 1997 Commodity Flow Database. Unless otherwise noted, Oregon statewide and Portland metropolitan region rail and truck commodity flow statistics are drawn from the Oregon DOT 1997 Commodity Flow Database.

[4] Standard Transportation Commodity Classification (STCC) code.

- Shipped by a business or industry located in Oregon (in railroad parlance, a freight-rail movement that originated in Oregon);

- Received by a business or industry located in Oregon (a freight-rail movement that terminated in Oregon); and

- Shipped and received by businesses and industries located within Oregon (an internal freight-rail movement that both originated and terminated within Oregon).

Oregon originating and terminating freight was 10.5 percent of all truck and rail freight tonnage carried for Oregon shippers and receivers.

Freight originating and terminating in Oregon is the focus of analysis in this paper because it measures freight that is "imported" by Oregon business and industry for consumption or production and freight that is "exported" by Oregon business and industry to earn "income" from other domestic and international markets. The transit time, price, and reliability of freight-rail services used to move this freight are important factors in determining the productivity of Oregon businesses and industry and their ability to compete cost-effectively in domestic and global markets.

Tables 3.4, 3.5, and 3.6 show the top 10 commodities and tonnage carried by rail for shipments originating, terminating, and internal to Oregon. "Miscellaneous Mixed Shipments," Standard Transportation Commodity Classification (STCC) 46, are typically goods and other merchandise associated with wholesale trade (e.g., warehousing and distribution). "Chemicals and Allied Products," STCC 28, include potash and soda ash, large volumes of which are exported through the Portland marine terminals. "Waste or Scrap Materials," STCC 40, is a general category that includes waste and scrap from many industries.

Table 3.4 Top 10 Rail Commodities Originating in Oregon by Tonnage, 1997

STCC	Name	Originating Tons (Shipped Outbound from Oregon)	Percent
24	Lumber or Wood Products	5,534,421	41%
26	Pulp, Paper or Allied Products	2,390,718	18%
46	Misc. Mixed Shipments	1,757,924	13%
20	Food or Kindred Products	642,963	5%
33	Primary Metal Products	562,729	4%
1	Farm Products	491,888	4%
10	Metallic Ores	387,316	3%
28	Chemicals or Allied Products	366,764	3%
37	Transportation Equipment	332,323	2%
14	Nonmetallic Minerals	304,125	2%
	All Other Commodities	3,030,480	5%
	Total	**13,459,413**	**100%**

Source: Oregon DOT 1997 Commodity Flow Database.

Table 3.5 Top 10 Rail Commodities Terminating in Oregon by Tonnage, 1997

STCC	Name	Terminating Tons (Received Inbound to Oregon)	Percent
28	Chemicals or Allied Products	4,365,323	22%
1	Farm Products	3,797,833	20%
46	Misc. Mixed shipments	2,313,239	12%
20	Food or Kindred Products	1,610,952	8%
40	Waste or Scrap Materials	1,226,259	6%
24	Lumber or Wood Products	1,075,928	6%
32	Clay, Concrete, Glass or Stone	960,729	5%
11	Coal	928,720	5%
29	Petroleum or Coal Products	656,365	3%
26	Pulp, Paper or Allied Products	654,177	3%
	All Other Commodities	5,300,308	10%
	Total	**19,464,261**	**100%**

Source: Oregon DOT 1997 Commodity Flow Database.

Table 3.6 Top 10 Rail Commodities Moving Internally in Oregon by Tonnage, 1997

STCC	Name	Internal Tons (Shipped and Received within Oregon)	Percent
1	Farm Products	363,028	22%
24	Lumber or Wood Products	284,636	17%
32	Clay, Concrete, Glass or Stone	219,364	13%
10	Metallic Ores	216,252	13%
40	Waste or Scrap Materials	194,344	12%
26	Pulp, Paper or Allied Products	175,960	11%
28	Chemicals or Allied Products	124,804	8%
20	Food or Kindred Products	49,608	3%
34	Fabricated Metal Products	7,120	0%
37	Transportation Equipment	6,796	0%
	All Other Commodities	7,000	9%
	Total	**1,648,912**	**100%**

Source: Oregon DOT 1997 Commodity Flow Database.

Rail Tonnage by County

The top 10 Oregon counties by tonnage of originating and terminating rail traffic are shown in the two following tables. (Internal shipments are included in the county of shipment origin.) Multnomah County, home to the Port of Portland's marine terminals and much of Oregon's manufacturing and distribution industry, is the predominate origin and destination for rail shipments. Multnomah County ships 41 percent of all rail tonnage statewide and receives 69 percent of all rail tonnage.

Table 3.7 Top 10 Counties in Oregon by Originating and Terminating Rail Tonnage, 1997

Oregon County	Originating Tons (Shipped Outbound from Oregon)	Percent
Multnomah	6,243,580	41%
Lane	1,410,259	9%
Douglas	1,128,801	7%
Yamhill	797,600	5%
Linn	624,838	4%
Klamath	596,540	4%
Baker	581,495	4%
Deschutes	531,580	4%
Lincoln	495,761	3%
Umatilla	493,715	3%
All Other Counties	12,904,169	15%
Total	**15,108,325**	**100%**

Oregon County	Terminating Tons (Received Inbound to Oregon)	Percent
Multnomah	14,590,698	69%
Lane	809,983	4%
Morrow	783,452	4%
Marion	609,717	3%
Linn	499,439	2%
Yamhill	450,865	2%
Clackamas	441,065	2%
Gilliam	377,614	2%
Malheur	371,528	2%
Lincoln	347,440	2%
All Other Counties	19,281,801	9%
	21,113,173	**100%**

Source: Oregon DOT 1997 Commodity Flow Database.

Oregon and the National Rail Network

Figure 3.5 maps originating rail tonnage by Oregon county. Figure 3.6 maps the terminating rail tonnage by Oregon county. The greater the rail tonnage shipped from the county, the darker the shading of the county.

Figure 3.5 Originating Rail Tonnage
By Oregon County

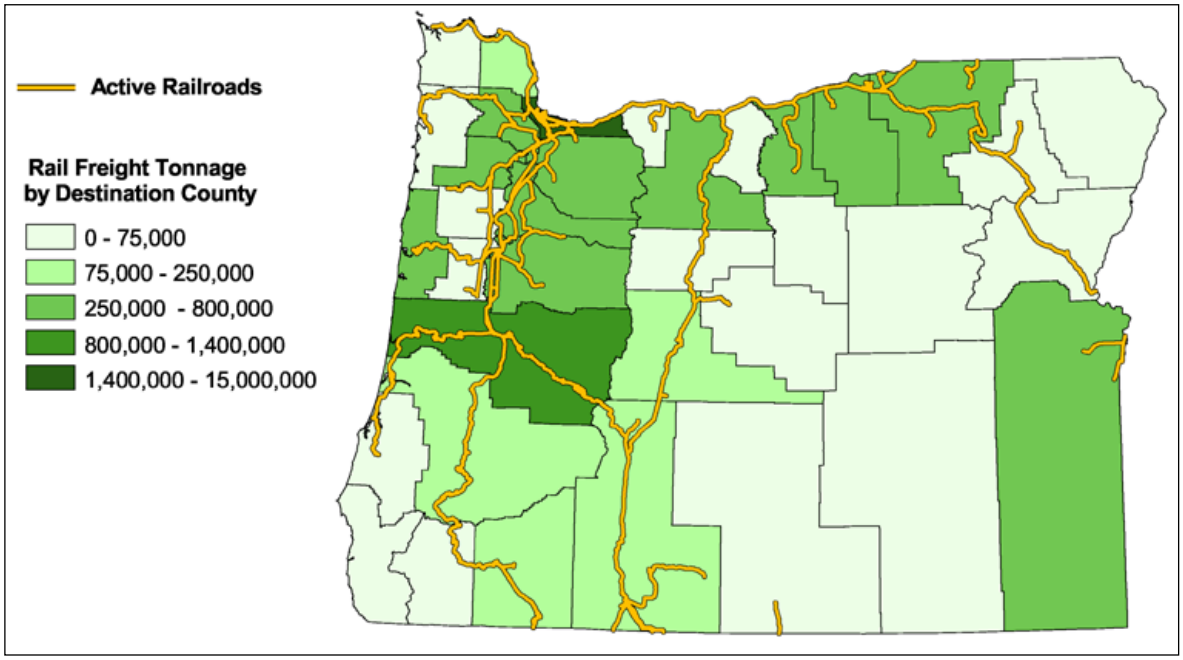
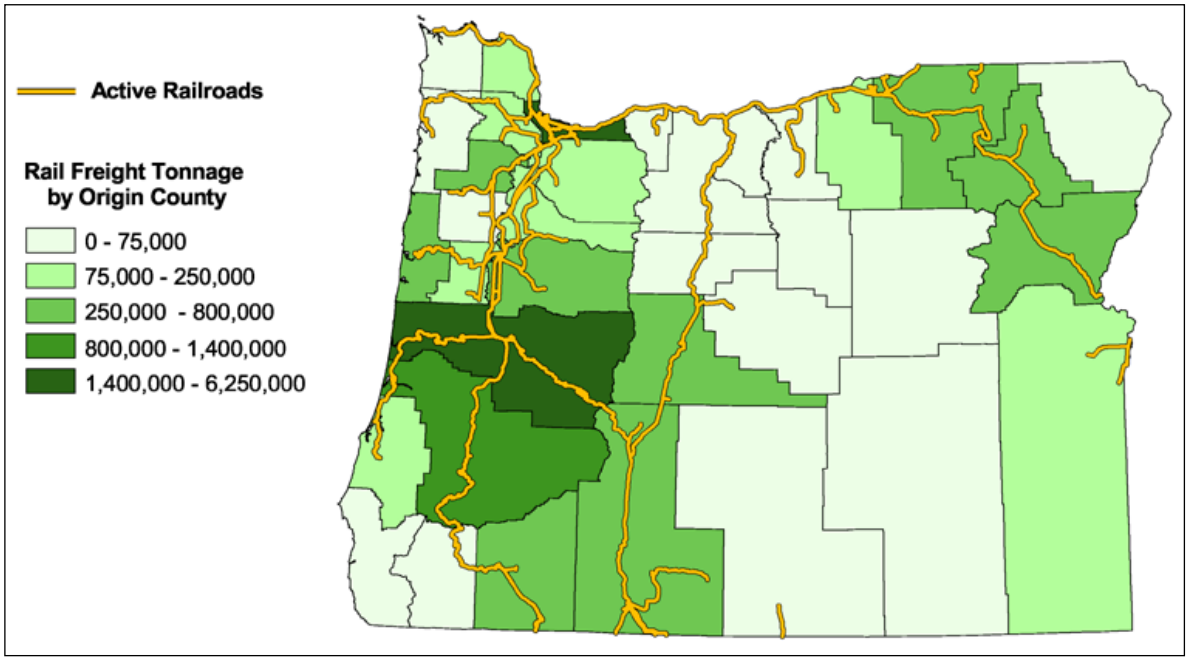


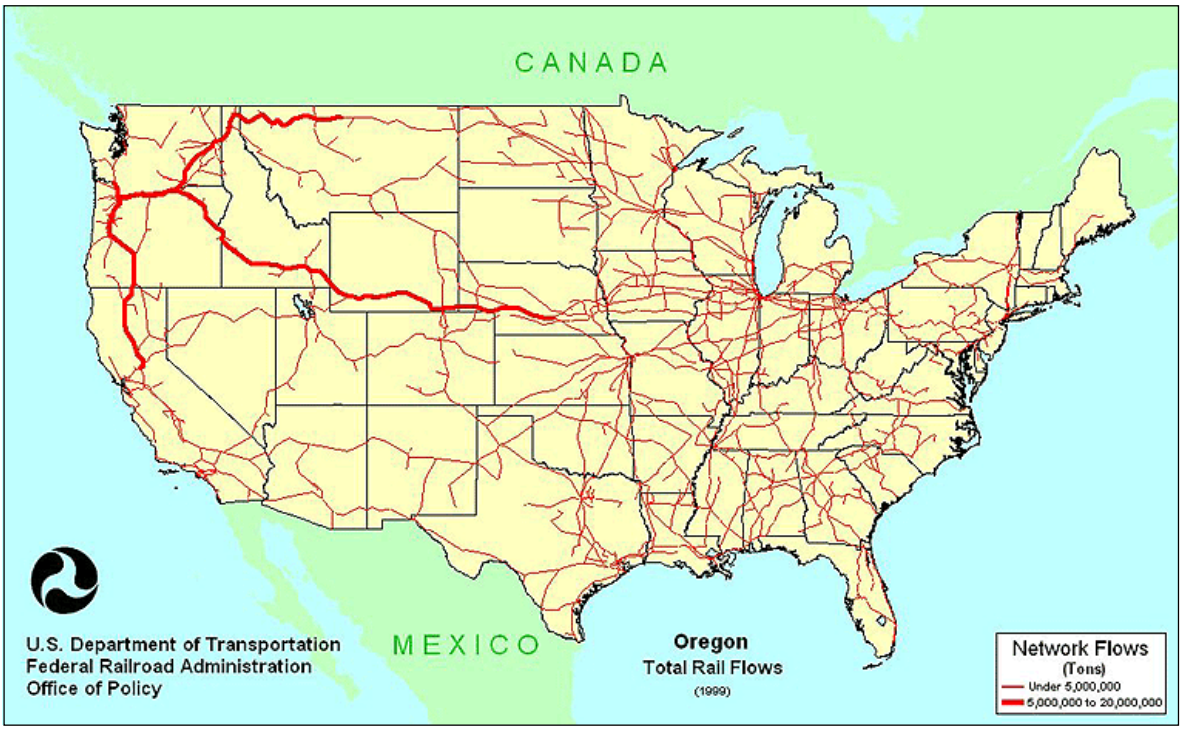
Figure 3.6 Terminating Rail Tonnage
By Oregon County



The final map in this section, Figure 3.7, shows the national rail flows to, from, and within Oregon based on 1999 Federal Rail Administration data.[5] The map highlights the importance of the Portland-Seattle, Willamette Valley, and Klamath corridors, which make up the north-south West Coast "I-5" rail corridor, and the Columbia Gorge and Boise (Northeast Oregon) corridors that provide east-west access.

[5] FRA. See http://www.ops.fhwa.dot.gov/freight/rail_maps/oregon_rail.htm.

Figure 3.7 National Rail Flows To, From, and Within Oregon



Portland Metropolitan Region Rail Tonnage and Commodities

Originating and Terminating Rail Tonnage and Commodities

The Portland metropolitan region – encompassing the counties of Clackamas, Columbia, Multnomah, Washington, and Yamhill – accounted for 66 percent of all Oregon originating and terminating rail tonnage in 1997. The region shipped 50 percent of Oregon's originating (outbound) rail tonnage and received 78 percent of the state's terminating (inbound) freight tonnage. Table 3.8 shows the top 10 rail commodities originating in the Portland metropolitan region. Table 3.9 shows the top 10 rail commodities terminating in the Portland metropolitan region.

Table 3.8 Top 10 Rail Commodities Originating in the Portland Metropolitan Region by Tonnage, 1997

STCC	Name	Originating Tons (Shipped Outbound from Portland region)	Percent
24	Lumber or Wood Products	1,770,040	24%
46	Misc. Mixed Shipments	1,757,124	24%
26	Pulp, Paper or Allied Products	1,057,979	14%
10	Metallic Ores	603,568	8%
33	Primary Metal Products	500,408	7%
28	Chemicals or Allied Products	466,449	6%
37	Transportation Equipment	322,603	4%
20	Food or Kindred Products	214,021	3%
40	Waste or Scrap Materials	92,520	1%
1	Farm Products	90,921	1%
	All Other Commodities	451,783	6%
	Total	**7,327,416**	**100%**

Source: Oregon DOT 1997 Commodity Flow Database.

Table 3.9 Top 10 Rail Commodities Terminating in the Portland Metropolitan Region by Tonnage, 1997

STCC	Name	Terminating Tons (Received Inbound to Portland region)	Percent
1	Farm Products	3,663,818	23%
28	Chemicals or Allied Products	3,552,004	23%
46	Misc. Mixed Shipments	2,302,559	15%
20	Food or Kindred Products	1,380,637	9%
32	Clay, Concrete, Glass or Stone	934,480	6%
40	Waste or Scrap Materials	679,172	4%
24	Lumber or Wood Products	579,781	4%
26	Pulp, Paper or Allied Products	542,456	3%
37	Transportation Equipment	427,672	3%
29	Petroleum or Coal Products	400,728	3%
	All Other Commodities	1,265,757	8%
	Total	**15,729,064**	**100%**

Source: Oregon DOT 1997 Commodity Flow Database.

4.0 Rail's Role in the Oregon Economy

4.1 Measures

This section reports measures of rail's role in the Oregon economy. The measures are grouped into two areas – economy and jobs. The measures are:

1. **Economy**
   - **Industry expenditures on rail services –** An estimate of the value of rail services purchased by industry, which is an indicator of the importance of rail to each industry;
   - **Industry output value –** The value of all goods and services produced by an industry, which is an measure of the size and economic importance of the industries that use rail;
   - **Railroad industry contribution to Gross State Product –** The value added to the Oregon economy by the rail industry itself; and
   - **Freight-rail "cost savings" to industry –** An approximation of the savings accruing to the Oregon economy from using lower-cost rail transportation instead of higher-cost truck transportation.
2. **Jobs**
   - **Railroad employment –** The number of jobs and amount of wages paid in the railroad industry; and
   - **Industry employment –** The number of employees in industries that use rail.

Economy

Rail Expenditures by Industry

The industries that expended the most on freight-rail service statewide and in the Portland metropolitan region in 2002 are shown in Table 4.1. The tables list the nine industries that spent over $10 million in 2002. These industries accounted for 96 percent of all rail expenditures. In the Portland metropolitan region, six industries spent over $10 million and accounted for 88 percent of rail expenditures. The industries that spent the

most on rail services both statewide and in the Portland metropolitan region were the lumber, wood, and paper products industry, the transportation equipment industry, and the wholesale trade industry.

The expenditures were calculated from carload waybill data reported by the railroads to the U.S. DOT Surface Transportation Board (STB). The STB carload waybill data are based on a sample of rail revenue and movement records and were used with the permission of Oregon DOT. The calculations were made by tabulating the amount of revenue spent on originating shipments of the major commodity produced by each industry. The underlying assumptions are that shippers pay transportation costs (which are recovered from the buyer in the price of the product) and that rail expenditures on the shipper's major product (commodity) are a reasonable proxy for the shipper's total rail expenditures. In practice, transportation costs may be split between shippers and receivers, and an industry may ship other products (commodities) by rail. Therefore, the expenditures shown in the table should be read as good relative measures of how much each industry spends on rail, not complete and absolute measures.

Table 4.1 Estimated Rail Expenditures by Industry

	Statewide	
	Industry	**Estimated Rail Expenditures on Originating Freight (millions)**
1	Lumber, wood, paper products	$486
2	Transportation Equipment	$107
3	Wholesale trade	$49
4	Food products	$37
5	Primary metals	$31
6	Construction	$19
7	Farm products	$16
8	Mining	$14
9	Chemicals	$10
	Total	**$772**
		96% of Oregon rail expenditures

	Portland Metropolitan Region[1]	
	Industry	**Estimated Rail Expenditures on Originating Freight (millions)**
1	Lumber, wood, paper products	$159
2	Transportation Equipment	$106
3	Wholesale trade	$49
4	Primary metals	$30
5	Food products	$15
6	Chemicals	$13
	Total	**$357**
		88% of Portland metropolitan region rail expenditures

Source: U.S. Department of Transportation, Surface Transportation Board, Carload Waybill Sample data for Oregon, 2002.

[1] Clackamas, Columbia, Multnomah, Washington, and Yamhill Counties.

Output Value by Industry

The output value in 2000 of the industries purchasing significant amounts of freight-rail service statewide and in the Portland-Vancouver metropolitan region are shown in Table 4.2.[2]

Table 4.2 Estimated Output Value by Industry

	Statewide	
	Industry	**Output Value (millions)**
1	Wholesale trade	$16,962
2	Construction	$14,744
3	Lumber, wood, and paper products	$8,745
4	Transportation Equipment	$6,889
5	Farm products	$5,891
6	Food products	$5,130
7	Primary metals	$2,508
8	Chemicals	$1,396
9	Mining	$562
	Total	**$62,827**

	Portland-Vancouver Metropolitan Region[3]	
	Industry	**Output Value (millions)**
1	Wholesale trade	$15,180
2	Transportation Equipment	$4,928
3	Lumber, wood, and paper products	$2,946
4	Food products	$2,312
5	Primary metals	$1,408
6	Chemicals	$777
	Total	**$27,551**

Source: U.S. Bureau of Economic Analysis data.

[2] Output value is a measure of an industry's gross sales or receipts. The value of intermediate inputs (e.g., consumption of goods and services purchased from other U.S. industries or imported) is subtracted from the output value to calculate the value added by an industry to a state's gross state product (GSP). Output values for Oregon industries were calculated based on GSP figures from the Bureau of Economic Analysis. U.S. output multipliers (the relation between U.S. GDP by industry and U.S. output by industry) were then applied to the Oregon GSP figures to generate estimates of Oregon output by industry. Output is used in the analysis rather than GSP because it can be more directly linked to transportation-related value of shipments.

[3] Statistics include industry output for Clackamas, Columbia, Multnomah, Washington, and Yamhill Counties in Oregon; and Clark County in Washington State.

The Oregon industries listed in the left columns of the table produced goods valued at $62.8 billion, accounting for 26.4 percent of Oregon output. The corresponding contribution of these industries to the Oregon Gross State Product (GSP) in 2001 was $17.6 billion, accounting for 14.7 percent of state's GSP.[4]

Railroad Industry Contribution to Gross State Product (GSP)

In 2001, the rail industry itself contributed $306 million to Oregon's gross state product (GSP) in direct activity (not including the indirect benefit of rail to shipping and receiving industries).[5] The rail industry's contribution to the Oregon GSP is on par with the U.S. average.

Freight-Rail "Cost Savings" for Oregon Industry

Freight-rail service "saved" Oregon industries an estimated $440 million in 1997. Oregon industry originated 12,623 million ton-miles of rail traffic in 1997.[6] The average cost nationwide of shipping by rail is 4.5 cents per ton mile and the average cost of shipping by truck is eight cents per mile.[7] If freight-rail service were not available to Oregon shippers and they were to make all shipments by truck, their costs would increase by 3.5 cents per ton mile or a total of about $440 million.

This is a hypothetical case and provides at best a "back-of-the-envelope" approximation of the direct transportation value of rail to Oregon shippers. If freight-rail service were not available in Oregon, cost and technical considerations would force some industries to relocate or close rather than shift their freight to trucking. The cumulative impacts of losing rail service could be considerably larger than $440 million, but there are no readily available analytical models for approximating this cost.[8]

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[4] U.S. Bureau of Economic Analysis data. GSP is the value added in production by the labor and property located in a state. Value added is equivalent to gross output (sales or receipts) minus intermediate inputs (consumption of goods and services purchased from other U.S. industries or imported). In general, output values are two time higher than the GSP values for an industry. However, for this group of selected industries, the ratios are significantly higher. The output value of the lumber, wood, and paper products industry is three times greater than its contribution to GSP; the transportation equipment industry's output is ten times higher; and the farm and food products industry's, four times higher; the primary metals and chemicals industries' output values are three times higher; and the construction industry, 2.5 times higher.

[5] U.S. Bureau of Economic Analysis data.

[6] American Association of Railroads data, 2002.

[7] Nationwide, intermodal rail service averages $0.045 per mile, and carload rail averages $0.023 per mile. The intermodal rate was used for this back-of-the-envelope calculation of rail "savings" because it produces a more conservative estimate.

[8] The analyses conducted for AASHTO's *Freight-Rail Bottom Line Report* and the I-95 Corridor Coalition's *Mid-Atlantic Rail Operations Program Initial Benefits Assessment Study* used the FHWA's

(Footnote continued on next page...)

Jobs

Railroad Employment

In 2002, the rail industry provided 2,745 railroad jobs in Oregon, of which 2,270 (83 percent) were in freight rail.[9] The number of rail employees in Oregon fell 62 percent between 1980 and 2002 – from 7,160 in 1980[10] to 3,660 in 1990[11] to 2,745 in 2002.[12] The decline in railroad jobs in Oregon paralleled the decline in railroad jobs nationally – about 60 percent over the 20-year period – the result of the reorganization of the rail industry after its economic deregulation in 1980 and the shrinking rail market.

In 2002, freight-rail employees in Oregon earned $163 million. The average wage for Oregon freight-rail employees was $59,500 with fringe benefits of $22,300, for a total compensation of $81,800. Average annual freight-rail wages have grown significantly since 1980 and are slightly above the national rail average. Average wage and salary disbursements per employee for the rail industry in Oregon are more than double the average wage for all industries in the state.[13]

Employment by Industry

The numbers of jobs supported in 2001 by industries that purchased significant amounts of freight-rail service are shown in Table 4.3.

Highway Economic Requirements Model (HERS) to estimate the economic impact of decreasing the volume of freight carried by rail and increasing the corresponding volume of freight carried by truck. The AASHTO study looked at the national impacts and the I-95 study looked at regional impacts, but neither attempted an industry-by-industry analysis, which would be necessary to provide a more precise estimate of the effects of rail-to-truck freight diversions. The newly available HERS/State models could be used to analyze the highway impacts of rail-to-truck freight diversions on Oregon and provide a more tailored measure of the value of rail to the Oregon economy.

[9] American Association of Railroads data, 2002.

[10] U.S. Bureau of Economic Analysis data.

[11] U.S. Bureau of Economic Analysis data.

[12] American Association of Railroads data, 2002.

[13] U.S. Bureau of Economic Analysis, U.S. Department of Commerce.

Table 4.3 Employment by Industry

	Statewide [14]	
	Industry	**Employment**
1	Construction	120,622
2	Wholesale trade	82,337
3	Farm products	67,021
4	Lumber, wood, and paper products	42,720
5	Food products	23,007
6	Transportation Equipment	15,656
7	Primary metals	9,693
8	Mining	3,228
9	Chemicals	4,237
	Total	368,521

	Portland-Vancouver Metropolitan Region[15]	
	Industry	**Employment**
1	Wholesale trade	55,600
2	Lumber, wood, and paper products	12,220
3	Transportation Equipment	11,200
4	Food products	8,800
5	Primary metals	7,700
6	Chemicals	2,358
	Total	97,878

Source: U.S. Bureau of Economic Analysis data.

[14] County Business Patterns, U.S. Census Bureau. Employment numbers are provided only for those industries that purchase a significant amount of freight rail service.

[15] Bureau of Economic Analysis, U.S. Department of Commerce.

5.0 Rail Use by Industry Statewide

5.1 Overview

This section provides profiles of rail use by industry statewide. The profiles cover nine industries that purchase significant amounts of freight-rail service. These industries, in order of their expenditures, are:

- Lumber, wood, and paper products industry;
- Transportation equipment industry;
- Wholesale trade industry;
- Food products industry;
- Primary metals industry;
- Construction industry;
- Farm products (agriculture) industry;
- Mining industry; and
- Chemical industry.

The first half of each industry profile lists the value of goods and services purchased by the industry from other industries and used as inputs to production. For example, the profile of the Oregon lumber, wood, and paper products industry shows that the industry purchases $2.3 billion of goods and services from within the industry itself, $540 million of goods and services from the agriculture and forest industry, and $190 million of goods and services from the chemicals industry. These purchases may be from within Oregon or from national and global suppliers. The profile also shows the industries that consume the output of the Oregon lumber, wood, and paper products industry.[1] Again, the consuming industries may be inside and outside Oregon.

The second half of the profile looks at how freight rail is used to move the key commodity associated with the industry. The profile describes the role of freight rail in moving the

[1] The allocation of the output value of Oregon's lumber, wood, and paper products industry across the consuming industries is not shown in the profile. The allocations can be calculated, but were beyond the scope of this study. The industries shown under "outputs used by" are based on national input-output data, not Oregon-specific data, but are generally representative of the industries that consume Oregon's products.

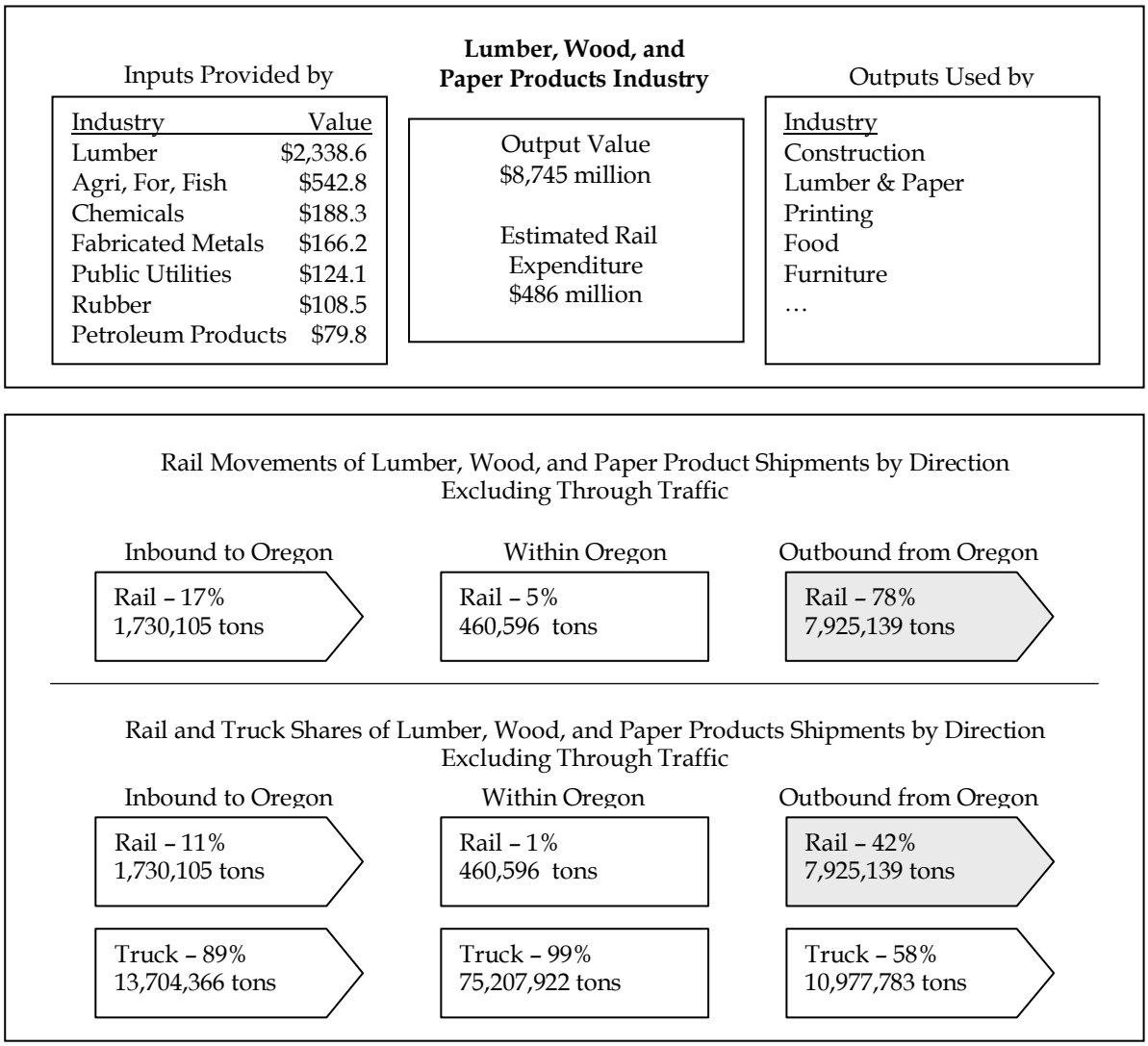
commodity into, within, and out of Oregon, and shows the share carried by rail compared to truck. Inbound commodity moves are important because they supply industry production. Outbound rail moves are important because they represent sales by Oregon industries to national and global export markets and bring money into the Oregon economy.

Lumber, Wood and Paper Products Industry

Statewide, the lumber, wood, and paper products industry spent an estimated $486 million on rail services, which helped support an industry economic output value of $8,745 million and 42,720 jobs. The major rail commodities associated with the industry were "lumber and wood products" and "pulp and paper products." Rail carried seven percent of all lumber and wood products shipments made by rail and truck and 34 percent of pulp and paper products shipments. Of the rail shipments, 78 percent were outbound shipments, making up 42 percent of all outbound rail and truck shipments. Rail service is vital to the industry in earning "export" dollars.

Lumber, wood, and paper are traditional pillars of the Oregon economy. While employment and output in this industry have been declining for years, a shift toward more value-added processing has created new business 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 higher-value items, such as structural architectural framings, before being shipped to domestic markets or overseas.

Oregon has been a primary source of lumber and wood products for much of the United States market. Lumber and wood products were shipped from Oregon to the major United States Midwest and East Coast markets. However, the supplier-market relationship has changed over time. Today, Oregon continues to be a principal supplier 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 manufacturers in Southeastern United States and Eastern Canada 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. The Port of Portland estimates that 60 of domestic lumber and wood products traffic moves north-south and 40 percent, primarily international traffic, moves east-west. Rail is now critically important to Oregon's lumber, wood, and paper products industry to reach the Southern California and Southwest markets.

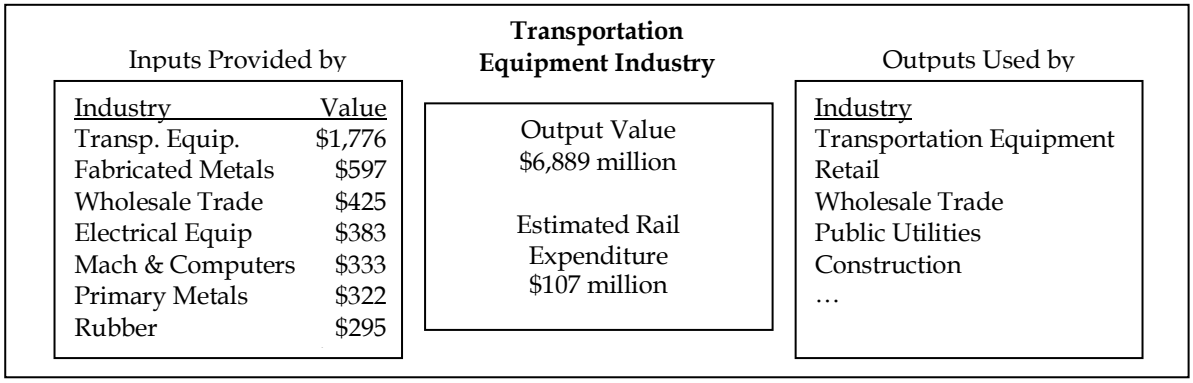


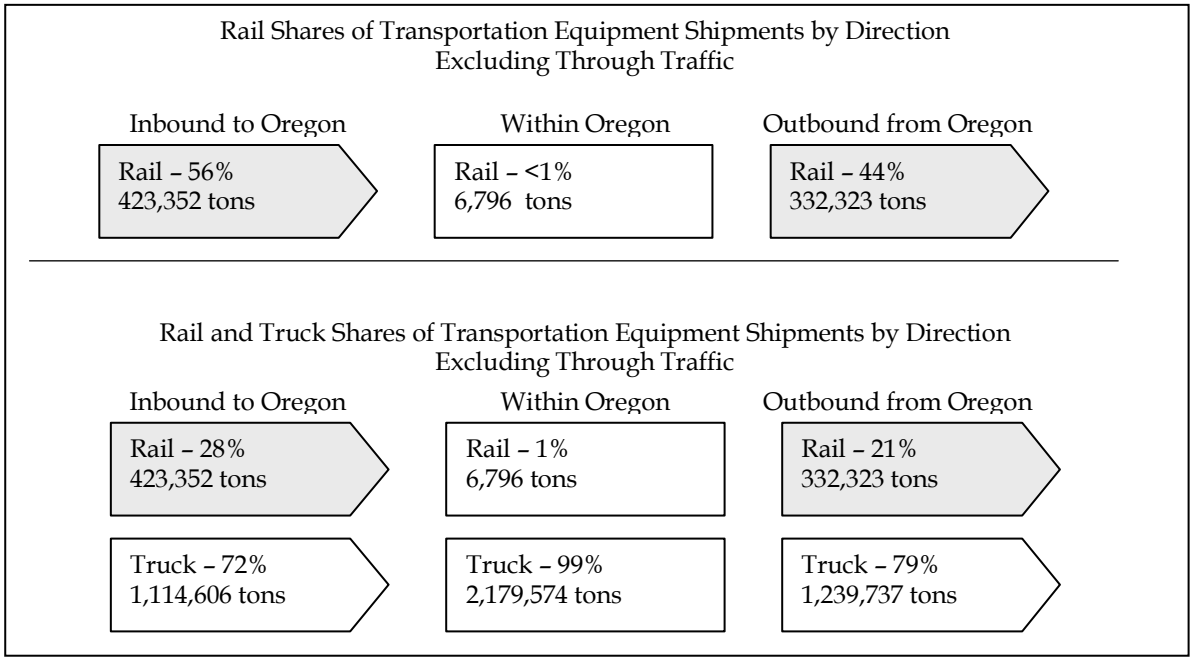
Transportation Equipment Industry

Statewide, the transportation equipment industry spent an estimated $107 million on rail services, which helped support an industry economic output value of $6,889 million and 15,656 jobs. The major rail commodity associated with the industry was "transportation equipment." Rail carried 14 percent of all transportation equipment shipments made by rail and truck. Of the rail shipments, 56 percent were inbound shipments, making up 28 percent of all inbound rail and truck shipments. Rail also carried a signification portion of outbound shipments, which made up 44 percent of rail shipments and 21 percent of all rail and truck outbound shipments.

The Pacific Northwest and Oregon are home to one of the greatest concentrations of transportation equipment manufacturers in the United States, including Boeing and Paccar in Seattle and Freightliner and Gunderson in Portland. Suppliers that support the aerospace, truck, and railcar manufacturing industries, including primary metal producers (e.g., aluminum and steel producers), are located throughout the Pacific Northwest.

The transportation equipment industry tends to be very cyclical, rising with economic upturns and falling during recessions. After a decade of robust growth, the aerospace industry has suffered a sharp slump, and the timing of its recovery is uncertain. However the Oregon's truck and railcar producers have done well through the recession and the outlook is for strong growth in these sectors. Finished transportation equipment is often driven, flown, or shipped out Oregon, but the manufacturers of transportation equipment require a reliable stream of components and parts to produce trucks and railcars in a timely and cost-effective manner. Rail service is particularly important for inbound shipments of heavy castings and components.



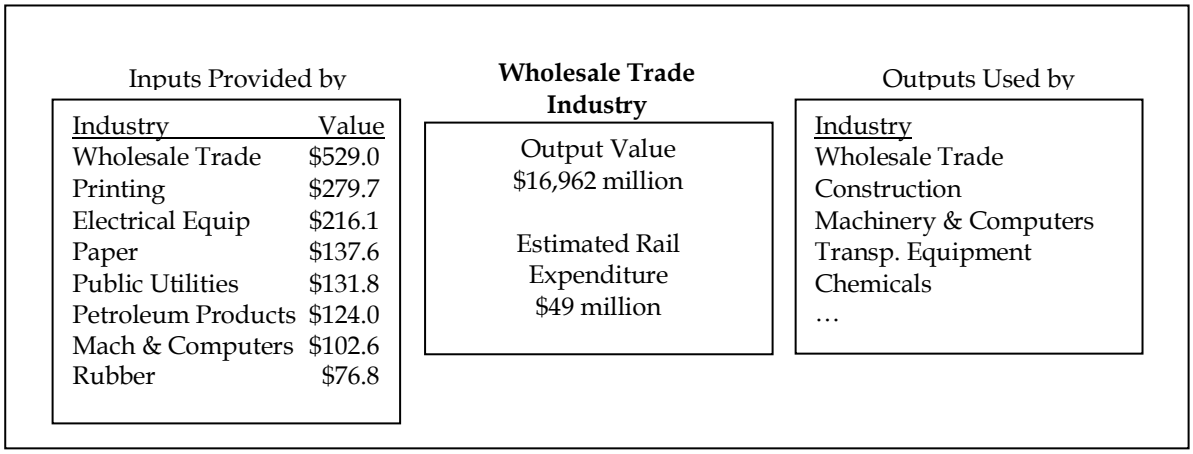


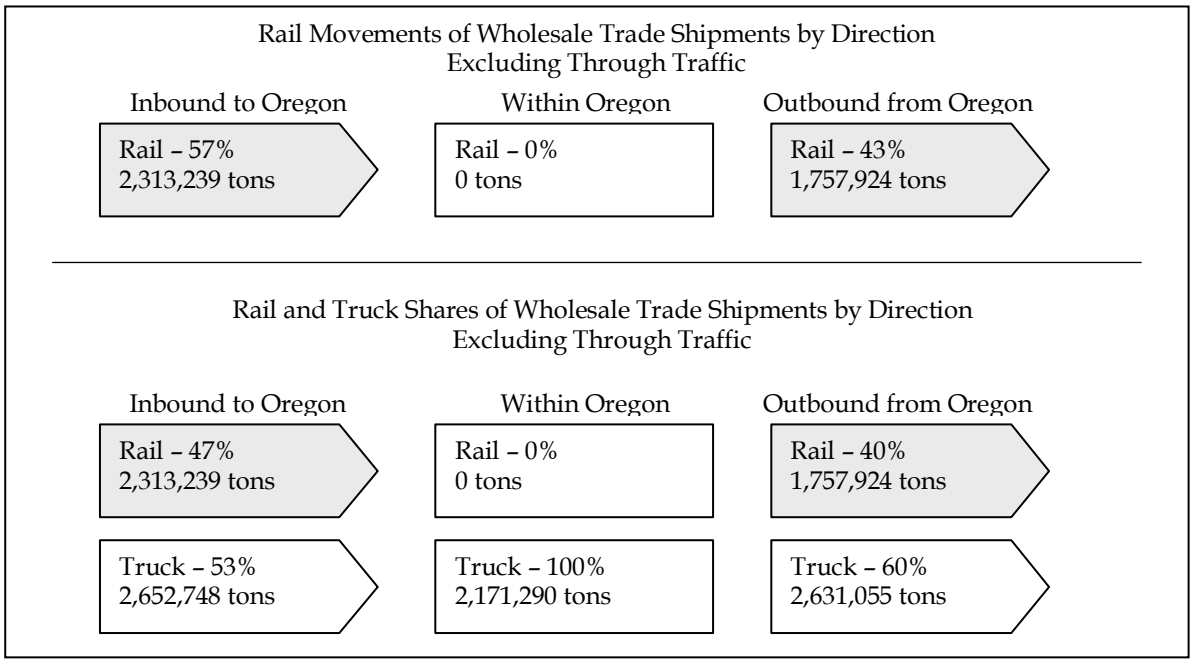
Wholesale Trade Industry

Statewide, the wholesale trade industry spent an estimated $49 million on rail services, which helped support an industry economic output value of $16,962 million and 82,337 jobs. The major rail commodities associated with the industry were "mixed shipments" and "general freight all kinds," predominately merchandise. Rail carried 35 percent of all

wholesale trade shipments made by rail and truck. Of the rail shipments, 57 percent were inbound shipments, making up 47 percent of all inbound rail and truck shipments, and 43 percent were outbound shipments, making up 40 percent of all outbound rail and truck shipments. The relatively high rail shares reflect Portland's role as a major distribution center for the Pacific Northwest and the benefits to Portland and Oregon shippers and receivers of good access to both the Port of Portland and the national rail system.

Distribution is part of Portland's economic legacy. The area developed as the distribution center for the Pacific Northwest because of its unique geographic advantages. It has access to interior states via a navigable waterway and river-level rail and highway routes, giving Portland a significant transportation advantage over other West Coast ports. Water access, combined with its location in the major valley of a mountainous region and proximity to the Pacific Ocean, make Portland area an ideal distribution hub. As the rail, water, and roadway network developed around Portland, the distribution industry grew, attracting distributors that today serve Oregon, Washington, Idaho, the western portions of Montana, and the northern parts of California. In recent decades the distribution and warehousing industry has expanded to accommodate a large influx of new residents into the region. As the Pacific Northwest continues to grow in population, the distribution industry in Oregon is expected to expand commensurately.





Food Products Industry

Statewide, the food products industry spent an estimated $37 million on rail services, which helped support an industry economic output value of $5,130 million and 23,007 jobs. The major rail commodity associated with the industry was "food products and processed foods." Rail carried seven percent of all wholesale trade shipments made by rail and truck. Of the rail shipments, 70 percent were inbound shipments, making up 23 percent of all inbound rail and truck shipments. This indicates that rail, because it transports heavy and bulk farm and foods products, is important to the industry in keeping production costs down and competitive.

The productivity of Oregon agricultural industry and the closely related food products industry is growing, with output in both sectors expanding while overall employment remains steady. This sector is forecast to be a long-term growth industry for the region, but only if it can move its high-valued-added products to market cost-competitively. Trucks are commonly used to ship processed foods, but rail is used to receive heavy, bulky inputs such as sweeteners, processing chemicals, and packing materials. Increasing rail costs or declining rail reliability increase production costs, driving up the price of food products, and undercutting the competitiveness of Oregon suppliers in domestic and global markets. Conversely, decreasing rail cost and improving rail reliability bolster the productivity and competitiveness of the industry.

Food Products Industry

Inputs Provided by

Industry	Value
Farm	$1,371.3
Food	$696.0
Wholesale Trade	$265.2
Paper	$144.5
Fabricated Metals	$117.9
Rubber	$92.9
Stone, Clay, Etc.	$49.9
Chemicals	$49.5

Output Value
$5,130 million

Estimated Rail
Expenditure
$37 million

Outputs Used by

Industry
Food Products
Farm Products
Retail
Chemicals
…

Rail Movements of Food Product Shipments by Direction
Excluding Through Traffic

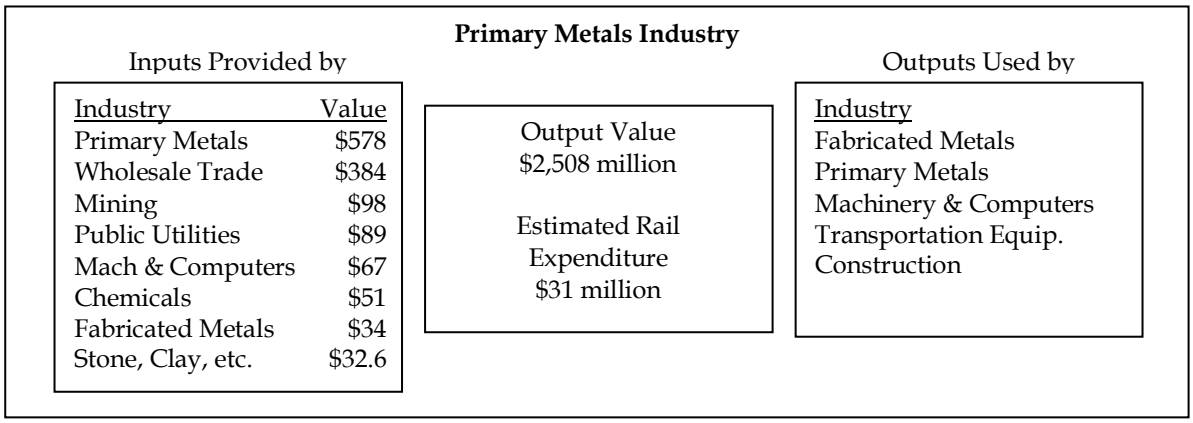
Inbound to Oregon	Within Oregon	Outbound from Oregon
Rail – 70% 1,610,952 tons	Rail – 2% 49,608 tons	Rail – 28% 642,963 tons

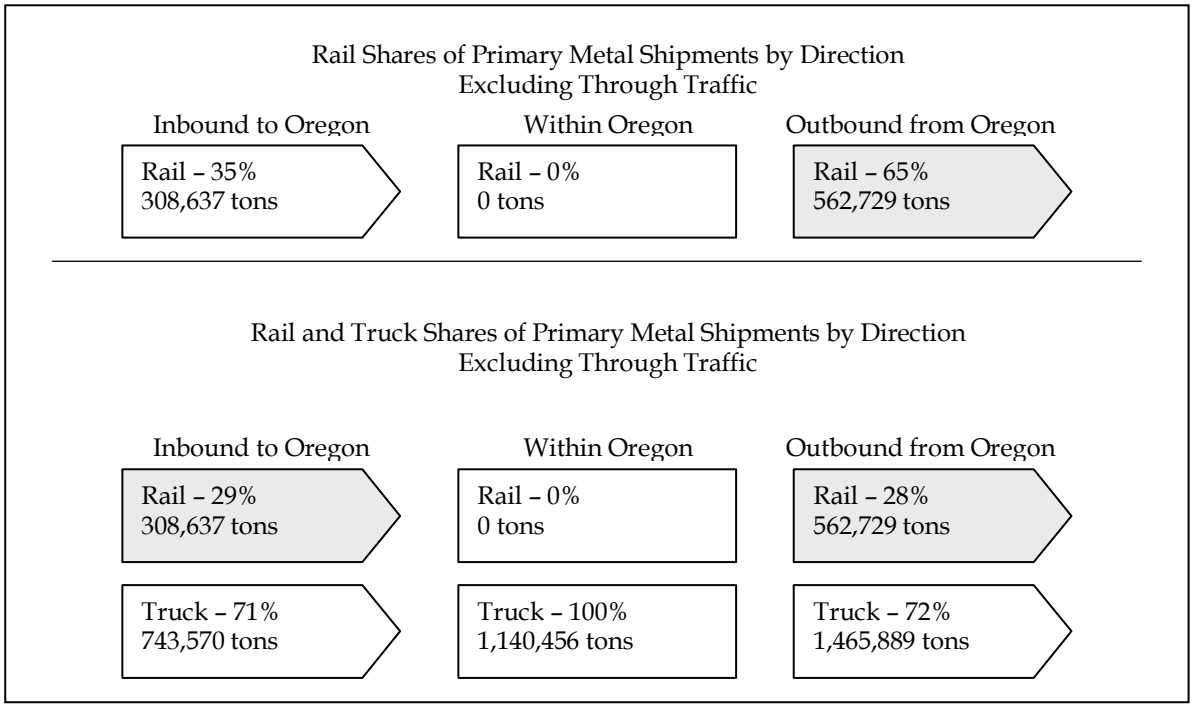
Rail and Truck Shares of Food Products Shipments by Direction
Excluding Through Traffic

Inbound to Oregon	Within Oregon	Outbound from Oregon
Rail – 23% 1,610,952 tons	Rail – <1% 49,608 tons	Rail – 13% 642,963 tons
Truck – 77% 5,535,492 tons	Truck – 99% 22,604,026 tons	Truck – 87% 4,483,733 tons

Primary Metals Industry

Statewide, the primary metals industry spent an estimated $31 million on rail services, which helped support an industry economic output value of $2,508 million and 9,693 jobs. The major rail commodity associated with the industry was "primary metals," which includes scrap metal imported for recasting. Rail carried 21 percent of all primary metals shipments made by rail and truck. Of the rail shipments, 65 percent were outbound shipments, making up 28 percent of all inbound rail and truck shipments. Rail also carried a signification portion of inbound shipments, accounting for 35 percent of rail shipments and 29 percent of all rail and truck inbound shipments.



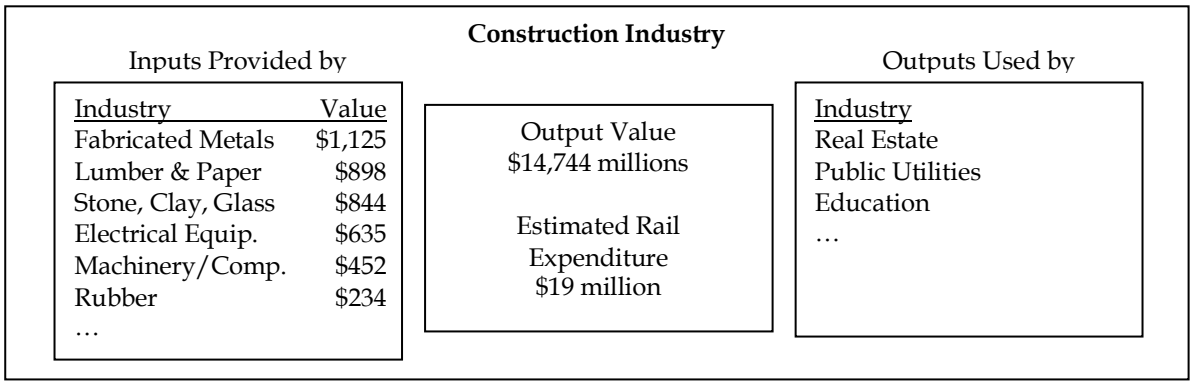


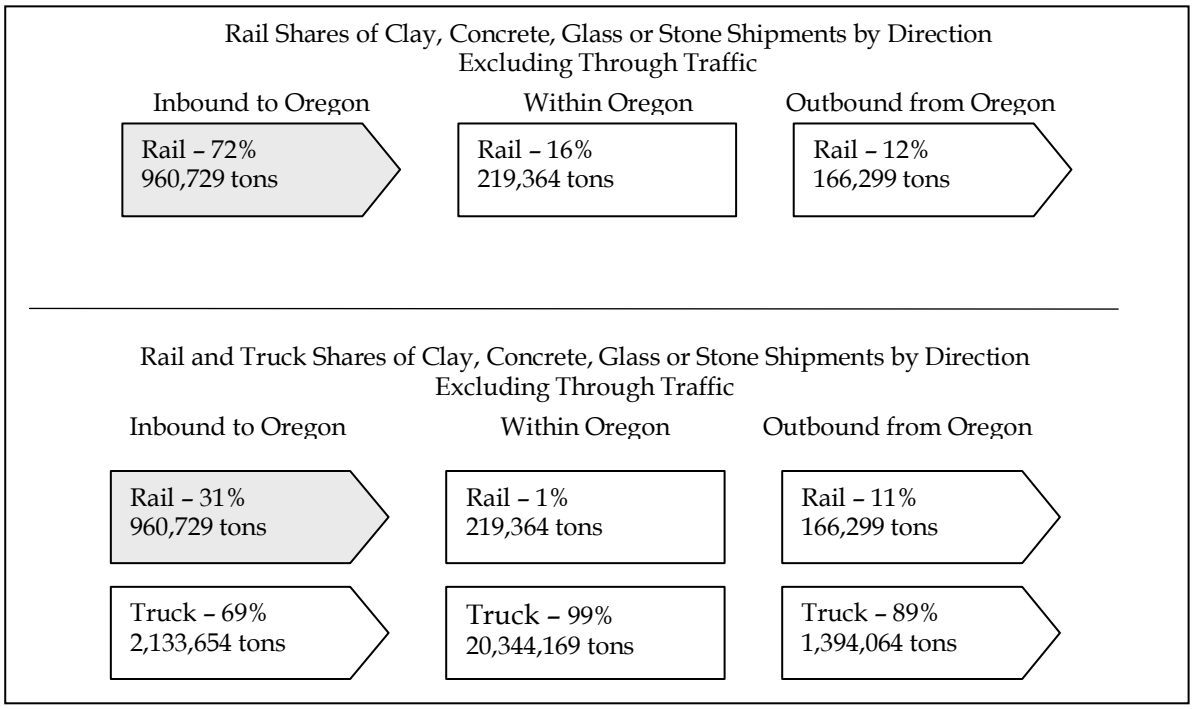
Construction Industry

Statewide, the construction industry spent an estimated $19 million on rail services, which helped support an industry economic output value of $14,744 million and 120,622 jobs. The major rail commodity associated with the industry was "clay, concrete, glass, and stone." (The highest-value commodity input to the construction industry was "fabricated metals," most of which was transported locally by truck.) Rail carried five percent of all clay, concrete, glass, and stone shipments made by rail and truck. Of the rail shipments, 72 percent were inbound shipments, making up 31 percent of all inbound rail and truck shipments, and indicative of rail's advantage in supplying heavy freight cost-effectively.

The construction industry is driven by population and economic growth. The region has significant potential for economic expansion. Regional economic growth averaged

3.4 percent per year over the last 20 years, outpacing the United States average in the last decade. Regional employment also has grown faster than the national average. Despite the recent slowdown in the economy, the economy of the Oregon and the Pacific Northwest is forecast to match or exceed the national average over the next 20 years. This growth will trigger a corresponding demand for residential, commercial, and industrial construction. Rail, which can supply heavy and bulky construction materials such as stone, clay, glass and concrete cost-effectively, will be important to keep down the cost of construction and, indirectly, the cost of doing business and living in Oregon.



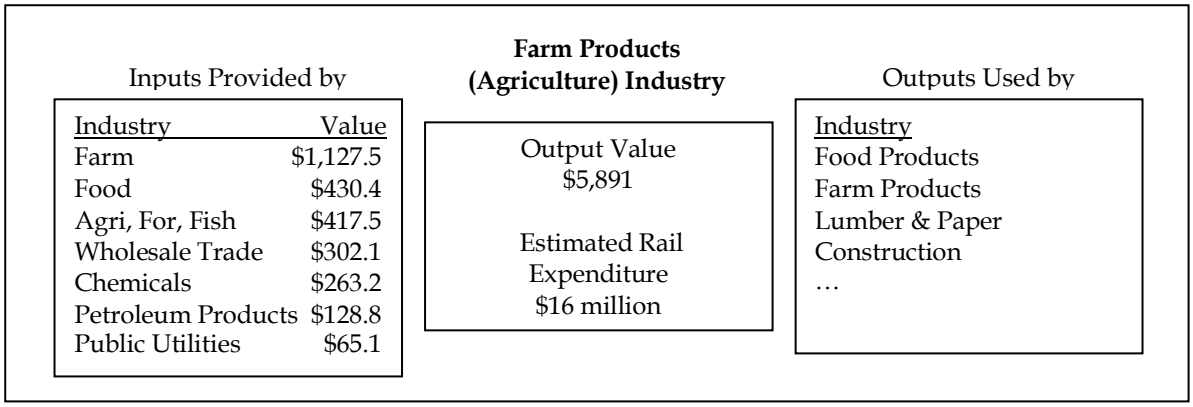


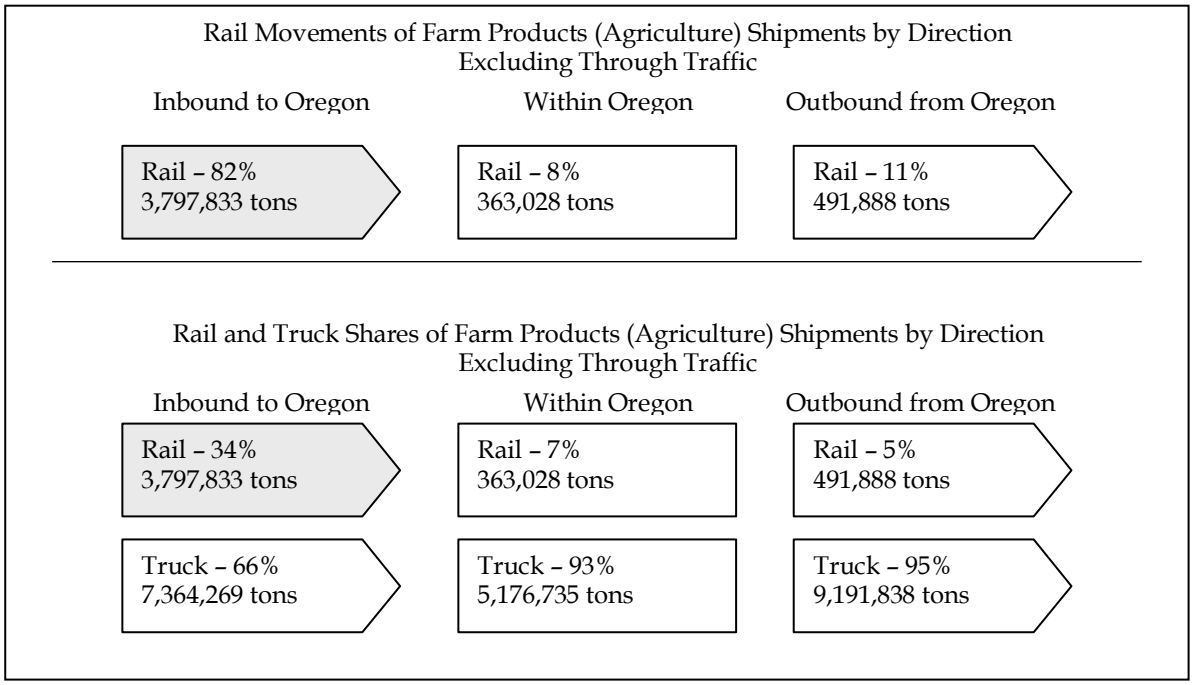
Farm Products (Agriculture) Industry

Statewide, the farm products (agriculture) industry spent an estimated $16 million on rail services, which helped support an industry economic output value of $5,891 million and 67,021 jobs. The major rail commodity associated with the industry was farm products.

Rail carried 18 percent of all farm products shipments made by rail and truck. Of the rail shipments, 82 percent were inbound shipments, making up 34 percent of all inbound rail and truck shipments and reflecting Portland's importance as a grain export and food processing center.

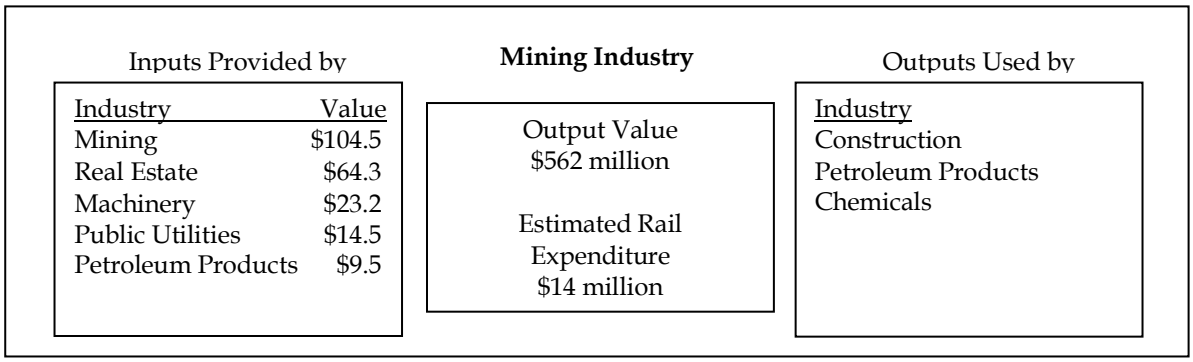
Umatilla, Oregon is the sixth largest grain producing in the United States. Producers in Oregon and across the Pacific Northwest compete in world grain markets with growers from Australia, Canada, France, and Argentina. Over half of the Pacific Northwest's export trade today is with Pacific Rim countries, much of it is trade in grain that moves through the Port of Portland's marine terminals and other Columbia River ports. Grain export sales are particularly sensitive to cost. Differences of a few cents a ton affect buyers' choices among global suppliers, making cost-effective rail movement of grain and farm products vitally important to competitiveness of Oregon agriculture.

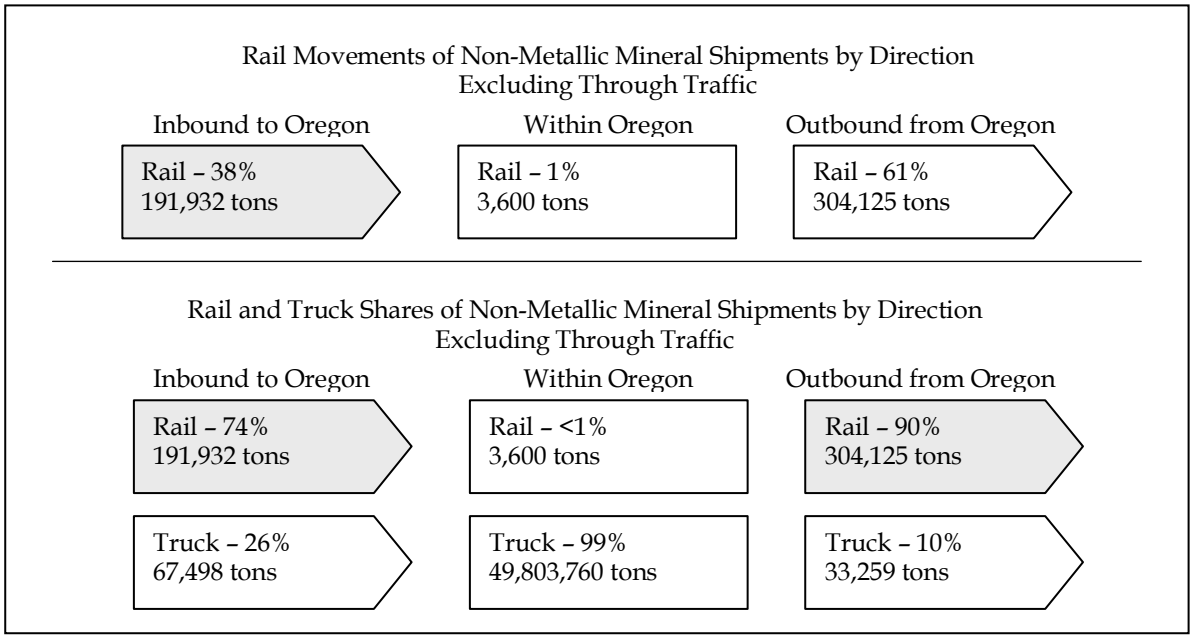




Mining Industry

Statewide, the mining industry spent an estimated $14 million on rail services, which helped support an industry economic output value of $562 million and 3,228 jobs. The major rail commodities associated with the industry were "non-metallic minerals," typically quarried stone, sand, gravel, clay, and ceramic and refractory minerals. Rail carried one percent of all non-metallic minerals shipments made by rail and truck. Trucks carried 99 percent of the total truck and rail tonnage within Oregon, but rail carried 74 percent of the inbound tonnage and 90 percent of the outbound tonnage. Without rail service capable of hauling heavy, bulky commodities the Oregon mining industry would likely lose much of its out-of-state market for quarried stone and related products.





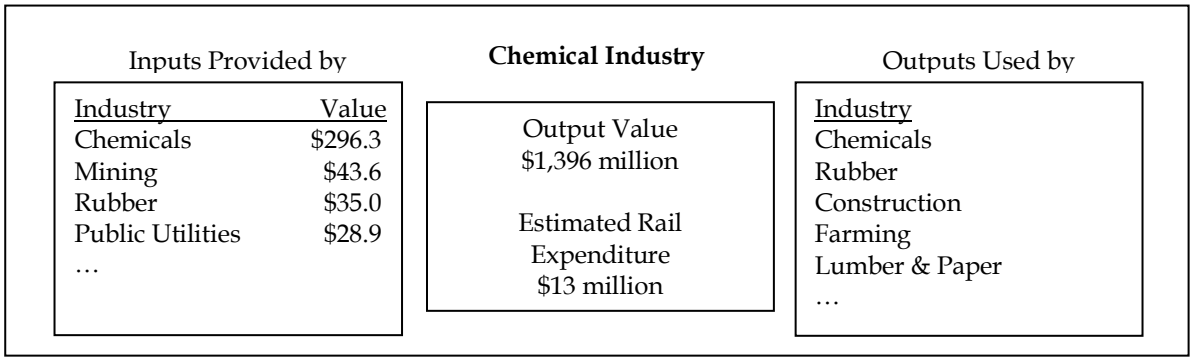
Chemical Industry

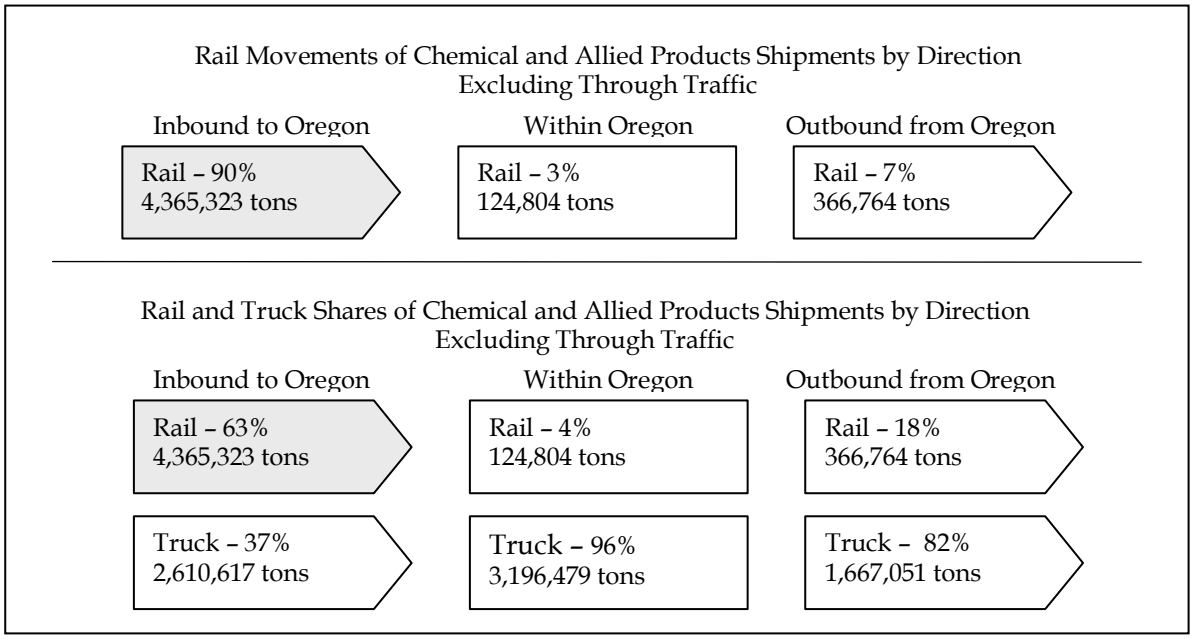
Statewide, the chemical industry spent an estimated $13 million on rail services, which helped support an industry economic output value of $1,396 million and 4,237 jobs. The major rail commodities associated with the industry were "chemical and allied products."

Rail carried 39 percent of all chemical and allied product shipments made by rail and truck. Of the rail shipments, 90 percent were inbound shipments, making up 63 percent of all inbound rail and truck shipments.

The bulk of inbound rail shipments were soda ash (2.9 million tons) and potash (1.5 million tons) moving to the Portland marine terminals for export. Alcohols, acyclic organic chemical such as ethylene and butylenes, plastics, and anhydrous ammonia (used in fertilizer) were the other significant inbound rail chemicals. The largest outbound chemical commodity was acyclic organic chemicals.

Rail is the preferred mode for shipment of bulk chemicals and, for safety reasons, shipment of hazardous chemicals. Chemicals transported by rail are a major input to other rail-dependent industries in Oregon such as the construction, farming, lumber, and paper industries. Cost-effective rail service is important to Oregon's chemical industry, itself, but also has a pronounced "multiplier" effect on other Oregon industries because of the volume of chemicals moved by rail.





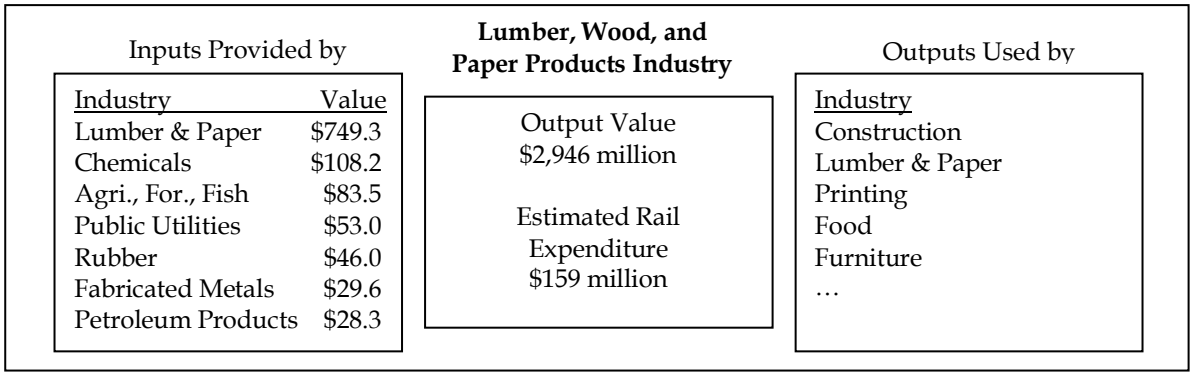
6.0 Rail Use by Industry in the Portland Metropolitan Region

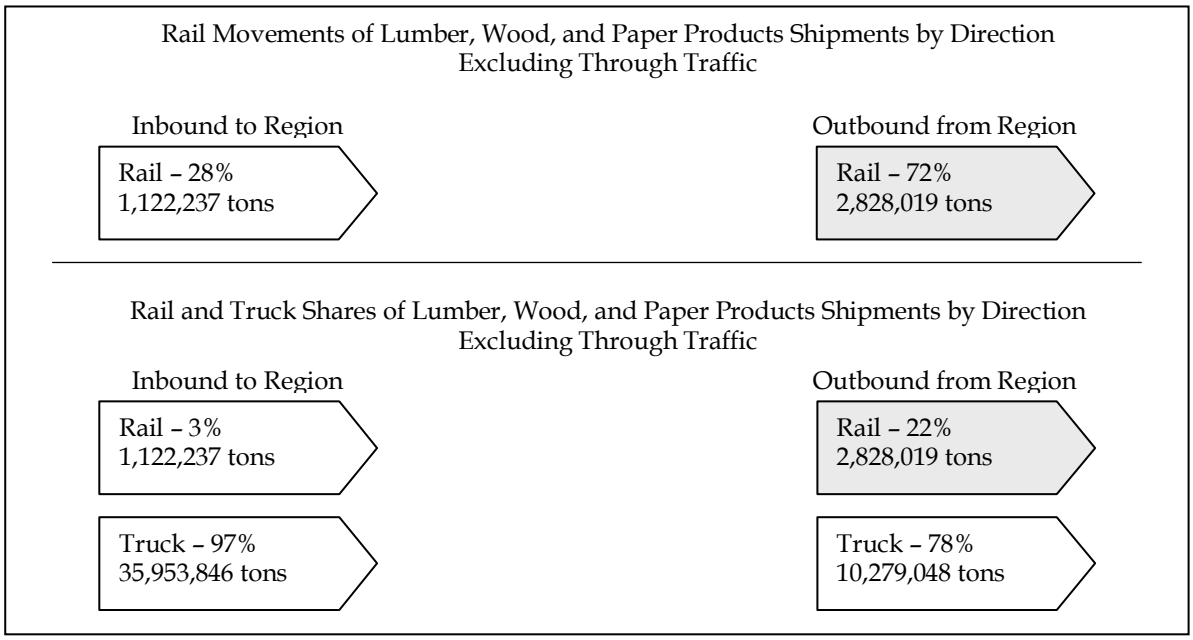
6.1 Overview

This section provides profiles of rail use by industry in the Portland metropolitan region. The profiles cover six industries that account for the majority of rail expenditures on originating shipments. The profiles follow the same format as the statewide industry profiles.

Lumber, Wood and Paper Products Industry

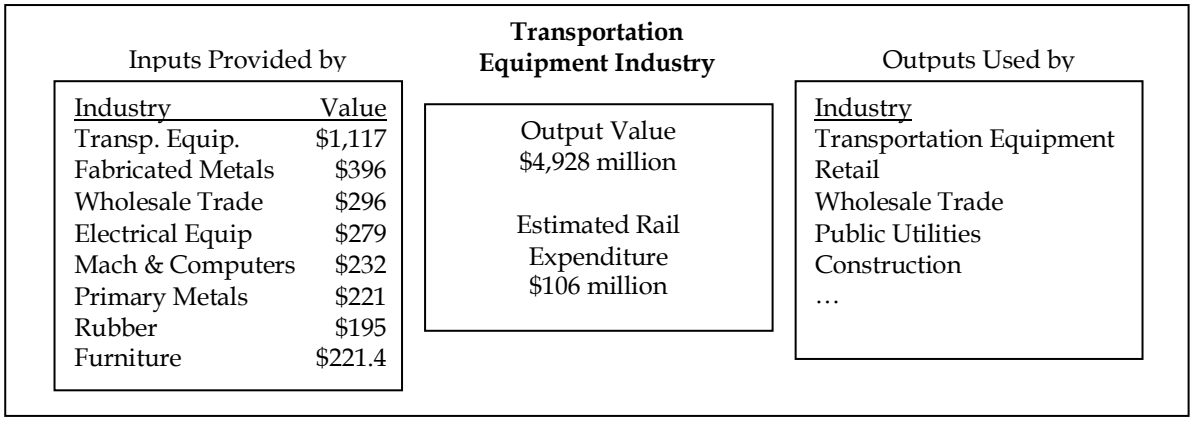
In the Portland metropolitan region, the lumber, wood, and paper products industry spent an estimated $159 million on rail services, which helped support an industry economic output value of $2,946 million and 12,200 jobs. The major rail commodities associated with the industry were "lumber, wood, pulp, and paper products." Of the rail shipments, 31 percent were inbound shipments and 69 percent outbound shipments, with a large portion of the outbound shipments going to markets in Southwest and California.

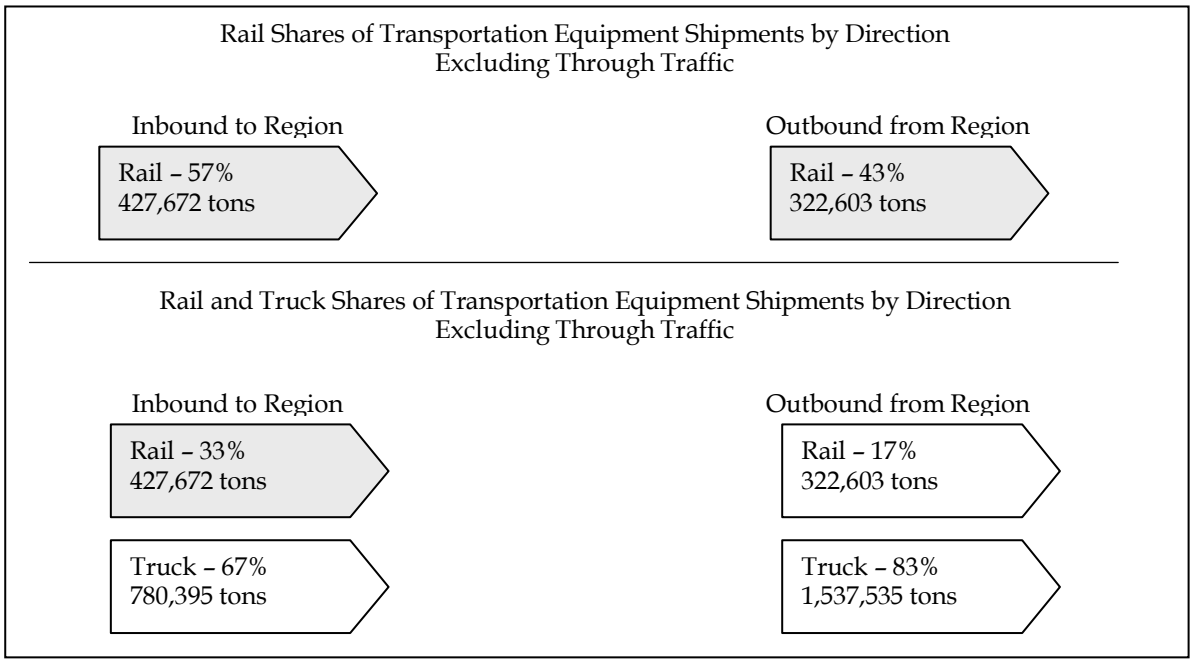




Transportation Equipment Industry

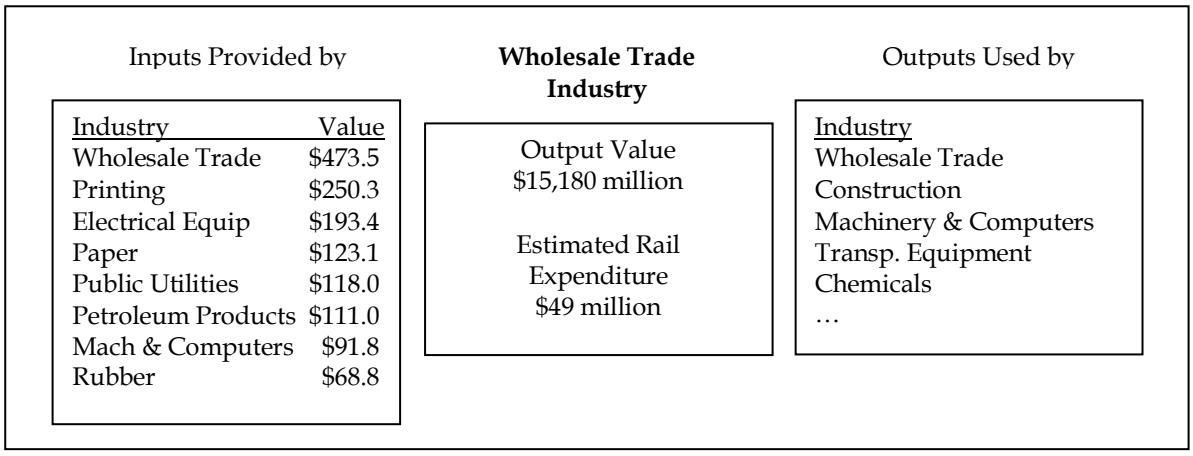
In the Portland metropolitan region, the transportation equipment industry spent an estimated $106 million on rail services, which helped support an industry economic output value of $4,928 million and 11,200 jobs. The major rail commodity associated with the industry was "transportation equipment." Of the rail shipments, 57 percent were inbound shipments.

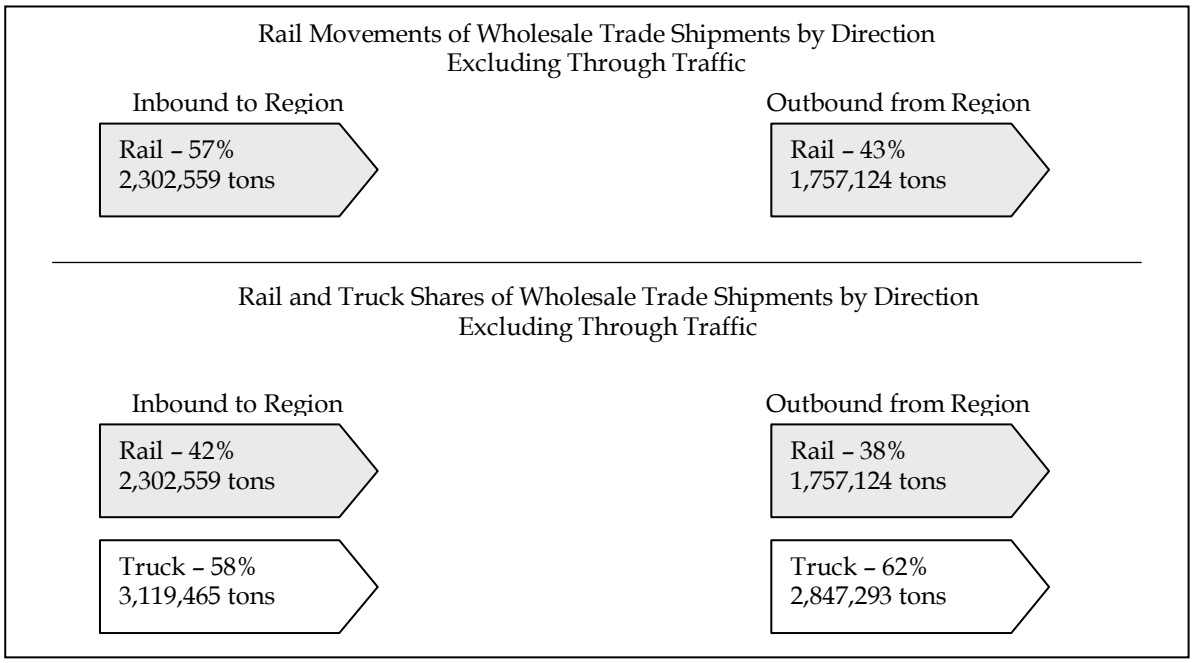




Wholesale Trade Industry

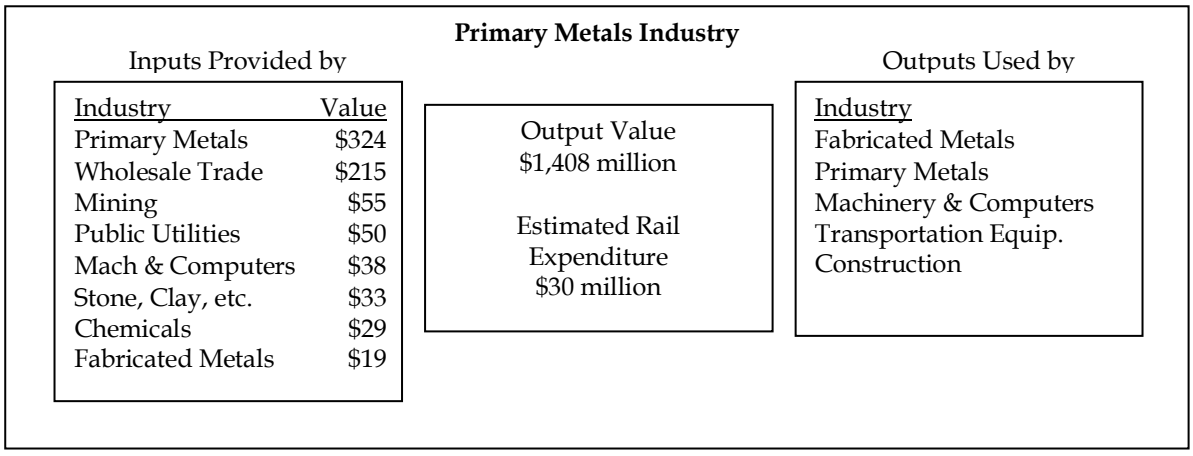
In the Portland metropolitan region, the wholesale trade industry spent an estimated $49 million on rail services, which helped support an industry economic output value of $15,180 million and 55,600 jobs. The major rail commodity associated with the industry was "mixed shipments/general freight all kinds," predominately merchandise. Of the rail shipments, 57 percent were inbound shipments and 43 percent were outbound shipments.

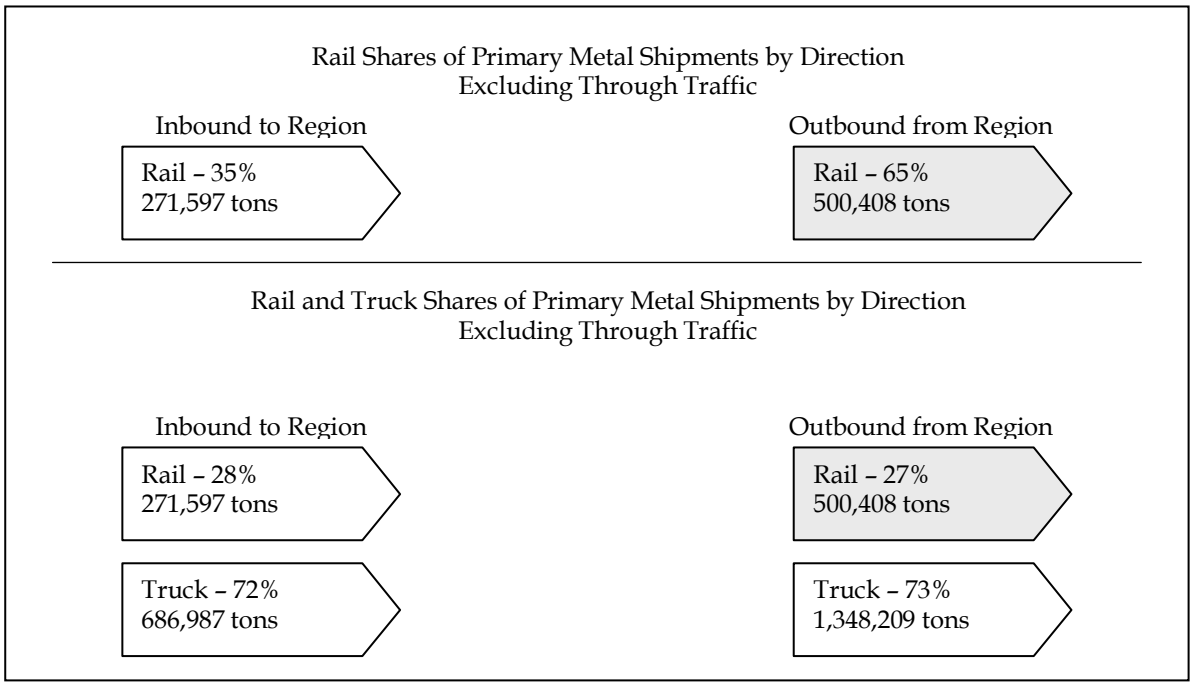




Primary Metals Industry

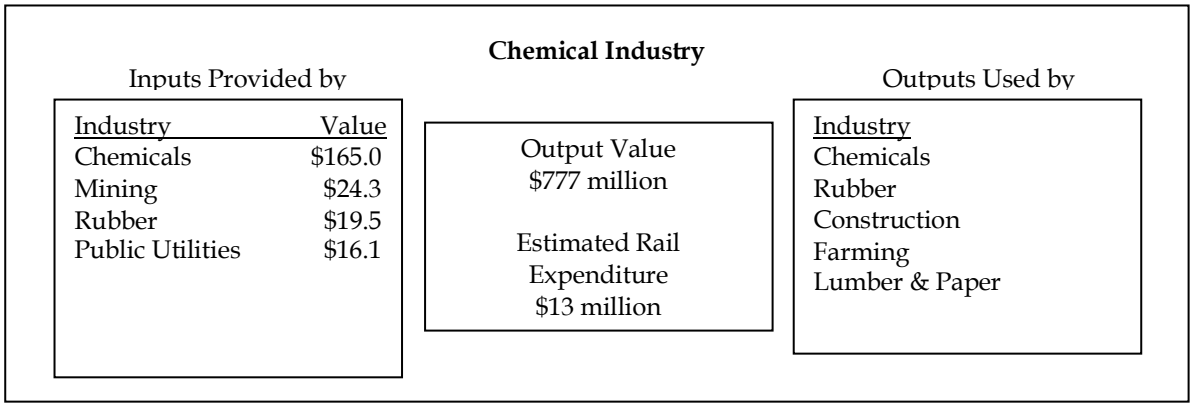
In the Portland metropolitan region, the primary metals industry spent an estimated $30 million on rail services, which helped support an industry economic output value of $1,408 million and 7,700 jobs. The major rail commodity associated with the industry was "primary metals," which includes scrap metal. Of the rail shipments, 65 percent were outbound shipments and 35 percent were inbound.

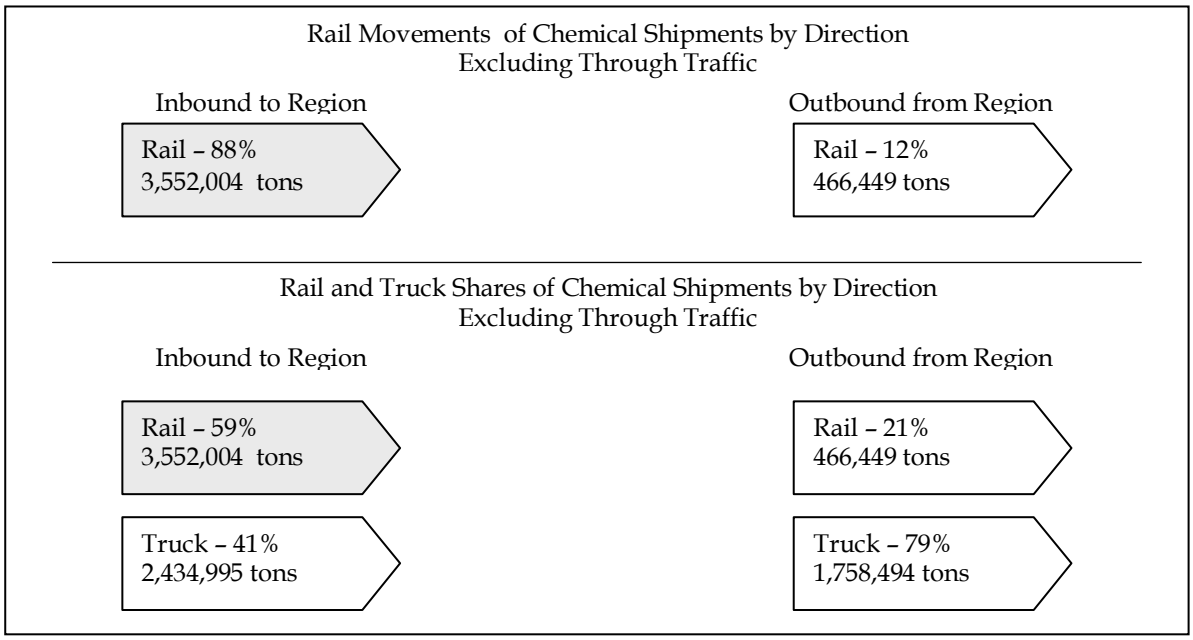




Chemical Industry

In the Portland metropolitan region, the chemical products industry spent an estimated $13 million on rail services, which helped support an industry economic output value of $777 million and 2,358 jobs. The major rail commodity associated with the industry was "chemicals and allied products." Of the rail shipments, 88 percent were inbound shipments.




Rail Movements of Chemical Shipments by Direction
Excluding Through Traffic
Inbound to Region
Rail – 88%
3,552,004 tons
Outbound from Region
Rail – 12%
466,449 tons
Rail and Truck Shares of Chemical Shipments by Direction
Excluding Through Traffic
Inbound to Region
Rail – 59%
3,552,004 tons
Truck – 41%
2,434,995 tons
Outbound from Region
Rail – 21%
466,449 tons
Truck – 79%
1,758,494 tons

7.0 Rail Use by the Port of Portland

7.1 Overview

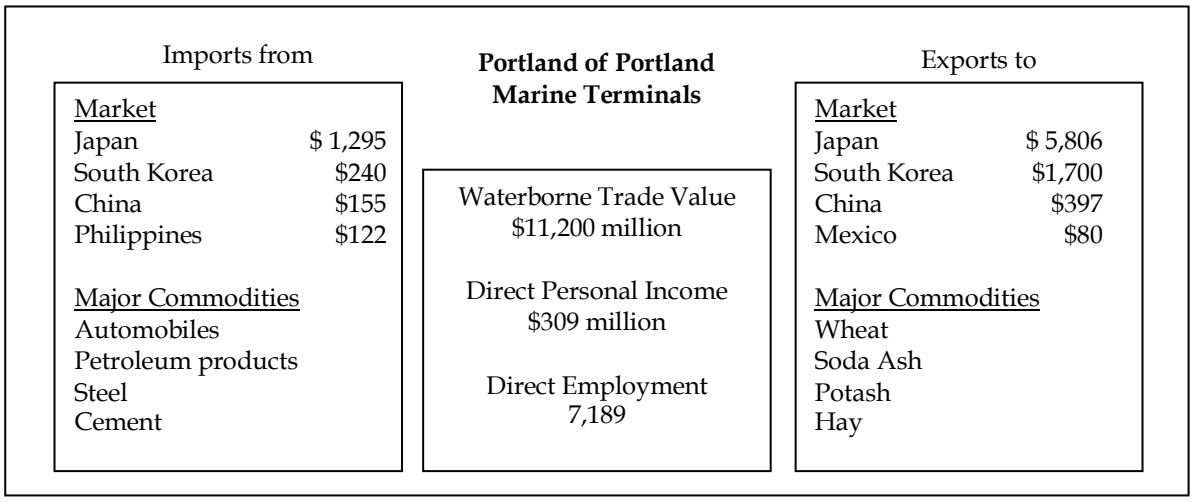
The Port of Portland transshipped 10.5 million tons of commodities valued at $11.2 billion in 2002. Of this tonnage, 6.2 million tons or 59 percent were moved by rail. In order of tonnage moved by rail, the commodities were: mineral bulks, grains, automobiles, containers, and breakbulk cargo.[1]

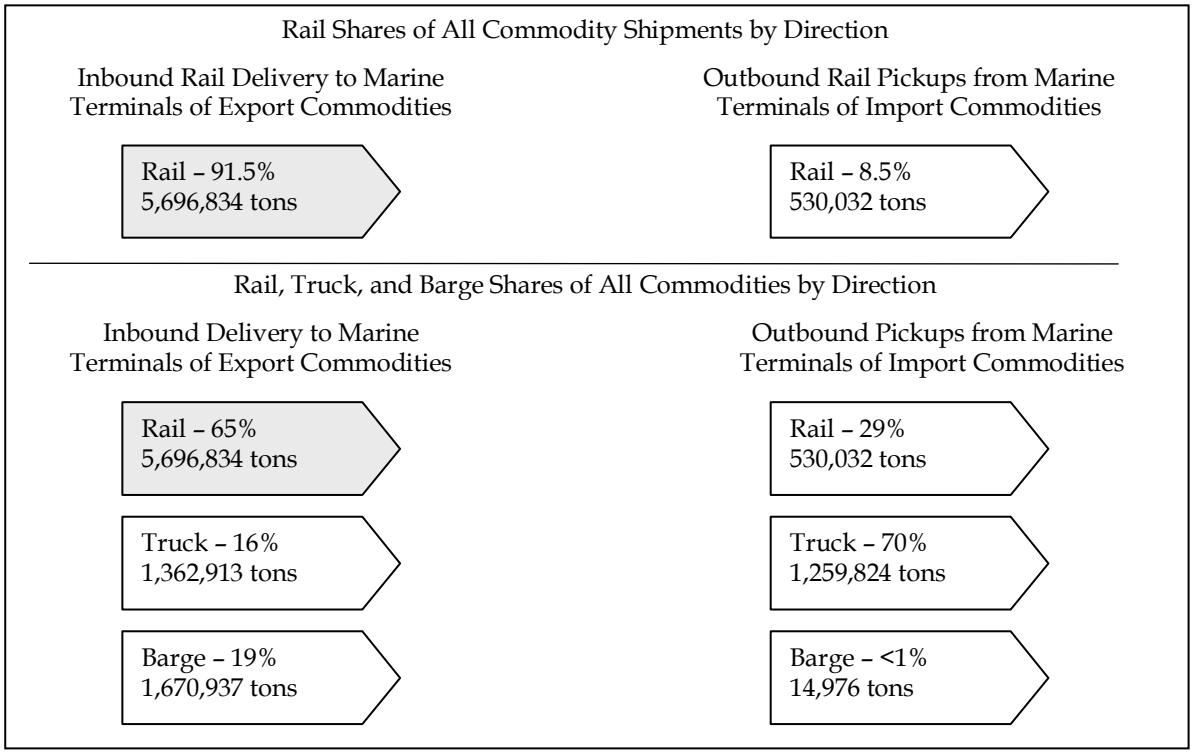
Inbound rail tonnage – rail shipments delivered to the Port's terminals to be loaded into ocean-going ships and exported to global markets – was 5.7 million tons and outbound rail tonnage – rail shipments off-loaded from ships and picked up at the Port's marine terminals for delivery to markets in the United States, Canada, and Mexico – was about 530,000 tons.[2] Rail tonnage into and out of the Port's terminals was about four percent of all truck and rail tonnage moving into and out of the Portland metropolitan region.

The Pacific Northwest is more reliant on international trade than the United States as a whole. Good, cost-effective rail access to Port of Portland gives the Oregon businesses a competitive edge in reaching global markets. This section provides snapshots of rail flows into and out of the Port of Portland's marine terminals by type of commodity. These statistics do not capture the rail tonnage moving into and out of private marine terminals in Portland or Vancouver, Washington; however, the general pattern of rail use is similar between the public and private terminals.

[1] Port of Portland data, 2002. Unless otherwise noted, all statistics on tonnage moving by rail, barge, and truck were provided by the Port of Portland.

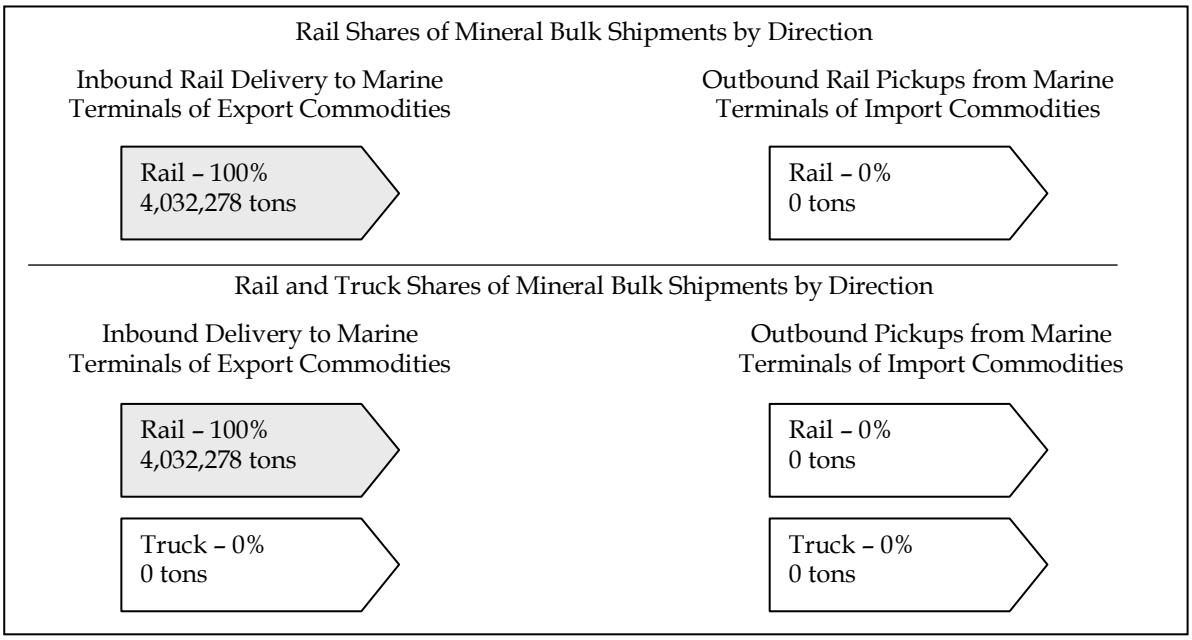
[2] A portion of the freight offloaded at Portland will move by rail to East Coast and Gulf Coast ports for reshipment to Latin American, European, and African markets.





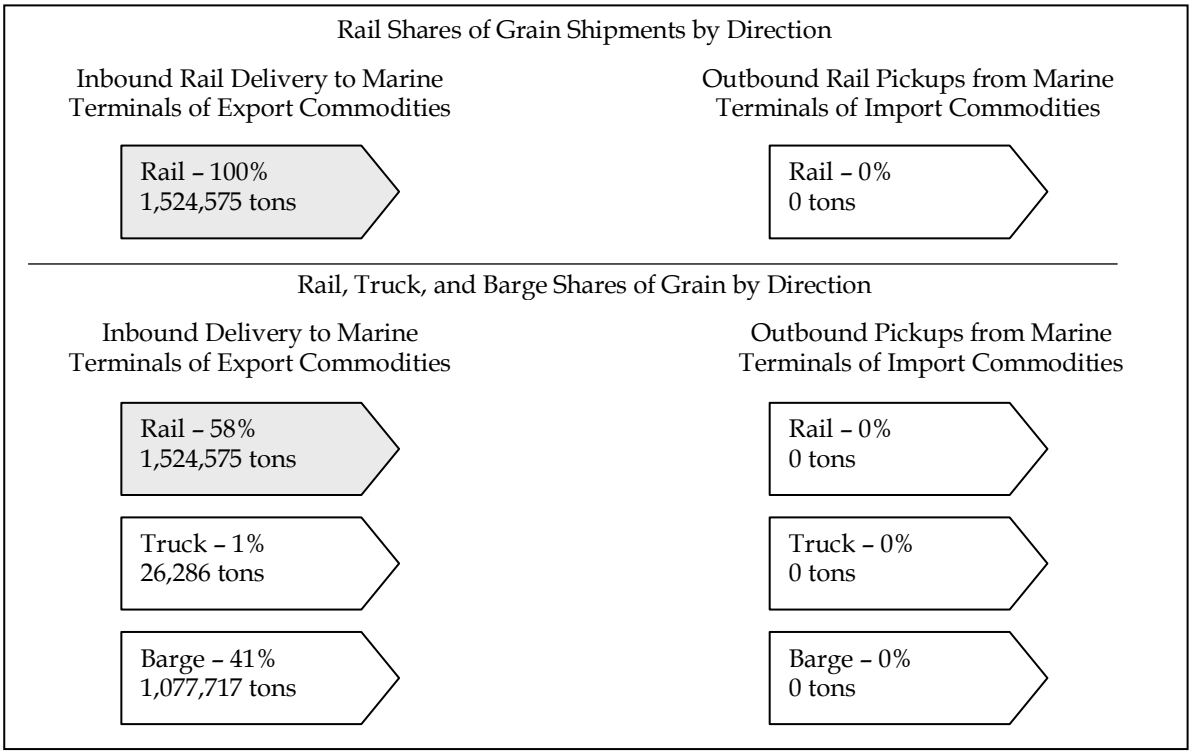
Minerals

The Port of Portland marine terminals handled 4,032,478 short tons of mineral bulks, primarily soda ash and potash (which are classified by the railroads under STCC 28 "Chemicals and Allied Products.") Portland is the largest mineral bulks port on the West Coast. Rail handled 100 percent of the mineral bulk tonnage, all inbound to the marine terminals.



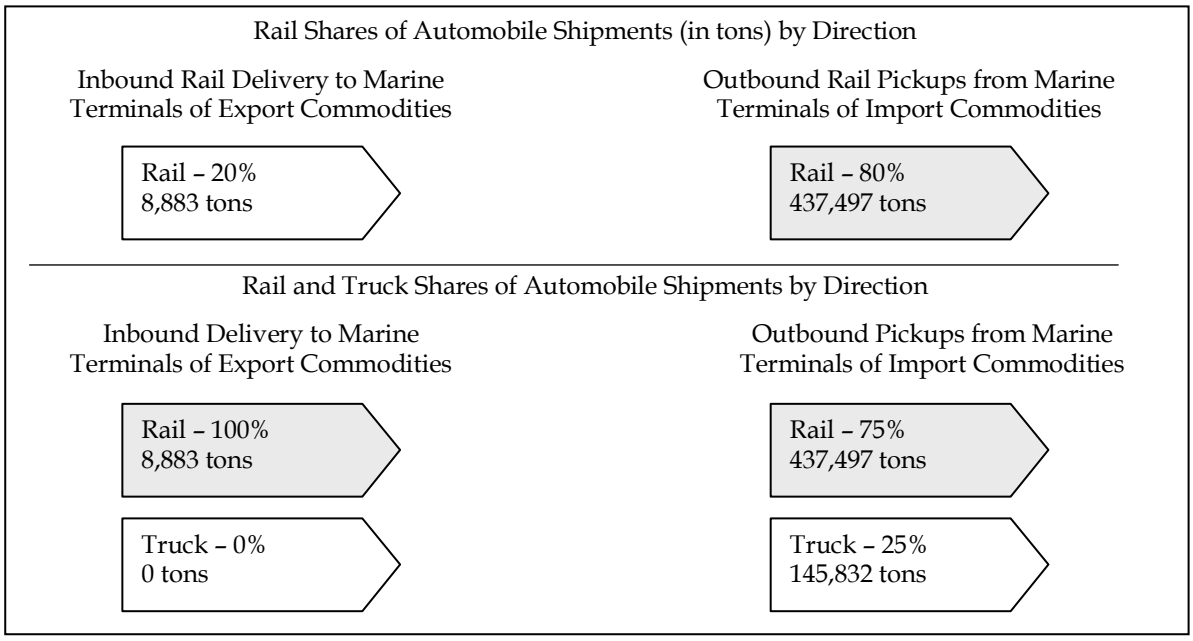
Grain

The Port of Portland marine terminals handled 2,628,578 short tons of grain, mostly wheat, in 2002. Portland is the largest wheat export port in the United States. Rail handled 58 percent of the total grain tonnage; barges handled 41 percent; and trucks, one percent. Of the grain moving by rail, all was inbound to the marine terminals.



Automobiles

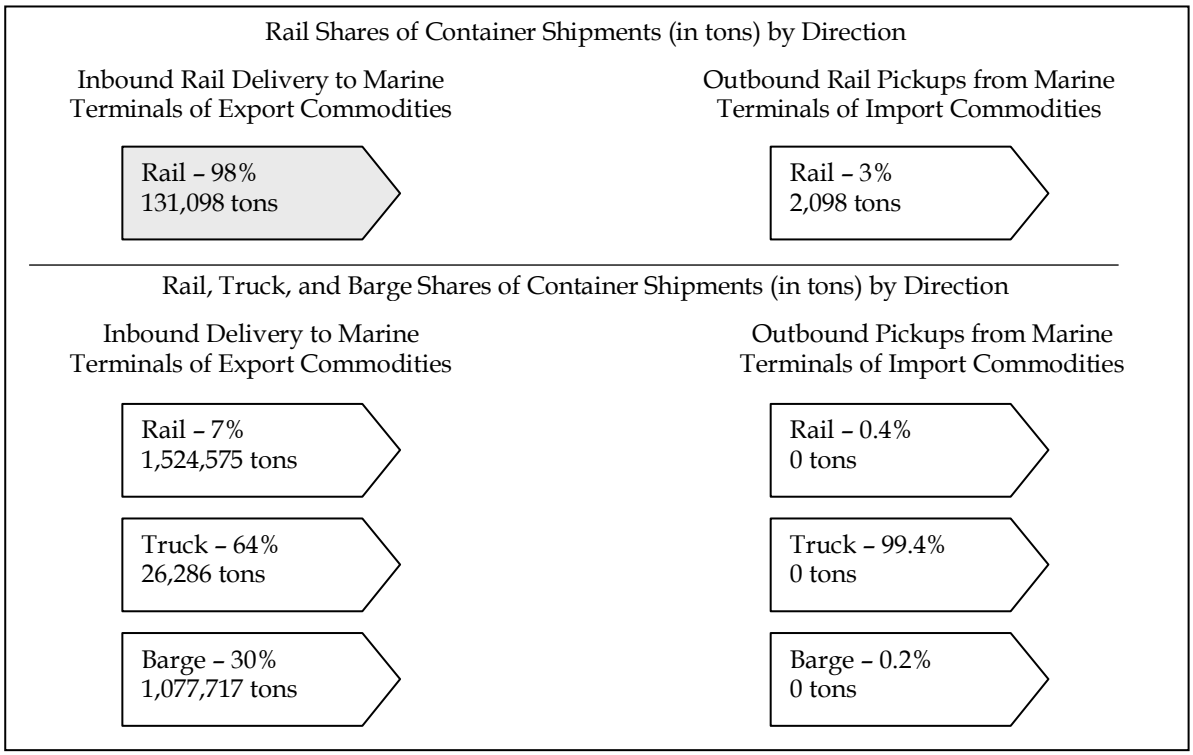
The Port of Portland handles more autos than any other port on the West Coast, and it handles the third largest volume of all U.S. auto-handling ports. In 2002, the Port of Portland's marine terminals handled 592,213 tons of autos. Rail carried 75 percent of all auto tonnage moved into and out of the marine terminals by truck and rail. Most of the autos that were picked up at the port for shipment to U.S. and other North American markets. The tonnage comprised 389,000 imported autos, 6,000 exported autos and 37,000 domestic units, which came into the terminals by rail and were all distributed back out of the terminals by truck. These statistics do not include autos handled by the region's private marine terminals.



Containers

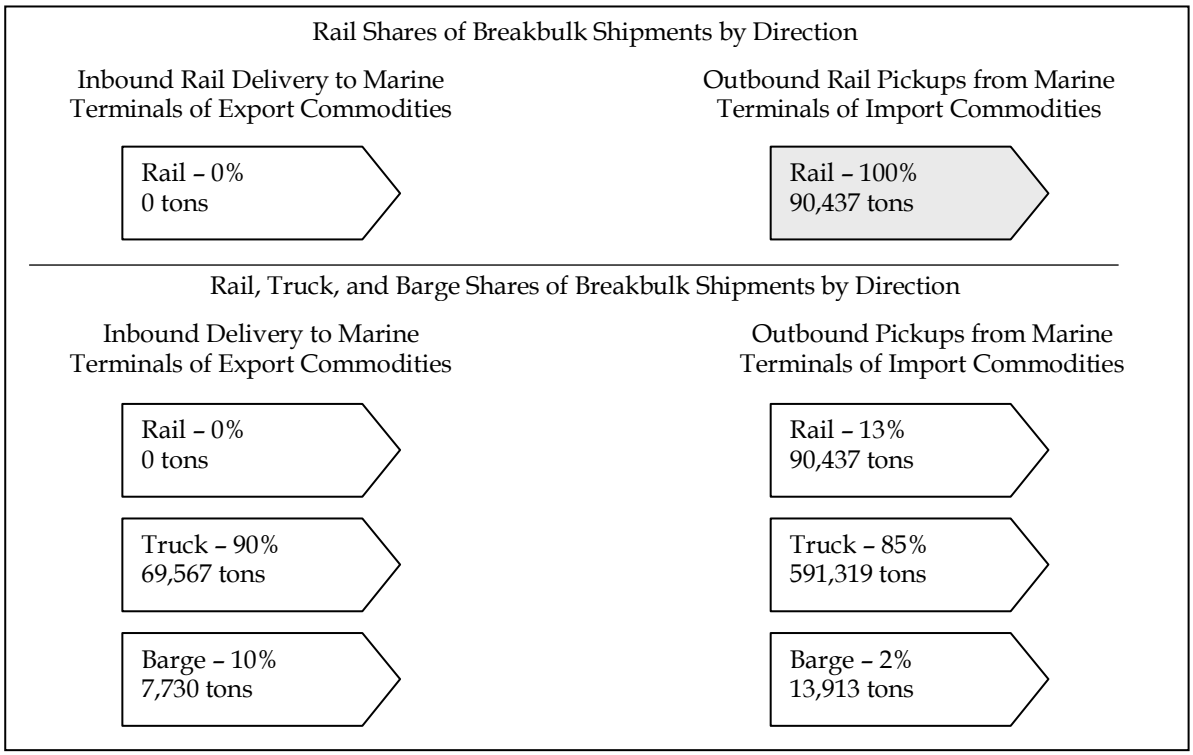
The Port of Portland marine terminals handled 2,509,483 tons or 255,745 TEUs (20-foot equivalent units) of intermodal containers in 2002, making it the 15th largest volume container port in the U.S. Of the 2,509,483 container tons, 80 percent was shipped to international and domestic ports and 20 percent was received from international and domestic ports. The Portland marine terminals handle a significant number of empty intermodal boxes moving from the Midwest to Asia.

Rail plays a modest role in container movement through the marine terminals. About seven percent of the container tonnage shipped to international and domestic ports arrived at the marine terminals by rail. The primary railed commodities were auto parts, meats, and hides. Less than one-half of one percent of container tonnage received from international and domestic ports was moved inland by rail; most containers imported through Portland are distributed by trucks.



Breakbulk Cargo

The Port of Portland handled 772,966 short tons of breakbulk cargo, primarily steel, in 2002. All rail moves were imports, mostly steel rail, moving from the marine terminals to U.S. markets.

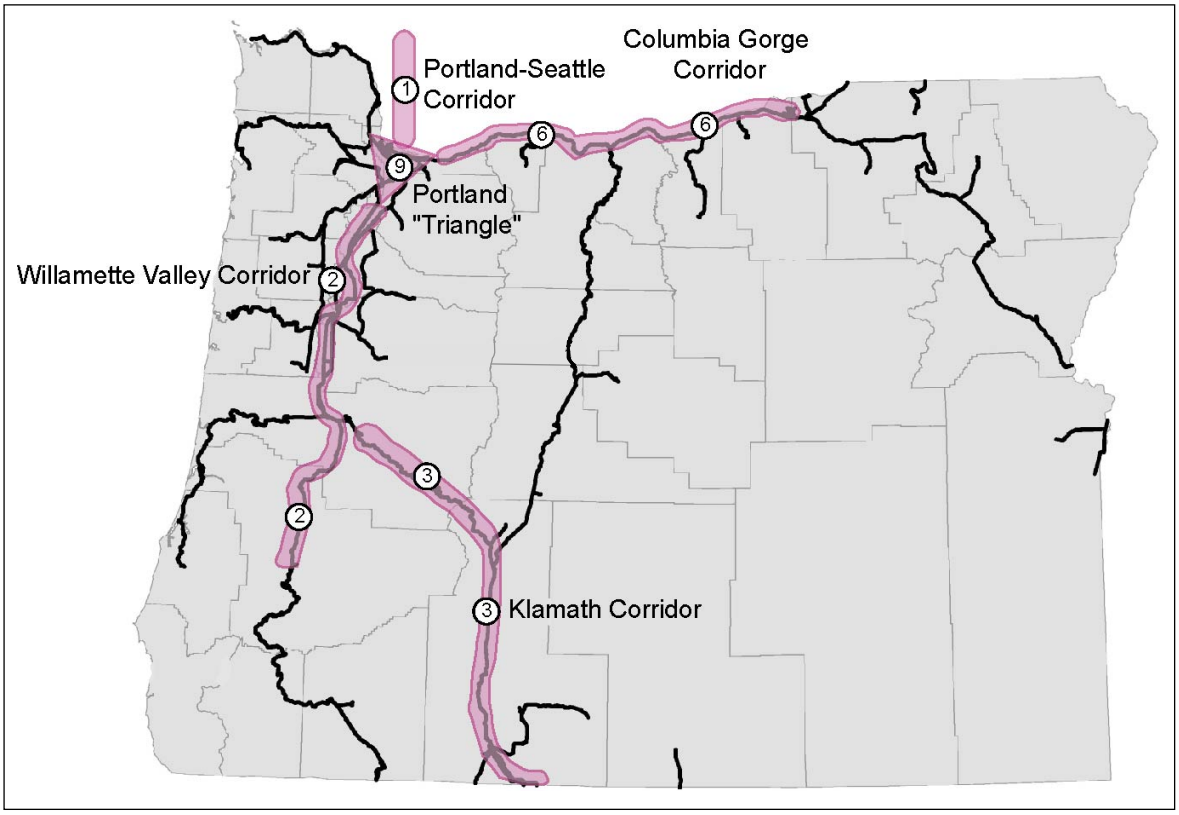

Rail Shares of Breakbulk Shipments by Direction
Inbound Rail Delivery to Marine Terminals of Export Commodities
Rail – 0%
0 tons
Outbound Rail Pickups from Marine Terminals of Import Commodities
Rail – 100%
90,437 tons
Rail, Truck, and Barge Shares of Breakbulk Shipments by Direction
Inbound Delivery to Marine Terminals of Export Commodities
Rail – 0%
0 tons
Truck – 90%
69,567 tons
Barge – 10%
7,730 tons
Outbound Pickups from Marine Terminals of Import Commodities
Rail – 13%
90,437 tons
Truck – 85%
591,319 tons
Barge – 2%
13,913 tons

8.0 Rail Capacity Issues

8.1 Corridors

Four major corridors and the Portland Triangle have significant rail capacity and service problems that will affect business and industry in Oregon and the Portland metropolitan region as freight demand and rail congestion increase.

Figure 8.1 Oregon Rail Corridors with Significant Capacity Issues



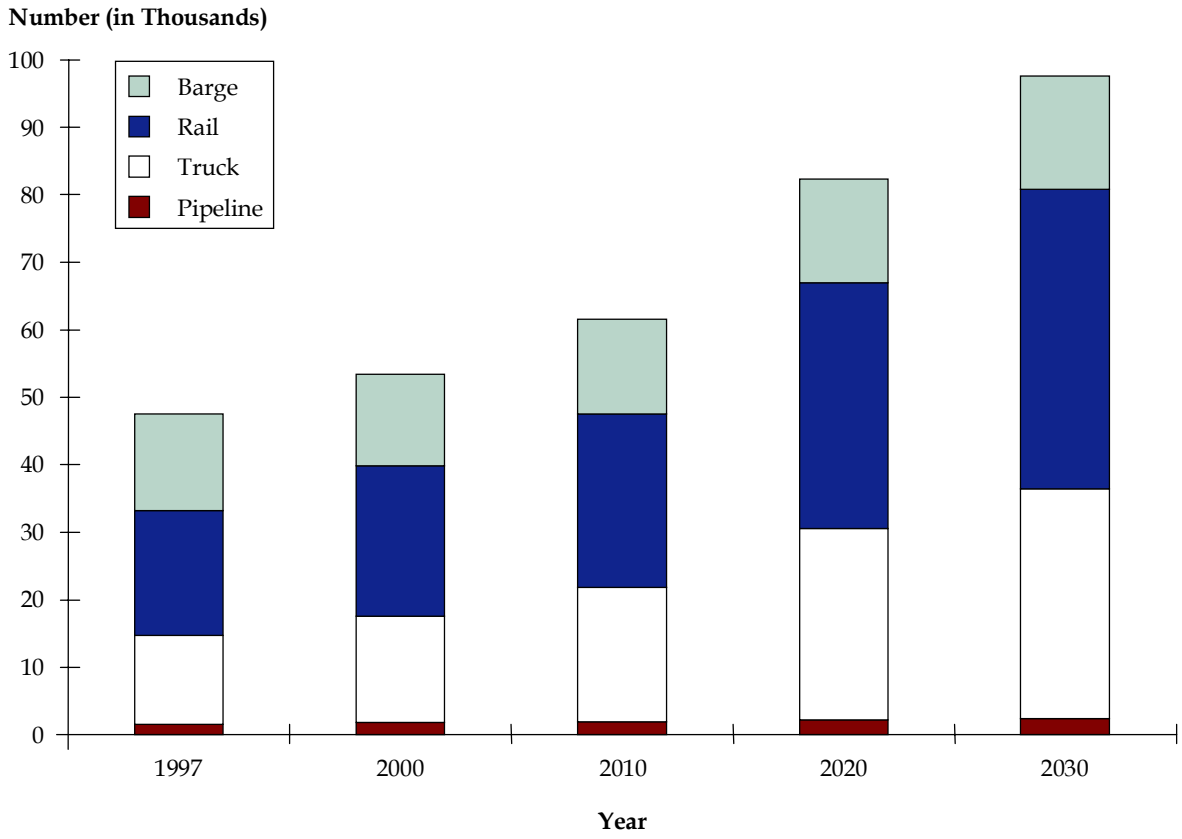
Portland-Seattle Corridor

The Portland-Seattle corridor serves freight-rail traffic moving north from Portland to Seattle and traffic moving south from Seattle, Tacoma and British Columbia to Portland, California and the Midwest.

The Portland-Seattle corridor is a high-volume corridor, especially for through trains. The BNSF operates about 35 trains per day in the corridor; the UP, an average of 38 trains per day. These trains include a mix of east-west and north-south traffic. From Portland, the east-west shipments travel along the Columbia River Gorge corridor to Midwestern and East Coast locations. The north-south rail traffic moves through the Klamath Falls gateway to California and the Southwest. The high volume of rail traffic benefits Oregon by providing Portland and Oregon shippers and receivers – especially those who use Portland's marine terminals – with access to a more frequent and extensive national rail service than the local economy would generate on its own.

However, the corridor is running out of capacity and will become increasingly congested as freight and intercity passenger-rail services expand and as urban development hems in the rail line. The tonnage of through freight-rail traffic is expected to at least double by 2030. Figure 8.2 shows the projected tonnage for (reading from top to bottom of the columns) barge, rail, truck, and pipeline.

Figure 8.2 Through-Freight Tonnage Forecasts[1]
Portland Region



Passenger rail service in the corridor also is increasing and competing with freight-rail for space and time on the corridor's rail lines. Three Amtrak intercity-passenger services use the corridor: the Amtrak Cascades, which operates between Vancouver, BC and Eugene; the Coast Starlight, which operates between Seattle and Los Angeles; and the Empire Builder, which runs from Seattle through Portland to Chicago. Between 1993 and 2002, ridership on the Portland-Seattle corridor grew from 163,000 to 600,000, an increase of 286 percent. Continued rapid growth in passenger rail ridership is anticipated if services can be expanded.

Finally, urban development along the corridor is forcing changes in rail operations. Trains, which once queued at Vancouver, WA for movement through the Portland junction, are now held at Seattle until they have clear passage through the Portland area. This is done to minimize noise impacts on new residential developments near the rail lines.

[1] "Forecast Summary: Commodity Flow Forecast Update and Lower Columbia River Cargo Forecast," Global Insight, BST, and Cambridge Systematics, June 2002.

With this development have come more grade crossings and more automobile traffic at the crossings, further slowing freight- and passenger-rail traffic along the corridor.

As the corridor becomes more congestion, the BNSF may route more trains from Seattle-Tacoma directly to Chicago instead of routing them through Portland. This will mean less frequent – and potentially less competitive – rail service for Portland and Oregon shippers. This could have an impact on the Port of Portland's marine terminals, whose import-export business depends in part on frequent, competitive, and low-cost rail service. Congestion along the Portland-Seattle corridor also may make the Ports of Portland, Tacoma, and Seattle relatively more costly and less reliable as transshipment centers compared to Los Angeles-Long Beach and East Coast ports. This could reduce the Pacific Northwest's share of global merchandise trade.

Portland Triangle

The Portland Triangle is the complex of rail lines, switches, sidings, yards, and terminals – including the BNSF rail bridge crossing the Columbia River – that serves freight- and passenger-rail traffic moving into, out of, and through the Portland-Vancouver metropolitan area. The Triangle is the linchpin of the Oregon and the Pacific Northwest rail systems. It serves north-south and east-west through-traffic, freight trains moving to and from Portland's marine terminals, the railroads' four major freight yards, and the state's largest collection of industrial shippers. Rail traffic must travel through the Triangle because the two-track rail bridge across the Columbia is the only rail crossing in the region. The next major rail crossing of the Columbia River is 92 miles upstream near The Dalles, Oregon.

The Triangle is congested. Train volumes exceed the capacity of the Triangle's rail network. Single tracks connect most of the junctions, forcing trains to queue for clearance. Yard capacity is inadequate, forcing trains to wait on mainline tracks. (The utilization of the major yards and terminals in the Portland Triangle is described in the table in Appendix A.) Local traffic moving into and out of marine port and railroad terminals competes for 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 Triangle is about twice that of Chicago, the nation's largest rail hub. An analysis of the Triangle 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 Triangle 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 Triangle experiences nearly half the delay hours of Chicago. The I-5 Transportation and Trade Partnership has recommended as program of improvements to increase capacity and speed the throughput of trains; however, it is estimated that the improvements will provide capacity for only 10 years of forecast growth. An additional program of capacity

improvements – possibly including expansion or replacement of the rail bridge – may be necessary within 20 years.[2]

Columbia Gorge Corridor

The Columbia Gorge corridor is the major east-west corridor connecting the Portland, Oregon, and the Pacific Northwest with the national rail system. UP owns and operates the rail line through the Gorge on the south (Oregon) side of the Columbia River. BNSF owns and operates a parallel rail line through the Gorge on the north (Washington State) side of the Columbia.

The Gorge corridor is the preferred route for heavy and transcontinental trains. Although the BNSF and the UP lines are single tracked for much of the route, the corridor rail lines run at river-grade through the Cascade Mountains. By contrast, the BNSF's more northerly routes, which run directly east from Seattle, must climb through the Cascades. The BNSF's Steven's Pass line travels through a seven-mile long, single-track tunnel at the height of the pass. Extra helper locomotives are needed to negotiate the steep grades, and the number of trains using the tunnel is limited to 32 per day to allow for venting of exhaust gases from the tunnel. The parallel Stampede Pass line also must negotiate a seven-mile long, single track tunnel and is not cleared for double-stack container trains.

The Gorge corridor is the major rail corridor serving the Portland marine terminals. Good and frequent east-west rail service through the corridor is critical to ensuring that the Port of Portland's marine terminals are competitive with the ports in Seattle, Tacoma, and Vancouver, BC. It also is critical to maintaining the Pacific Northwest's competitive position as a transshipment center for Pacific Rim trade bound for Midwest and East Coast markets.

The corridor operates well today, but there is concern that congestion could become a problem in the future as freight-rail volumes increase. The Gorge is an aesthetically and environmentally sensitive area; it will be difficult to add rail lines if capacity is needed in the future. Operational strategies to increase capacity, such as operating the UP and BNSF lines in the corridor as a one-way pair, have been suggested. This could increase the total throughput of the Columbia River Gorge corridor, but would necessitate and depend upon prior improvements to the Portland Triangle.

Finally, there have been discussions across the Pacific Northwest about breaching dams along the Columbia River to restore free-flow conditions and help replenish the stock of salmon. If this were done, it would reduce the number and extent of barge operations on the Columbia. Barges carried 41 percent of the grain moving down the Columbia to the Port of Portland marine terminals; rail carried 58 percent; and trucks, one percent. If

[2] "Freight, Intercity Passenger and Commuter Rail," PowerPoint presentation to the Portland-Vancouver I-5 Transportation and Trade Partnership on May 21, 2002; and "Final Strategic Plan: June 2002," prepared for the Portland-Vancouver I-5 Transportation and Trade Partnership.

barge capacity were reduced, much of this grain, as well grain moving by barge to privately operated terminals in the Portland-Vancouver area, would seek to shift to rail. This would stress the capacity of the Columbia Gorge rail corridor, force grain transportation prices up, and make Northwest gain producers less competitive in global markets.

Willamette Valley Corridor

The Willamette Valley Corridor rail lines parallel I-5, serving customers between Portland and Roseburg. Between Portland and Eugene, the corridor also serves as the main north-south through-route for West Coast rail corridor freight- and passenger-rail trains. It is estimated that 50 percent of the northbound trains in the corridor are through trains.

The major challenge to rail operations in the Valley corridor is maintaining the region's short-line railroads. Short-line railroads provide the collection and distribution system for the Class I long-haul shipments. To serve as a collection and distribution system, the short-line and Class I railroads must be able to handle the same equipment and must have good connections. Many of the lines acquired by the short lines from the Class I railroads suffer from deferred maintenance and much of the track, designed for an earlier era of railroading, cannot accommodate the newer generation of heavier, higher-capacity, 286,000-pound railcars. The 2001 Oregon Rail Plan estimates that $174 million in track improvements and another $56 million in bridge upgrades are necessary to handle the modern 286,000-pound railcars.

The short lines also offer short distance, shipper-to-receiver rail services. As a general rule railroads are not competitive with trucks at distances less than 500 miles; however, this tends to be more true for the Class I railroads than for the short lines. Short-line railroads, with lower operating and overhead costs, often provide successful short distance operations. Examples of successful short-line operations in Oregon include services that haul aggregate moving 23 miles between Salem and Wilsonville, logs between Rainier and the Roseburg area, and plywood between Northern California and Medford. These short-haul services are less dependent on maintaining compatibility with Class I carriers, but do depend on some public assistance for construction of rail spurs into industrial sites. This public support is often justified by economic development and job creation.

In 1916, short-line railroads owned 51 percent of the 3,300 miles of road in Oregon rail system. By 1986, the Class I railroads dominated Oregon and the short lines operated only 8.2 percent of the total miles of road. In the 1990s, after the economic deregulation of the railroad industry, the Class I railroads spun-off many of their low-volume branch lines. Today short-line operators own 1,277 or 47 percent of the 2,413 miles of road in Oregon.[3] They are again a vital part of the Oregon rail system. Without the short lines, businesses would shift their freight to truck, adding heavy-truck traffic to the highways, or in some cases, relocate or close at the cost of lost jobs and revenue to the Oregon economy.

[3] Personal communication with Oregon Department of Transportation.

Over half of Oregon's rail shippers are on short lines, but in Western and Southern Oregon, the shippers and receivers are widely scattered across mountainous territory. The short-line railroads that link shippers and receivers to the Class I railroads operating along the Willamette mainline corridor must thread their way up and down steep grades at slow speeds. The geography makes railcar-positioning operations time-consuming and pick-up and delivery operations labor intensive, driving up costs. As a consequence, freight-rail is slowly losing market share to trucking along this corridor.

The other challenge in the Valley corridor is providing capacity for increased passenger-rail service. Amtrak operates the Cascade service between Eugene and Portland, providing four trains daily in each direction. Ridership has grown from 24,000 in 1993 to 101,000 in 2000, an increase of 321 percent.[4] If passenger-rail service increases, rail-line capacity must be expanded to maintain freight-rail service. This corridor also is a Federally designated high-speed rail corridor and eligible to compete for Federal high-speed rail capital funding. High-speed service would require a dedicated track.

Klamath Corridor

The West Coast rail corridor extends 1,200 miles north-south, paralleling I-5, and linking Seattle, Portland, and Southern Oregon to the Bay Area, Los Angeles, and San Diego. The corridor serves freight flows between the Pacific Northwest and the Pacific Southwest, as well as Canadian and Mexican cross-border traffic. Food, lumber, wood and paper products, primary metals, and farm products are the primary commodities moving along the corridor. Import and export traffic to and from Canada and Mexico accounts for 17 percent of total tonnage in the corridor. The major rail carriers along the I-5 corridor are the UP and the BNSF. Historically, the Southern Pacific (SP) provided service along the I-5 corridor, but during the UP acquisition of SP a complex series of trackage-rights agreements were implemented to provide competitive rail service. The UP and BNSF share track in much of the corridor (e.g., the UP-owned track between Chemult and Klamath Falls).

Rail is not competitive with trucking along the West Coast corridor today with respect to transit time and service reliability. Rail captures a modest share of southbound carload traffic, but captures only small share of northbound intermodal traffic. Rail capacity is constrained because of the mountainous terrain. The rail lines in Oregon, including the main corridor over the Willamette Pass in the Cascades, are not cleared for high-cube, domestic, double-stack service.[5] Five tunnels, each only a few hundred feet long, must be crown cut to allow sufficient clearance for double-stack trains.

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[4] 2001 Oregon Rail Plan.

[5] International containers are six inches shorter than containers used for domestic service. International containers are cleared for double-stack service along this route, but it is usually more economical to control the north-south movement of international containers through the port of discharge.

There are numerous choke points along the West Coast rail corridor; however, highway capacity along the I-5 corridor is even more constrained than rail capacity. I-5 is one of the nation's most heavily used routes for both automobile and truck traffic. Absent improvements, the Federal Highway Administration estimates that by 2020 traffic on I-5 could operate at level of service E and F (e.g., stop-and-go) for many hours a day for virtually the entire distance between San Diego and the Bay Area, as well as through the Portland and Seattle-Tacoma metropolitan regions.

Freight traffic will be part of the problem. By 2020, freight flows in the West Coast corridor are forecast to reach 57 million tons and over 52 billion ton-miles. Of this, 69 percent of tonnage and 72 percent of ton-miles will be carried by truck; 31 percent of tonnage and 28 percent of ton-miles will be carried by rail – if the capacity exists.

Severe highway congestion and the fact that the average length of a truck haul in the corridor is 936 miles – a distance at which rail intermodal is highly competitive with truck – suggests there is room to improve rail service along the corridor.

Oregon needs improved West Coast rail corridor service to reach the large and lucrative Southern California markets and to keep down the cost of food and goods brought north to supply the growing population and industry of the Pacific Northwest. This will require coordinated improvements to rail capacity in the Portland Triangle, the Willamette Valley corridor, and the Klamath gateway in Southern Oregon.

9.0 Economic Implications of Rail Capacity Constraints

9.1 Overview

This section summarizes the implications of the corridor-level freight-rail constraints industry-by-industry. Table 9.1, at the end of the section, presents summary information in a matrix format.

Lumber, Wood, Paper Products Industry

The lumber, wood, and paper products industry is the single largest user of rail services in Oregon. The two corridor-level rail problems affecting the industry are:

1. Inadequate short-line railroad infrastructure in the Willamette Valley corridor, which increases the cost of forest-to-mill and mill-to-mill (interplant) moves and increases the industry's reliance on heavy truck moves. This, in turn, increases state and local spending on highway pavement and bridge reconstruction.

2. The absence of north-bound "backhaul" rail freight increases the cost to the railroads of providing service south-bound over the West Coast rail corridor. The major markets for Oregon lumber, wood, pulp, and paper products have shifted toward Southern California and Texas. The industry ships finished goods south by rail, but pays a relatively high price for rail service because the overall demand for north-bound rail service is weak.

Transportation Equipment Industry

The Portland metropolitan region hosts a major concentration of truck and railcar manufacturers. The industry requires a reliable stream of components and parts to produce trucks and railcars in a timely and cost-effective manner. Rail service is particularly important for inbound shipments of heavy castings and components. The key corridor-level rail problem affecting the industry is:

- Increased costs and deteriorating reliability of rail service because of congestion in Portland Triangle.

Wholesale Trade Industry

Portland is the Pacific Northwest's major wholesale trade center. The region's major warehouses and distribution centers are supplied by truck and rail from U.S. and international sources. It is a growing industry, responding to steady population and economic growth of the Pacific Northwest. The key corridor-level rail problems affecting the industry are:

- Congestion and delays in the Portland Triangle, which increase the cost of doing business in the Portland metropolitan region and make wholesale trade more dependent on trucking. The industry is facing increased pressure in the Portland area from land development and highway congestion. This has led to a steady shift of warehousing and distribution centers out of the city center into smaller cities north and south of along I-5 and as far east as the Tri-Cities area (where large distributors are equi-positioned to distribute by truck to Portland, Seattle, Spokane, and Boise).

- Growing congestion along the I-5 corridor. Rail capacity along the West Coast rail corridor is not a problem today for the wholesale industry today since most of the industry brings goods from California into Oregon by truck. However, as truck congestion increases along I-5, especially south of Sacramento, the wholesale industry will see increasing trucking costs, which will drive up the cost of moving freight from California into Oregon. Without competitive rail service, especially the capacity to provide northbound, domestic, double-stack intermodal service, these costs will be absorbed by the Oregon economy, making the region less competitive economically.

- Potential future congestion along the Columbia Gorge corridor. The corridor is a major corridor for both inbound and outbound rail transport of wholesale-related goods. Congestion or a sharp increase in grain train traffic have the potential to significantly disrupt the movement of wholesale and other industry traffic on the corridor. The wholesale trade industry is particularly sensitive since it moves traffic in both directions along the corridor – bringing goods from the Midwest to Portland for distribution locally, and importing goods through the Port of Portland for distribution back to Midwest and other U.S. markets.

Food Products Industry

The Oregon food products industry has been steadily expanding its domestic and international markets. The key corridor-level rail problems affecting the industry are:

- Loss of rail service in the Willamette Valley corridor and related shortages of specialized railcars and containers, which has shifted much of the industry's traffic from rail to truck over the last decades.

- Delays in the Portland Triangle, which increase the costs of receiving inbound farm products, processing equipment, chemicals, and packing materials.

- Limited southbound rail service along the West Coast rail corridor, which may become a significant factor in reaching the large Southern California market as I-5 highway congestion and trucking costs increase.

Primary Metals (Manufacturing) Industry

The primary metals industry provides materials to the transportation equipment industry and to fabricators, who in turn supply the construction and other industries. The key corridor-level rail problems affecting the industry are:

- Congestion and delays in the Portland Triangle and inadequate rail service in the Willamette Valley corridor, both of which increase inbound and outbound shipping costs for the industry. An important input the industry is scrap metal, which is recast. The primary metals industry buys scrap and other inputs from U.S. and international markets as well as locally. Scrap is a low-value, high-weight commodity that can be transported very cost-effectively by rail or by ship. In Portland, manufacturers have good price-competitive access to both ship and rail transportation, one of the considerations that maintains the industry in the region. Increasing rail transport costs threatens to undermine this competitive balance and raise the cost of production in the region.

Construction Industry

The construction industry moves clay, concrete, glass, and stone into the Portland metropolitan region for residential, commercial, and industrial development. The key corridor-level rail problem affecting the industry is:

- Congestion and delays in the Portland Triangle, which increase costs and make trucking more cost-competitive in hauling these commodities. Because the commodities are heavy, shifting them from rail to truck means that state and local governments will bear the long-term cost of increased pavement repair and reconstruction.

Farm Products (Agriculture) Industry

Oregon and the Pacific Northwest are among the most productive agricultural centers in the world. Productivity in the industry is increasing along with exports to global markets, making the industry a long-term growth industry for the region. The key corridor-level rail problems affecting the industry are:

- Delays to grain trains moving from Eastern Oregon (and other grain producing areas as far east as Montana and Iowa) through the Portland Triangle to the Port of Portland's marine terminals. The global market is very sensitive to cost and a few cents per ton increase in transportation costs can make a difference in sales. The railroads have responded to shipper pressure for more cost-effective transportation by

increasing the capacity of grain cars to 286,000 pounds and lengthening trains to gain economies of scale and drive down the price per ton. The trains take up more space in the Portland Triangle and take longer to unload, making them one of a number of factors increasing congestion and delay across the Triangle network. Left unaddressed, these the delays risk increasing cost, weakening the position of Oregon grain exporters in global markets, and undermining Portland's position as the major grain exporting facility on the West Coast.

- Potential congestion along the Columbia Gorge corridor. The preferred route for heavily loaded grain trains moving to the Port of Portland (as well as to Seattle and Tacoma) is through the Gorge corridor because train operating costs are lower (and safer) on the river-level grades of the corridor. As freight demand grows, grain trains will be competing with carload and intermodal trains for the use of this corridor. Major disruptions – or a major increase in demand occasioned by low water levels in the Columbia River or other interruptions of grain-barge transportation system – could lead to congestion along the corridor and severe disruption of grain exports.

Chemical Industry

Portland is a major export center for soda ash (2.9 million tons) and potash (1.5 million tons). The region also imports a large volume of chemicals and allied products to support the lumber and pulp industry, the food processing industry, manufacturing, and other industries. The key corridor-level rail problem affecting the industry is:

- Congestion in the Portland Triangle. The major consumers of chemicals brought into the state by rail are located in the Portland metropolitan region. Delays in Portland Triangle increase the cost of delivering railcar and tank-car chemical shipments. And export shipments of potash and soda ash. Because chemicals, especially liquid chemicals, are heavy and often hazardous, there is limited opportunity to shift from rail to truck, so delays are felt directly as increased costs of production for the industry.

Portland Marine Terminals

The public and private marine terminals in Portland are a major industry and source of jobs. The key corridor-level rail problems affecting the marine terminal industry, especially the Port of Portland, are:

- Congestion on the Portland-Seattle corridor. Portland's container import and export business depends in part on the frequency of national rail service passing through Portland. Because Portland marine terminals are eight hours steaming time up river from the ocean, Portland is less attractive than Seattle-Tacoma as a port-of-call for the major containership lines and mega-containerships; nevertheless, Portland maintains a sizeable business in container traffic because steamship operators, shippers, and brokers understand that Portland has excellent rail service. This enables Portland to capture container that might otherwise go Seattle and Tacoma. Congestion in the corridor that

makes it cost-effective to divert rail container traffic to BNSF's northern Seattle-Chicago corridors threatens the level of service that maintains the Portland's container business.

- Delays and inadequate reliability of rail moves through the Portland Triangle. Congestion in the Triangle impacts almost all of the Portland marine terminals' major customers: grain and bulk mineral exporters; lumber, paper, wood, and processed food manufacturers looking to expand their export markets; automobile and wholesale merchandise importers bringing goods in from the Pacific Rim for distribution to the Midwest, etc. Over time, congestion at the core of the Portland rail network will erode the marine terminals' major asset – the perception among shippers, brokers, and carriers that freight transportation through the Portland gateway is relatively less congested and more manageable than other West Coast port cities. This will make the Los Angeles-Long Beach gateway and East Coast ports look relatively better. In the worst case, Portland could lose market share, especially in the niche markets that it holds today.

- Risk of congestion or disruption to rail traffic on the Columbia Gorge corridor. The short-term outlook for rail service along the Gorge corridor is good, but long-term service levels are less certain. Much of the Portland marine terminals' business in grain and mineral bulk exports, as well as their business in automobile and containerized merchandise imports, is at risk if east-west rail service along the Gorge corridor is not reliable.

- Inadequate short-line service in the Willamette Valley corridor, which forces shippers to shift from truck to rail. The volumes of rail traffic involved are small, and diversion to truck does not have a direct business impact on the marine terminals since most of the shipments will continue to flow through Portland; however, diversion from rail to truck increases truck pressure on the state highways and the Portland metropolitan roadways serving the marine terminals, aggravating truck traffic and noise impacts on local communities, and putting pressure on the marine terminals to be a "good neighbor" by restricting access.

Table 9.1 Major Oregon Rail Using Industries and Impacts of Rail Capacity Constraints by Corridor

	Industry								
	Lumber, Wood, Paper Products	**Transportation Equip.**	**Wholesale Trade**	**Food Products**	**Manufacturing**	**Construction**	**Farm Products (Agriculture)**	**Chemical**	**Port of Portland Marine Terminals**
	Lumber, Wood, Pulp, Paper	*Vehicles, Castings, Parts...*	*Merchandise*	*Processed Foods*	*Primary Metals*	*Clay, Concrete, Glass and Stone*	*Grains and Related Bulk Products*	*Soda Ash, Potash, Chemicals and Allied Products*	*Port of Portland Marine Terminals*
Corridor									
Portland-Seattle *Constrained line capacity as freight and intercity passenger-rail services expand*	Delays through movement of lumber and wood products from WA and BC to Southern CA		Increases cost of warehousing and distribution in Portland area						Makes LA/LB and East Coast ports more costly trans-shipment centers than Seattle-Tacoma and Portland. Reduces service and market share
Portland Triangle *Train volumes exceeding existing line, siding, switch, and signal capacity; resulting congestion and delay affecting through traffic and access to marine terminals*	Delays through movement of lumber and wood products from WA and BC to Southern CA	Delays increase cost of inbound movements of heavy castings and outbound movements of finished vehicles	Increases cost of warehousing and distribution in Portland area	Delays increase domestic and export costs. Risk losing market share overseas.	Delays increase material costs, (esp. scrap iron imports) and production costs. Diverts rail traffic to truck. Risk losing market.	Delays increase costs. Risk losing rail share to trucks. Increases pavement wear on major highways into Portland region.	Delays access to marine terminals and increases cost of grain exports. Risk losing global market share to overseas suppliers	Delays delivery of chemicals to Portland marine terminals for export. Risk losing market share	Delays make major export commodities (wheat, soda ash, potash and hay) less competitive in global markets. Risk losing port-related jobs.
Willamette Valley *Inadequate short-line railroad infrastructure; constrained line capacity as intercity passenger-rail services expand*	Increases the cost of regional shipments of logs to mills and interplant shipments of logs and partially finished goods			Delays and shortages of specialized rail cars undermine rail market, shifting freight to trucks with increased wear to highways					
Klamath/West Coast "I-5" Rail Corridor *Not cleared for domestic double-stack in OR; transit time and reliability not competitive with trucking*	Wood products shipped south to major LA markets by rail, but lack of backhaul traffic increases rail costs. Risk losing market share to SE and overseas suppliers	Delays increase cost of access to large Southern California markets	Rail captures small share of south to north merchandise flow because of lack of domestic double-stack service in Oregon. Increases cost of goods moving into Portland and OR	Lack of truck-competitive rail service increases cost of moving heavier food products to Southern CA markets	Lack of truck-competitive rail service increases cost of moving heavier products to Southern CA markets				
Columbia Gorge Corridor *Preferred water-level route for heavy and transcontinental trains, but congestion increasing with higher volumes*		Delays increase cost of inbound movements of heavy castings and outbound movements of finished vehicles	Increases cost of distribution in Portland area				Delays access to marine terminals and increases cost of grain exports. Risk losing global market share to overseas suppliers	Delays delivery of chemicals to Portland marine terminals for export. Risk losing market share	Long-term, congestion could reduce level of rail service, reducing market area for commodities such as grain and minerals

10.0 Public Role in Freight Rail

The objective of this paper is to provide a starting point for discussions about the public sector's role in the freight-rail system and strategies for ensuring that freight rail can keep pace with economic growth and meet the needs of Oregon's business and industry. The paper reviews background information on freight demand and the state of the rail industry; Oregon's freight-rail network and railroads; and the role of rail freight in the economies of Oregon, the Portland metropolitan region, and the Port of Portland's marine terminals. It outlines corridor-level rail capacity issues and explores the economic implications of these rail capacity issues for key industries.

The paper finds that a dozen major industries that depend on affordable freight-rail service, especially the lumber, wood, and paper products industry, the transportation equipment industry, the wholesale trade industry, and the Port of Portland's marine terminal business. The paper finds current and emerging rail capacity problems in five corridors: Portland-Seattle corridor, Willamette Valley corridor, Klamath/West Coast "I-5" corridor, the Columbia Gorge corridor, and the Portland Triangle. The most pressing congestion and capacity problems are in the Portland Triangle. However, if freight-rail tonnage doubles within the next 20 years as suggested by recent economic forecasts, the Portland-Seattle corridor and the Klamath/West Coast "I-5" corridor will experience significant capacity problems; and in the longer-term, the region may face capacity problems along the Columbia Gorge corridor. These capacity problems will impact all Oregon industries that use freight-rail, but the most vulnerable to increasing congestion and declining freight-rail service performance will likely be the lumber, wood, and paper products industry, the Portland-centered transportation equipment and wholesale trade industries, and the Port of Portland's marine terminal business.

The paper ends with a short review of initiatives that the public sector may wish to consider if it decides that the public benefits of the freight-rail system warrant public initiatives to expand freight-rail capacity.

10.1 Public Policy Choices and Roles

Freight volumes are growing with the economy; this growth will strain Oregon's freight-rail system. Public investment in the rail system has historically treated the bottom of the system: grade crossings, branch lines, and commuter rail services. The present need is to treat the top: major corridors, intermodal terminals and connectors, and urban rail inter-changes such as the Portland Triangle. The public sector has two broad policy choices for dealing with these needs. It can opt for market-drive evolution of the freight rail system or it can push for policy-driven expansion of capacity.

Opting for a market-driven evolution of the freight-rail system means minimizing state involvement, betting that the rail industry will continue to be stable, productive, and competitive with enough business and profit to operate. It means that the railroads may not to replenish their infrastructure as quickly or as grow rapidly as the demand for freight, but it also means lower state investment and financial risk at a time when the state's budget is tight. But it means accepting a somewhat higher risk that freight-rail system may not have the capacity to support state economic development goals.

Opting for a policy-driven expansion of the freight-rail system means building a new public-private partnership with the railroads. It means increasing state involvement and investment to achieve a freight-rail system that provides the cost-effective transport needed to serve national and global markets, helps relieve truck pressure on highways, and supports Oregon's economic development. This approach also carries risk. The public sector can facilitate or invest in rail improvements, but it cannot provide effective and cost-competitive services that will attract and retain services. The railroads must deliver these services and do so in a very difficult business environment. And there is always the possibility that market will not respond to the public sector's or the railroad's vision of the state's freight transportation needs.

In either case, but especially if the public sector opts to build a new partnership with the railroads and expand the freight-rail system, Oregon DOT, the Portland metropolitan community, and the Port of Portland may wish to consider the following initiatives:

- Define state and local freight and economic development policies.
  - Enunciate clear public policies to address freight-rail needs and link public initiatives in the freight-rail system to Oregon and Pacific Northwest economic development goals.
- Clarify public roles and responsibilities.
  - Convene a Pacific Northwest Freight Advisory Committee, including the railroads and rail shippers;
  - Focus metropolitan, state, and Pacific Northwest freight-advisory committees on freight-rail issues and opportunities; and
  - Designate a state freight coordinator (as is likely to be required under the proposed SAFETEA reauthorization of the Federal surface transportation legislation).
- Strengthen decision-making procedures.
  - Improve state, metropolitan, and Port freight-rail planning and analytical capabilities to better understand business logistics and freight-rail services, and better identify and assess opportunities for public initiatives; and
  - Work with the railroads to develop a regional rail-network model sufficient to identify major mid- and longer-term capacity constraints.

- Leverage resources (especially emerging SAFETEA program provisions); examples would include:
  - Intermodal connector grants (NHS funds);
  - Intermodal transfer facility development grants (STP);
  - Proposed 'freight gateways' program or 'projects of national significance' program;
  - Multi-state corridor planning, project development, and decision-making program (revamped Borders and Corridors program); and
  - State and local tax incentives for investment in freight rail improvements (e.g., tax-exempt private activity bonds, etc.).

A successful program will require a bottoms-up approach of carefully considered projects tested against a state- and regional-level understanding of economic growth patterns, shipper needs, and freight-rail capabilities.

The problems of the freight transportation sector, especially the freight-rail system, and the consequences of not addressing them are clearer today than they were a few years ago, and they will sharpen in the coming years. The public sector, business, and the railroads will benefit from closer attention to the capacity of the freight-rail system and its contribution to the Oregon economy.

Appendix A

Utilization of Primary Rail Yards in the Portland Triangle

Table A.1 Utilization of Primary Rail Yards in the Portland Triangle

Rail Terminal/Yard	Owner	Primary Function/Commodity	Current Utilization[1]	Comments/Plans[2]
A & B Yards in North Rivergate	BNSF & UP joint ownership	Support yards for Terminal 6 unit trains. International: containers and finished autos (Honda and Hyundai). Domestic: Oregon Steel, Boise Cascade paper, Pizza Blends, Oregon Transfer, etc.	100% static utilization. Two turns per day.	
Albina Yard	UP	Primary functions: domestic container and trailer traffic as well as and empty repositioning of international containers, especially to Asia. Secondary function: block swap of intermodal railcars. Portland's main rail classification yard for UPRR	100% static utilization. 80% dynamic utilization. 2,000-3,000 cars per day. 8,000 containers month.	Largest UP yard in the Portland area. Largest intermodal yard in Portland area.
Barnes Yard	UP	Manifest boxcars, hoppers gondolas – grain, potash, soda ash. Assembled auto – GM, Chrysler, Toyota. Toyota imports, GM & C & T are PNW domestic distribution	100% static utilization. 80% dynamic utilization. Three turns per day.	
Bonneville Yard	UP & BNSF joint	This is not a yard for storing or interchanging railcars. It is a series of running tracks connecting Slough Bridge trackage and Barnes with Terminal 5. UP stages chemical and steel business.	80% utilization. Yard capacity is not an applicable measure.	
Brooklyn	UP	TOFC/COFC domestic activity for North-South Corridor. Also short-line and hauler staging and interchange	100% static utilization. 65% dynamic utilization. (5,100 containers/trailers month)	Third largest intermodal yard in Portland area
Northwest Container	Private	Shuttle international cargo from Portland to Puget Sound area to steam ship lines not calling Portland	100% static utilization. 80% dynamic utilization. (2,500 containers month)	Fourth largest intermodal yard in Portland area
PoP Terminal 5	Port	Portland Bulk Terminals (PBT): potash unit train facility. Columbia Grain (CG): agriculture products unit train facility.	PBT – 40% static utilization. CG – 85% dynamic utilization, 2 turns day.	

Table A.1 Utilization of Primary Rail Yards in the Portland Triangle (continued)

Rail Terminal/Yard	Owner	Primary Function/Commodity	Current Utilization[1]	Comments/Plans[2]
PoP Terminal 6	Port	Intermodal facility – international containers. BNSF & UP.	100% static utilization. 70% dynamic utilization. One to two turns per day.	
Ramsey (Yard)	Owned by Port – leased to UP & BNSF	Not a yard. This is a connection for through movements of container, grain and potash unit trains.	75% utilization.	Yard is under design. It is a top priority and was part of the I-5 study. Yard will be for unit train classification and rail carrier interchanges.
South Rivergate Yard	UP	Support yard for Terminal 5. International: Grain, potash Domestic: steel, chemical, general merchandise	100% static utilization.	
Vancouver Yard	BNSF	Main classification yard. Handles all types of traffic. Makeup and termination of trains, full car facilities, and a roundhouse. International: grain and potash.	100% static. Two to three turns per day.	Main BNSF yard in Portland region.
Yeon Yard	BNSF	Domestic cargo (UPS, Swift, etc.)	100% static utilization. 80% dynamic utilization. (5,800 containers month)	Second largest intermodal yard in Portland area

[1] Static capacity is based on railcars and equipment spending 24 hours in a yard or terminal. Many of the yards/terminals in the Portland area exceed static capacity. Dynamic capacity is based on an operating plan allowing equipment to spend less than 24 hours in a yard/terminal. Two turns indicates that equipment moves through and is replaced every 24 hours, three turns indicates a 24/7 operation where rail equipment is capable of being turned three times in 24 hours. Yards exceeding static capacity are more susceptible to backups, delays, and congestion and require operating plans to be executed efficiently.

[2] Many of the yards/terminals in the Portland area are in need of upgrading to more modern configurations to handle today's equipment and to support longer unit/shuttle trains. Expansion is often difficult when the facilities are located in urban areas. The emphasis is more on locating new facilities outside the urban areas instead of expanding existing facilities.