

**Southwest Washington Regional
Transportation Council**

**Clark County Freight
Mobility Study**

**Technical Memorandum:
Task 2B Current and Expected Economic Conditions &
Economic Impact of Freight Delay**

**Prepared By:
BST Associates**

**Prepared For:
RTC**

November 2009

**Southwest Washington Regional Transportation Council
Clark County Freight Mobility Study**

Task 2B

**Current and Expected Economic Conditions &
Economic Impact of Freight Delay**

Prepared By

BST Associates

PO Box 82388

Kenmore, WA 98028-0388

Prepared for

SW Regional Transportation Council

1300 Franklin Street, Floor 4

Vancouver, Washington 98660

November 2009

Table of Contents

- 1. SUMMARY1**
 - 1.1 DESCRIPTION OF FREIGHT FLOWS IN CLARK COUNTY 1
 - 1.2 ROLE OF FREIGHT GENERATION IN CLARK COUNTY’S ECONOMY.....2
 - 1.3 RELEVANCE OF FREIGHT EXPENDITURES3
 - 1.4 OPPORTUNITIES FOR ECONOMIC DEVELOPMENT4
 - 1.5 CONCLUSIONS5
- 2. SOCIO-ECONOMICS6**
 - 2.1 POPULATION.....6
 - 2.2 DEMOGRAPHICS9
 - 2.3 PERSONAL INCOME10
 - 2.4 JOB CREATION AND THE LABOR FORCE12
 - 2.5 RECENT EMPLOYMENT TRENDS13
 - 2.6 EMPLOYMENT AND LAND USE18
 - 2.7 WAGES22
 - 2.8 WAGES BY INDUSTRY SECTOR24
- 3. FREIGHT GENERATION26**
 - 3.1 PORTLAND-VANCOUVER REGION26
 - 3.2 KEY COMMODITIES27
 - 3.3 LOCATION OF FREIGHT GENERATING INDUSTRIES IN CLARK COUNTY.....28
 - 3.4 FREIGHT ORIGINATING AND TERMINATING IN CLARK COUNTY32
 - 3.5 DESCRIPTION OF OCEAN MOVEMENTS32
 - 3.6 DESCRIPTION OF BARGE MOVEMENTS36
 - 3.7 DESCRIPTION OF RAIL MOVEMENTS39
 - 3.8 DESCRIPTION OF AIR MOVEMENTS43
 - 3.9 DESCRIPTION OF PIPELINE MOVEMENTS45
 - 3.10 DISTRIBUTION OF TRUCK MOVEMENTS.....47
- 4. ECONOMIC IMPACT.....53**
 - 4.1 SUMMARY OF IMPACTS54
 - 4.2 PURCHASES OF INPUTS (INDIRECT IMPACTS).....55
 - 4.3 IMPORTANCE OF TRANSPORTATION COSTS IN ECONOMIC DEVELOPMENT56

List of Tables

TABLE 1. ESTIMATED FREIGHT MOVEMENTS BY MODE ORIGINATING AND TERMINATING IN CLARK COUNTY (2007)	.1
TABLE 2. OFM POPULATION GROWTH FORECAST	7
TABLE 3. EMPLOYMENT BY INDUSTRY SECTOR IN CLARK COUNTY (IN THOUSANDS)	14
TABLE 4. EMPLOYMENT BY INDUSTRY SECTOR IN CLARK COUNTY (IN HUNDREDS)	16
TABLE 5. COUNTY OF WORK FOR CLARK COUNTY RESIDENTS	18
TABLE 6. COUNTY OF RESIDENCE FOR CLARK COUNTY WORKERS	18
TABLE 7. NET BUILDABLE INDUSTRIAL SUPPLY BY TIER PORTLAND-VANCOUVER PMSA	19
TABLE 8. ES-202/CLARK COUNTY/RTC/METRO EMPLOYMENT PROJECTIONS	21
TABLE 9. COMPARISON OF METRO AND ESD EMPLOYMENT PROJECTIONS	22
TABLE 10. AVERAGE WAGE BY INDUSTRY SECTOR	25
TABLE 11. METROPOLITAN PORTLAND FREIGHT FORECAST 2007 (1,000 SHORT TONS)	26
TABLE 12. ESTIMATED FREIGHT MOVEMENTS BY MODE ORIGINATING AND TERMINATING IN CLARK COUNTY (2007)	32
TABLE 13. CLARK COUNTY RAILTRAFFIC IN 2007 (1,000 METRIC TONS)	41
TABLE 14. ECONOMIC IMPACTS OF FREIGHT GENERATORS IN CLARK COUNTY	55
TABLE 15. TOTAL US LOGISTICS COST (BILLIONS OF DOLLARS IN 2008)	56
TABLE 16. INTRA-INDUSTRY PURCHASES IN CLARK COUNTY (ALL FIGURES REPRESENT PERCENT OF COLUMN TOTAL)	60
TABLE 17. ESTIMATED MODAL SPLIT BY COMMODITY (1,000 METRIC TONS)	61
TABLE 18. ESTIMATED VALUE BY MODE AND COMMODITY (\$ MILLIONS)	62

List of Figures

FIGURE 1. JOBS CREATED IN FREIGHT GENERATING SECTORS.....	3
FIGURE 2. TRANSPORTATION AND THE ECONOMY.....	5
FIGURE 3. POPULATION GROWTH IN CLARK COUNTY.....	7
FIGURE 4. CLARK COUNTY HOUSEHOLDS GROWTH BY TAZ, 2005 TO 2030.....	9
FIGURE 5. COMPONENTS OF CLARK COUNTY POPULATION GROWTH.....	10
FIGURE 6. PER CAPITA PERSONAL INCOME IN CLARK COUNTY.....	11
FIGURE 7. PERSONAL INCOME INDEX (1980 BASE – CURRENT DOLLARS).....	11
FIGURE 8. WORKFORCE, EMPLOYMENT AND UNEMPLOYMENT IN CLARK COUNTY.....	12
FIGURE 9. EMPLOYMENT IN FREIGHT-GENERATING INDUSTRIES IN CLARK COUNTY (2007).....	13
FIGURE 10. CLARK COUNTY SHARE OF PORTLAND METROPOLITAN AREA EMPLOYMENT AND LABOR FORCE.....	17
FIGURE 11. INFLATION-ADJUSTED AVERAGE WAGE.....	23
FIGURE 12. INFLATION-ADJUSTED AVERAGE WAGE.....	24
FIGURE 13. COMMODITY COMPOSITION OF METROPOLITAN FREIGHT ALL MODES.....	27
FIGURE 14. COMMODITY COMPOSITION OF METROPOLITAN FREIGHT TRUCKS.....	28
FIGURE 15. LOCATION OF FREIGHT GENERATING EMPLOYMENT.....	29
FIGURE 16. GROWTH IN FREIGHT GENERATING EMPLOYMENT.....	30
FIGURE 17. GROWTH IN FREIGHT GENERATING EMPLOYMENT BY TAZ 2005 TO 2030.....	31
FIGURE 18. LOWER COLUMBIA RIVER DEEP DRAFT NAVIGATION PORTS.....	33
FIGURE 19. LOWER COLUMBIA RIVER OCEAN TRAFFIC (1,000 METRIC TONS).....	34
FIGURE 20. CLARK COUNTY OCEAN TRAFFIC IN 2007 (1,000 METRIC TONS).....	35
FIGURE 21. CLARK COUNTY OCEAN TRAFFIC IN 2007 (MILLIONS OF 2007\$).....	35
FIGURE 22. COLUMBIA SNAKE RIVER BARGE SYSTEM.....	36
FIGURE 23. CARGO TONNAGE AT BONNEVILLE LOCK & DAM.....	37
FIGURE 24. CLARK COUNTY BARGE TRAFFIC IN 2007 (1,000 METRIC TONS).....	38
FIGURE 25. CLARK COUNTY BARGE TRAFFIC IN 2007 (MILLIONS OF 2007\$).....	38
FIGURE 26. RAIL SYSTEM IN CLARK COUNTY.....	40
FIGURE 27. CLARK COUNTY RAIL TRAFFIC IN 2007 (1,000 METRIC TONS).....	42
FIGURE 28. CLARK COUNTY RAIL TRAFFIC IN 2007 (MILLIONS OF 2007\$).....	43
FIGURE 29. CLARK COUNTY AIR TRAFFIC IN 2007 (1,000 METRIC TONS).....	44
FIGURE 30. CLARK COUNTY AIR TRAFFIC IN 2007 (MILLIONS OF 2007\$).....	44
FIGURE 31. PACIFIC NORTHWEST PETROLEUM FLOW MAP.....	46
FIGURE 32. PORTLAND/VANCOUVER MARKET SUPPLY & DEMAND OVERVIEW (1,000 BARRELS PER DAY).....	46
FIGURE 33. TRUCK REGIONS.....	48
FIGURE 34. AVERAGE WEEKDAY TRUCK VOLUMES BY YEAR INTERSTATE 5 AT NORTH COUNTY LINE.....	49
FIGURE 35. CLARK COUNTY TRUCK TRAFFIC IN 2007 (1,000 METRIC TONS).....	52
FIGURE 36. CLARK COUNTY TRUCK TRAFFIC IN 2007 (MILLIONS OF 2007\$).....	52
FIGURE 37. FLOW OF IMPACTS.....	53
FIGURE 38. OUTLAY BY CLARK COUNTY FIRMS ON OUTSIDE TRANSPORTATION (PERCENT).....	57

1. Summary

The purpose of the Freight Mobility Study is to describe the transportation system used for moving freight in Clark County, to discuss the system's current and future deficiencies, and to explain how the economy of Clark County depends on adequate freight transportation links.

The following economic background report presents a summary of current and expected economic conditions in Clark County. This report draws from numerous reports and data sources to document trends in employment, wages and personal income, and population, and includes summary forecasts of future economic activity in Clark County.

This report focuses on the freight generating sectors of the economy of Clark County, such as agriculture, mining, forestry/logging, construction, manufacturing, wholesale and retail trade, and transportation/utilities. These sectors use the freight and goods system to receive inputs, to ship outputs, and to move interim products, and these sectors are the biggest users of the freight system.

1.1 Description of Freight Flows in Clark County

Clark County handled approximately 32 million tons of freight with an estimated value of \$26.4 billion in 2007. This includes freight originating in Clark County bound for locations outside of the County; freight terminating in Clark County from locations outside the County as well as freight moving within Clark County. It does not include freight passing through Clark County.

Trucks account for the largest share of the freight that originates or terminates in Clark County. Trucks accounted for an estimated 55.2 percent of total freight tonnage in the County in 2007, with an estimated value of nearly 60 percent of the freight. Ocean and rail accounted for approximately 18 percent and 17 percent, respectively, of freight tonnage and value. The remaining freight tonnage was moved by barge (7 percent of tonnage and 3 percent of value), pipeline (2 percent of tonnage and 1 percent of value), and air (0.1 percent of tonnage and 2 percent of value). (See Table 1.)

**TABLE 1. ESTIMATED FREIGHT MOVEMENTS BY MODE
ORIGINATING AND TERMINATING IN CLARK COUNTY (2007)**

Mode	Tons		Value		\$/Ton
	(1,000)	%	(\$1,000s)	%	
Ocean	5,943	18.3%	4,660,220	17.6%	784
Barge	2,269	7.0%	675,383	2.6%	298
Rail	5,625	17.3%	4,568,740	17.3%	812
Truck	17,920	55.2%	15,818,286	59.9%	883
Air	42	0.1%	433,668	1.6%	10,249
Pipeline	647	2.0%	252,517	1.0%	390
Total	32,446	100.0%	26,408,813	100.0%	814

Source: BST Associates using 2007 data, analysis performed in 2009

Freight moves by each mode in accordance with the needs of the freight generating sectors.

Ocean freight occurs exclusively at the Port of Vancouver. In terms of weight, grain exports are the dominant product transported accounting for approximately 68 percent of total tonnage.

Other key commodities include exports of metallic ores, base chemicals, waste and scrap as well

as imports of chemicals/fertilizers, petroleum products, metal products, fully assembled autos and trucks, machinery and windmill turbines.

Barge traffic utilizes the Port of Vancouver marine terminals and the Tidewater Barge Lines Vancouver Terminal. Approximately 1.3 million tons of grain was barged from upriver elevators to the United Grain export elevator in 2007, accounting for 58 percent of the barge traffic in Clark County. There were also 355,000 tons of petroleum products shipped by barge to upriver communities in 2007 accounting for 16 percent of Clark County's barge traffic by weight. The rest of the barge traffic consisted of natural sands and waste and scrap.

Rail freight traffic consists of grain at 55 percent of all rail traffic by weight followed by wood products (10 percent), metallic ores (6 percent), pulp and paper shipments (6 percent), base chemicals (5 percent), fertilizer (5 percent), and nonmetallic minerals (4 percent).

Air freight consists of higher valued time sensitive and/or perishable items. In Clark County, air freight consists mainly of electronic and electrical equipment (37 percent) followed by machinery (21 percent), mixed freight (miscellaneous consumer products at 5 percent).

Product shipped by pipeline originates at refineries on Puget Sound, and moves via the Olympic Pipeline. The volume of these products moving by pipeline into Clark County facilities is estimated at 647,000 tons with a value of \$252 million.

Truck movements are relatively diverse. Wood products are the primary commodity moving by truck in Clark County, accounting for 23 percent of all truck traffic in Clark County. The next largest commodities by weight were non-metallic minerals (11 percent), machinery (9 percent), electronics and electrical equipment (7 percent), petroleum products (6 percent). These leading commodities account for an estimated 56 percent of Clark County's truck traffic by weight. Other commodities only account individually for 5 percent or less of Clark County's truck traffic.

1.2 Role of Freight Generation in Clark County's Economy

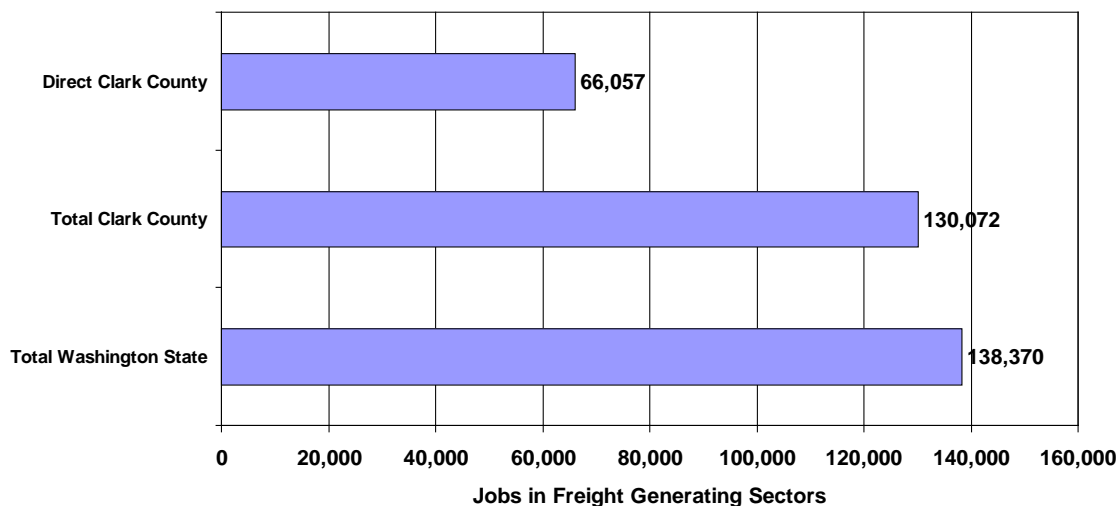
The freight that originates or terminates in the County is directly tied to jobs in the County, and preserving and enhancing the multi-modal corridors used by these cargoes is crucial to preserving existing jobs and attracting new jobs. The importance of maintaining an efficient multi-modal transportation system that serves the needs of businesses and consumers in Clark County is critical.

Freight generating sectors located in Clark County directly employed 66,057 employees in Clark County in 2007. The total impact (direct, indirect and induced effects) in Clark County is 130,072 employees and 138,370 employees in Washington State. Each job in the freight generating sector in Clark County creates 0.97 additional jobs in Clark County and 1.09 additional jobs in Washington State. (See Figure 1)

Freight generating sectors located in Clark County generate direct income (wages, salaries) of \$3.2 billion. The total impact (direct, indirect and induced effects) in Clark County is \$6.1 billion and \$6.3 billion in Washington State. Each dollar in wages and salaries in the freight generating sector in Clark County creates \$0.91 in additional income in Clark County and \$0.99 in additional income in Washington State.

Jobs in freight-generating industries tend to pay wages that are higher than the County average. Clark County has traditionally had strong employment in these sectors, but recent developments in the economy have clouded the near term picture. In order to continue to support these high-paying jobs, Clark County needs to maintain an efficient freight transportation system.

FIGURE 1. JOBS CREATED IN FREIGHT GENERATING SECTORS



1.3 Relevance of Freight Expenditures

In the United States, the estimated cost of logistics was \$1.3 trillion in 2008, representing 9.4 percent of the U.S. Gross Domestic Product (GDP). Transportation costs via all modes (intercity trucks, local trucks, railroads, water carriers, oil pipelines and air carriers as well as freight forwarders) accounted for 6.0 percent of the GDP. Other related-transportation costs accounted for an additional 3.4 percent of GDP, including inventory carrying costs, shipper related costs and logistics administration.

Transport costs are an increasing for U.S businesses and consumers. In the U.S.¹, the cost to transport tools is approximately 1.2 percent of its retail price in stores while the cost to transport fresh vegetables is approximately 9.9 percent of its retail price.

In Clark County, the expenditures² on outside transportation range from 3 percent for firms in the agriculture and construction sectors to as much as 11 percent and 12 percent for firms in the retail and wholesale sectors. This estimate does not include internally provided transportation costs, inventory carrying costs or other logistics costs.

Firms are seeking to lower transportation costs in order to preserve or enhance operating margins and profits. This is becoming increasingly difficult to accomplish due to the current economic

¹ Source: U.S. Benchmark Input-Output Accounts, 2002; By Ricky L. Stewart, Jessica Brede Stone, and Mary L. Streitwieser, October 2007

² Source: IMPLAN model results for Clark County, See Table 15 below.

recession. However, this is an excellent time for Clark County and its partners to evaluate how to improve the multi-modal transportation system in the County.

1.4 Opportunities for Economic Development

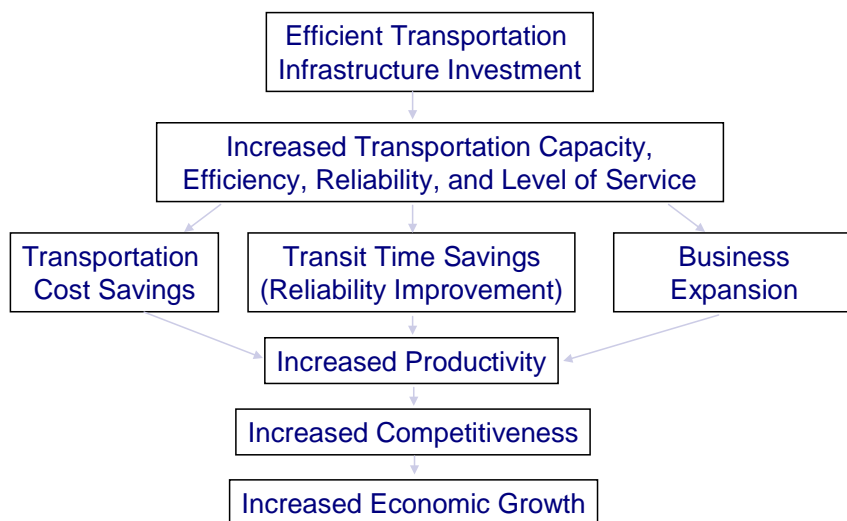
The number of workers living in Clark County will continue to grow, and these workers will need jobs. An additional 89,000 to 204,000 people are projected to move to Clark County between 2010 and 2030, or at 1.0 percent to 1.8 percent per year. During this same period Washington's population is projected to grow at a much slower rate, ranging between 0.7 percent and 1.6 percent per year.

The availability of land in Clark County increases the likelihood of growth in freight-generating sectors. According to the *Regional Industrial Land Study*³, Clark County has a disproportionate share of the available industrial land in the Portland metropolitan area, or nearly one-third of the total inventory. The properties in Clark County also tend to be larger and have fewer development constraints than those in Oregon. As a result, Clark County will likely absorb a large portion of regional industrial growth. Ports and private developers in Clark County are expanding their portfolios of commercial/industrial lands. Improvements in truck and rail access (as well as in other modes) are required to make these efforts successful, particularly improved freeway access.

Investments in infrastructure and operational improvements that reduce the cost of moving goods to and from markets can help to increase and sustain economic growth. This can improve the ability of a community to attract and retain high paying family wage jobs.

An efficient transportation system leads to improvements in reliability, transit times, service levels, and reduced costs. This increases productivity, improves competitive position and ultimately leads to increased economic growth. (See Figure 2)

³ *Regional Industrial Land Study for the Portland-Vancouver Metropolitan Area*, Otak Inc., December 1999

FIGURE 2. TRANSPORTATION AND THE ECONOMY⁴

1.5 Conclusions

There is a direct link between an efficiently functioning multi-modal transportation system and economic growth. There are several economic development opportunities that are available in Clark County if the right decisions are made.

The current severe recession coupled with prior unprecedented increases in fuel costs is causing shippers, carriers and developers to change their operations. Cost containment is a central theme to these efforts, across all modes of transportation as well as for commercial and industrial firms. These conditions will linger for the near-term future (around 5 years). However, the focus of this study is on the long term system needs for the next 30 years. This is a perfect time to begin to address these issues so as to be ready for opportunities as they arise.

The multimodal transportation system in Clark County needs improvements:

- Trucks handle the largest volume of traffic in Clark County. The key issues for truckers are congestion and a need for additional capacity on key routes. This includes improvements across the Columbia River and at key routes within Clark County (Interstate 5 [I-5], I-205, State Route [SR] 14 among others).
- Rail traffic is the next largest generator of traffic in Clark County. Key issues also include congestion, port access and mainline capacity limitations. The proposed Vancouver Bypass and the Port of Vancouver Freight Access Project will greatly improve rail traffic flows. Improvements to the shortline operation in Clark County will also benefit shippers.

⁴ Source: Economic Effects of Transportation: The Freight Story by ICF Consulting and HLB Decision-Economics for the Federal Highway Administration, 2002, page 1.

- Barge operators need improvements in the navigation channel and will also benefit from road and highway improvements.

Decision makers have an opportunity to set the groundwork for these improvements. Failure to do so will lead to a familiar pattern. An increase in transportation costs and decrease in system reliability will lead to diversion of traffic and loss of commercial and industrial development. This will lead to a loss of revenues and ultimately to a loss of jobs.

The purpose of this report is to clarify the issues impacting freight movement in Clark County to assist decision makers to make informed decisions.

2. Socio-Economics

The population of Clark County has climbed steadily over the past five decades, with growth especially strong in the last 20 years. Over the next 25 years Clark County is projected to add as many as 200,000 new residents, and many of these new residents will need jobs.

Jobs in the freight-generating sector pay well, and this type of employment is forecast to grow in Clark County. In order for this to happen, however, the freight movement system in the County must be robust enough to ship goods efficiently. Without such a robust transportation system, the high-paying freight-generating jobs may locate elsewhere.

The following section presents background information on trends in population, demographics, employment, and income in Clark County.

2.1 Population

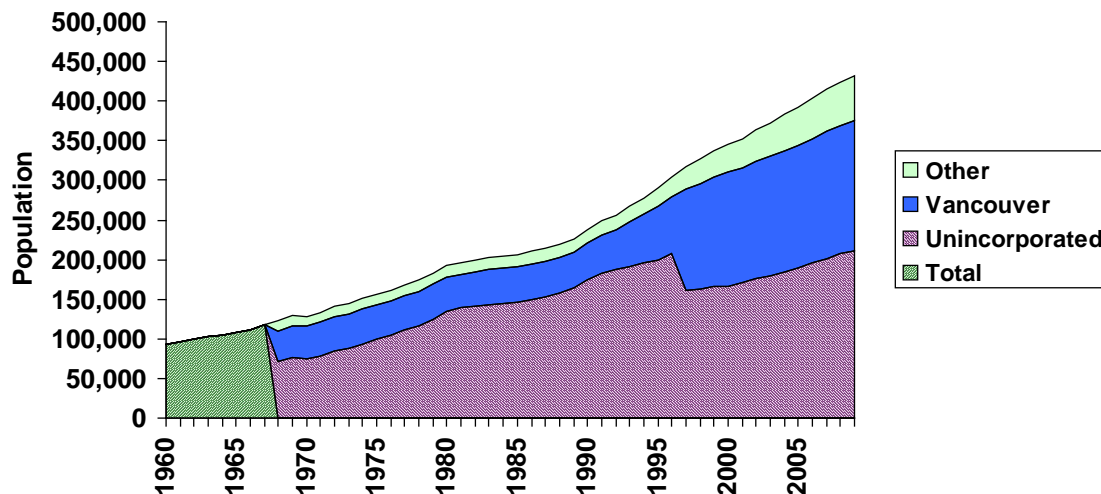
Clark County has grown much faster than Washington State for nearly five decades. While annual population growth averaged 1.7 percent per year statewide, the population of Clark County grew by an average of nearly 3.2 percent per year⁵.

Growth in Clark County has been especially strong in the most recent two decades. Between 1990 and 2000 the County's population jumped by more than 107,000, climbing from 238,000 to 345,000 residents, and representing total growth of more than 45 percent. Between 2000 and 2009 the rate of growth has slowed considerably, but has still been strong enough to raise that County's population by an additional 86,000 residents.

A major portion of the growth in Clark County has taken place outside of the incorporated cities and towns. The available information shows that the share of residents living in unincorporated parts of the County grew from 58 percent in 1968 to 74 percent in 1992. During this period the number of people living in unincorporated areas grew from 71,000 to more than 188,000. (See Figure 3)

⁵ Washington State Office of Financial Management, *April 1 Intercensal and Postcensal Estimates of the Total Resident Population by Year for the State, Counties, Cities, the Unincorporated Areas, and Incorporated Areas: 1968 to 2009*, http://www.ofm.wa.gov/pop/cociseries/cocity1960_2009.xls, accessed August 2009

FIGURE 3. POPULATION GROWTH IN CLARK COUNTY



Source: Washington State Office of Financial Management, 2009

Due to annexations, the share of the population living outside of cities dropped to just 51 percent in 1997, and to an estimated 49 percent in 2009. Despite this drop, however, the number of residents in unincorporated areas grew from 160,000 in 1997 to 210,000 in 2009.

The majority of Clark County residents who live in incorporated areas are residents of Vancouver. In 2009, approximately 75 percent of the residents living in an incorporated area lived in Vancouver, accounting for 38 percent of all County residents. It is notable that between 1969 and 1992 the population of Vancouver grew slowly in comparison to the rest of the County, or from 40,000 to less than 49,000 residents. Between 1992 and 2009, however, Vancouver’s population more than tripled due to annexation.

According to forecasts from the Washington State Office of Financial Management (OFM), the population of Clark County is expected to grow by an additional 89,000 to 204,000 between 2010 and 2030, which is equivalent to a compound annual growth rate (CAGR) of between 1.0 percent and 1.8 percent. During this same period the state population is projected to grow more slowly, with projected growth ranging between 0.7 percent and 1.6 percent per year.

TABLE 2. OFM POPULATION GROWTH FORECAST

Forecast	2005	2010	2015	2020	2025	2030	Growth 2010-2030
Clark County							
Low	345,000	405,000	433,000	456,000	477,000	493,000	89,000
Mid	345,000	436,000	477,000	513,000	548,000	580,000	143,000
High	345,000	470,000	524,000	575,000	625,000	674,000	204,000
Washington State							
Low	5,894,000	6,326,000	6,607,000	6,851,000	7,056,000	7,216,000	890,000
Mid	5,894,000	6,792,000	7,256,000	7,699,000	8,121,000	8,509,000	1,717,000
High	5,894,000	7,373,000	8,043,000	8,713,000	9,380,000	10,027,000	2,654,000

Source: Washington State Office of Financial Management, 2009

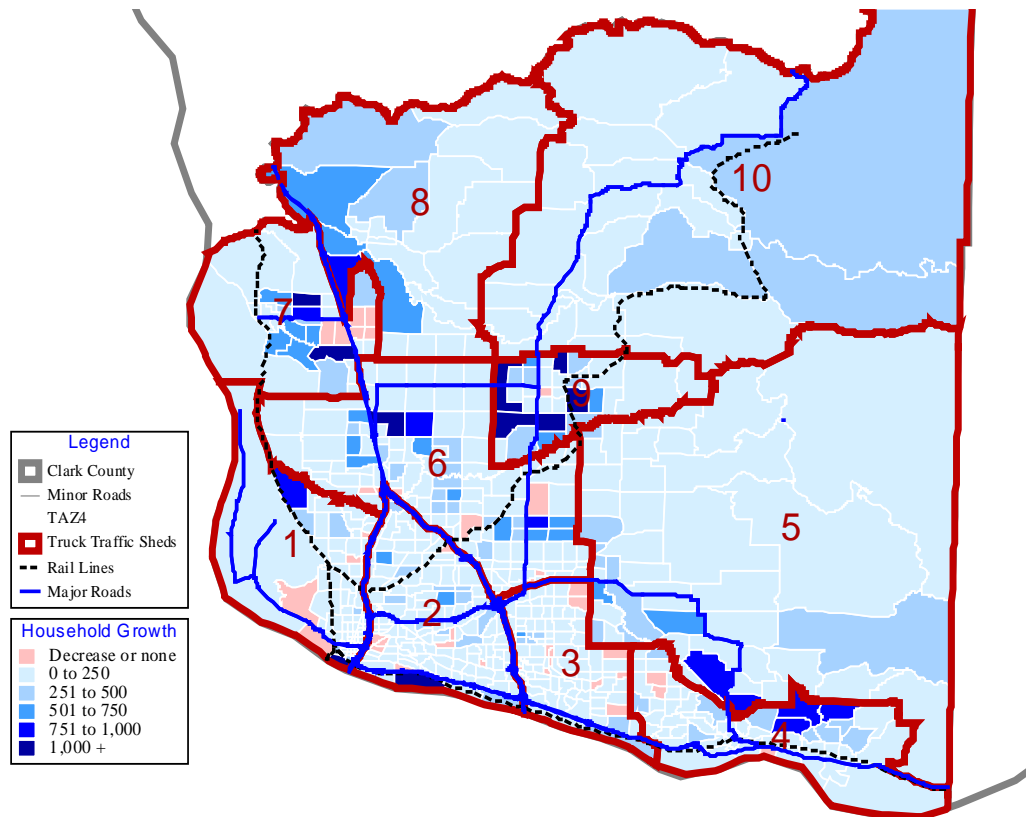
Another source of forecasts is Woods & Poole Economics, Inc⁶, an independent firm that specializes in long-term County economic and demographic projections. The Woods & Poole projections are compared to the OFM projections in order to validate the OFM numbers. The Woods & Poole forecast of Clark County's population is in line with OFM mid-range to high-range forecast. According to Woods & Poole, the population of Clark County is expected to grow from 404,000 in 2005 to 662,000 in 2030, while OFM projects a 2030 population of 674,000 under the high range and 580,000 under the mid-range forecast. Woods & Poole projects average annual growth of 1.9 percent, compared with the OFM high-range forecast of 1.8 percent per year.

Projections developed by Metro, in conjunction with Clark County and the RTC⁷, indicate where growth in housing is expected to occur over the next two decades. These growth projections are illustrated in Figure 4. In Figure 4, projected growth in the number of households is indicated by the intensity of the color for each TAZ, with darker blue indicating higher numbers of new households.

As shown in Figure 4, the number of households is projected to increase in nearly every TAZ in Clark County. A comparison between this figure and Figure 17, which shows projected growth in freight-generating employment, may indicate areas where the transportation requirements of industry overlap or conflict with those of households.

⁶ 2009 Complete Economic and Demographic Data Source, Woods & Poole, 2009

⁷ Data for 2005 is ES-202 data, geo-coded by Clark County GIS Department. Projections for 2030 are based on Metro's disaggregation of TAZ-level data from the Clark County's Comprehensive Growth Management Plan as allocated by the RTC .

FIGURE 4. CLARK COUNTY HOUSEHOLDS GROWTH BY TAZ, 2005 TO 2030

Source: 2005: ES-202 data; 2030: Clark County/RTC/Metro.

One example of this is TAZ 103, which is located between the Columbia River and SR14, in the middle of Truck Zone 2. This TAZ contains a large industrial that is served by both rail and truck, has water access, and is across SR14 from Pearson Airpark. However, a dense multi-family development borders the industrial park to the west. Access to both the industrial and residential development is via the same interchange with SR14, or via the two-lane SE Columbia Way from downtown Vancouver.

Two more areas with substantial growth projected in both households and freight-related employment are Truck Zones 7/8 and 9. Interstate 5 forms the boundary between Zone 7 and Zone 8 at the north end of the County, and strong household and employment growth is projected to occur on both sides of the freeway. In Zone 9, along the west side of Battleground, growth is also projected to be very strong.

2.2 Demographics

Between 1970 and 2005, the share of Clark County's population accounted for by working-age residents grew faster than that of residents 65 or older, or younger than 25⁸. The share of total population accounted for by working-age residents grew from 44.4 percent in 1970 to 54.8

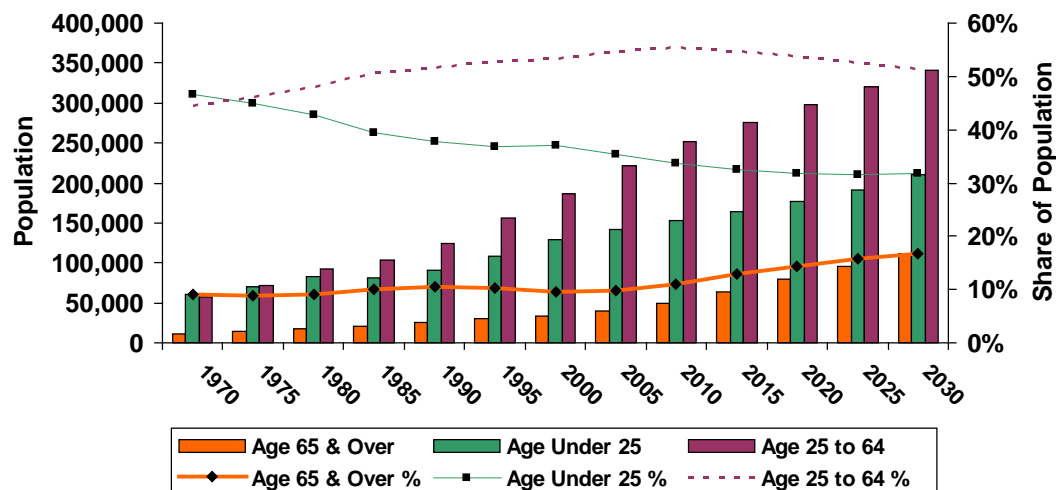
⁸ Woods & Poole, 2008

percent in 2005. In contrast, the retirement-age cohort grew from 9.0 percent of total in 1970 to 9.9 percent in 2005, while the under-25 cohort saw its share drop from 46.6 percent to 35.3 percent. (See Figure 5.)

As is the case throughout the country, the retirement-age cohort is expected to grow faster than the other two groups, due to aging of the baby boom generation. According to the Woods & Poole forecasts the number of County residents 65 or older is projected to grow by more nearly 4.2 percent per year, while the number of working-age residents is projected to grow at an average rate of 1.6 percent per year and the number of under-25 residents at 1.6 percent per year.

Despite the lower growth rate of working-age residents, the total number of people in the working-age population (25 to 64 years of age) is projected to grow by nearly 89,000 between 2010 and 2030.

FIGURE 5. COMPONENTS OF CLARK COUNTY POPULATION GROWTH



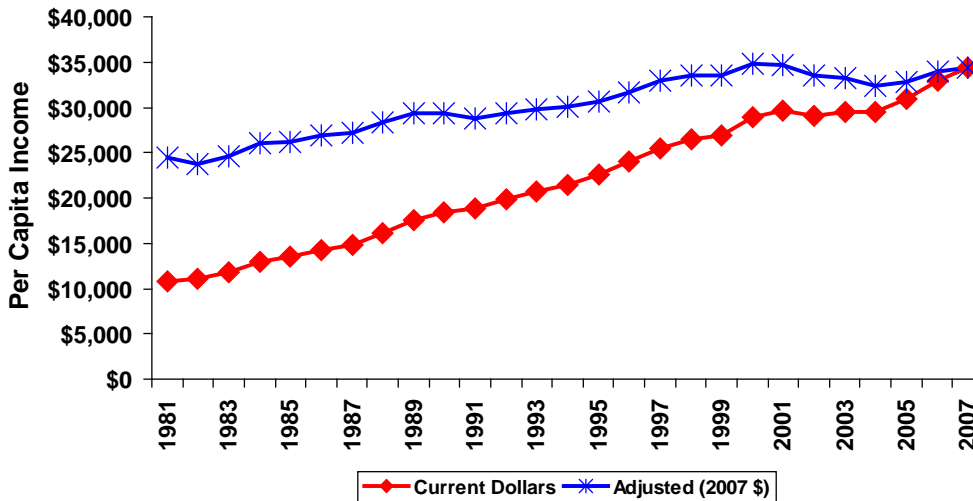
Source: Woods & Poole, 2008

2.3 Personal Income

Per capita personal income in Clark County grew by a factor of 3.5 between 1980 and 2007, according to statistics from the Bureau of Economic Analysis. Per capita income grew from approximately \$9,900 per person per year in 1980 to more than \$34,400 per person in 2007, representing annual average growth of 4.7 percent per year.

Despite the nominal growth in personal income, the rate of inflation during the 1980 to 2006 time period limited growth in real (inflation-adjusted) income. The Consumer Price Index (CPI) increased at an average annual rate of 3.5 percent during that period, which resulted in real personal income in Clark County growing by 1.2 percent per year. Real personal income averaged \$24,900 in 1980 (in 2007 dollars), and rose to \$34,400 in 2007. (See Figure 6)

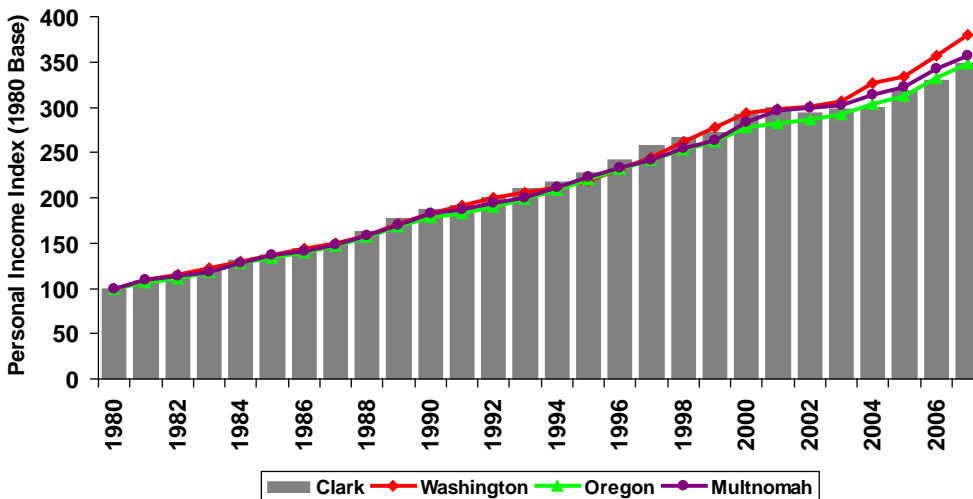
FIGURE 6. PER CAPITA PERSONAL INCOME IN CLARK COUNTY



Source: Bureau of Economic Analysis, 2008

Growth in per capita personal income in Clark County has lagged behind that of Washington State in recent years. Statewide, personal income grew by 380 percent between 1980 and 2007 (in current dollars) compared with 348 percent for Clark County. Income growth in Clark County was slightly slower than in neighboring Multnomah County, Oregon, but was identical to that in Oregon as a whole. This is another indication of the tie between the economy of Clark County and that of Oregon. (See Figure 7)

FIGURE 7. PERSONAL INCOME INDEX (1980 BASE – CURRENT DOLLARS)



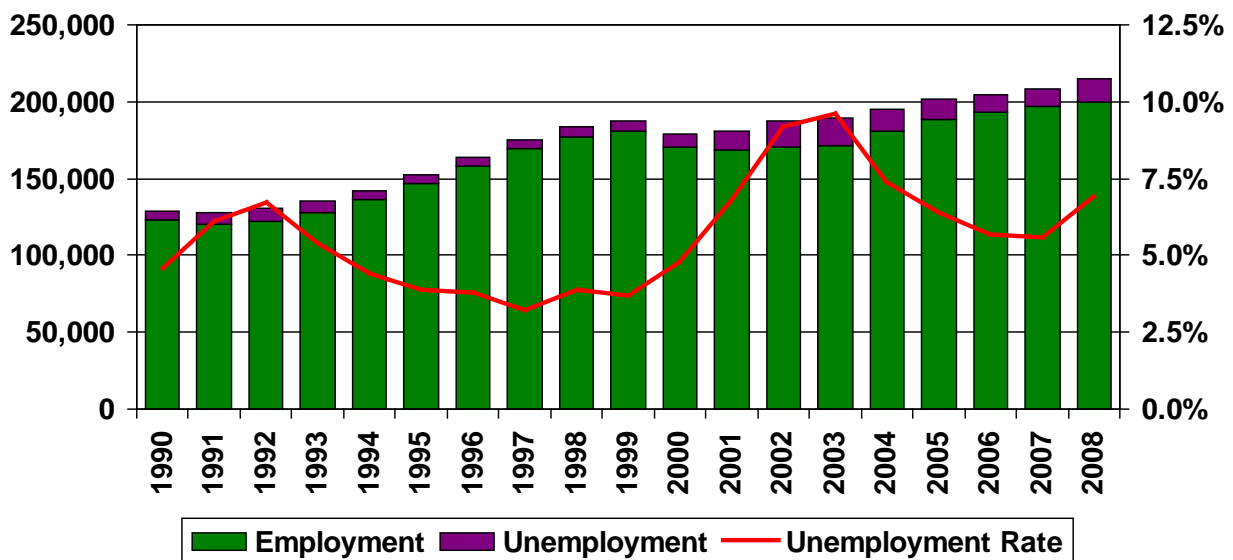
Source: Bureau of Economic Analysis, 2008

2.4 Job Creation and the Labor Force

The number of jobs in Clark County has not kept pace with the growth in population, which has led to both an increased unemployment rate in Clark County and an increase in commuter activity.

From 1990 through 2008 the number of jobs in Clark County grew by 2.7 percent per year while the labor force grew at an average rate of 2.9 percent per year⁹. During that period the civilian workforce grew by more than 86,000 new workers, while the number of workers employed grew by 77,000. (See Figure 8).

FIGURE 8. WORKFORCE, EMPLOYMENT AND UNEMPLOYMENT IN CLARK COUNTY



Source: US Bureau of Labor Statistics, 2009

In recent years the unemployment rate in Clark County has increased. The share of the workforce not employed varied from a low of 3.2 percent in 1997 to a high of 9.6 percent in 2003. The rate of unemployment was lowest between 1994 and 2000, averaging less than 5.0 percent or less in each of those years. Unemployment peaked in 2002 and 2003, exceeding 9.2 percent for the only time during the 18-year period.

According to the Washington State Employment Security Department (ESD), the current severe economic recession has had a significant impact on Clark County, with the unemployment rate jumping from 6.9 percent in January 2008 to 13.2 percent in August 2009, before declining to 11.9 percent in September 2009¹⁰.

⁹ US Bureau of Labor Statistics, <http://data.bls.gov/PDQ/servlet/SurveyOutputServlet;jsessionid=a23031c394b718601823>, accessed August 2009

¹⁰ Washington Employment Security Department, http://www.workforceexplorer.com/admin/uploadedPublications/1886_la_us_historical.xls, accessed November 2009

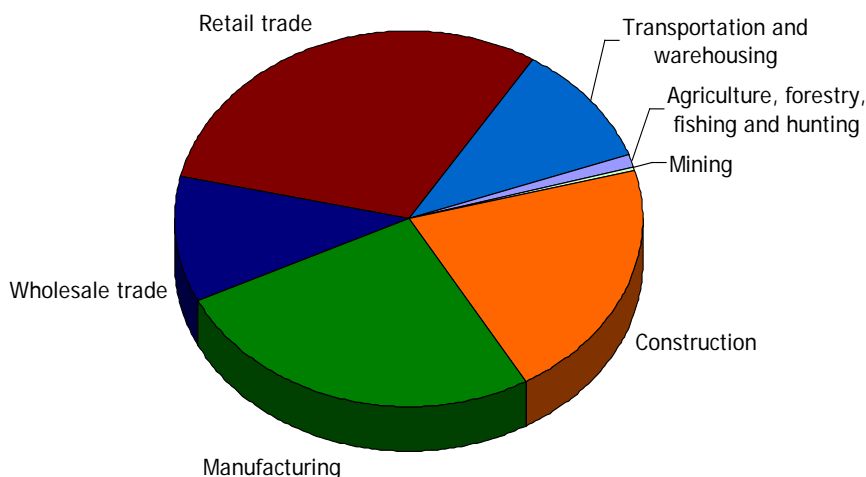
2.5 Recent Employment Trends

Freight-generating industries are a major source of jobs in Clark County, but in recent years they have not kept pace with other parts of the economy. In order to encourage freight-generating employers to locate in Clark County, an efficient freight and good movement system is critical.

According to data from the ESD¹¹, between 2000 and 2009 YTD the freight-generating sector accounted an average of 38.9 percent of all nonfarm employment in Clark County. However, that share declined between 2000 and 2003, and again since 2006. It is currently at its lowest share during this decade due to the severe economic recession.

Retail trade, manufacturing, and construction account for the largest shares of freight-generating employment. Figure 9 illustrates the relative size of each of the freight-generating sectors, in terms of direct employment. Note that the numbers presented are for 2007. This was done to maintain consistency with freight volume data presented later in this document, and for which the latest year available was 2007.

FIGURE 9. EMPLOYMENT IN FREIGHT-GENERATING INDUSTRIES IN CLARK COUNTY (2007)



Source: Washington State Employment Security Department, 2009

The total number of nonfarm jobs in Clark County grew by 15,600 between 2000 and mid-2009, from 116,700 to 132,300 jobs. This represented annual growth of 1.4 percent per year. (See Table 3)

However, growth was uneven across the sectors. The freight generating sectors lost 600 jobs during this period. As a result, the market share of freight generating businesses declined from

¹¹ *Nonagricultural Wage and Salary Employment in Washington, 2009*. Note that these figures exclude proprietors, self-employed, members of the armed services, workers in private households, and agriculture. It includes all full- and part-time wage and salary workers. It also excludes other jobs that are not covered by Employment Security, such as longshore and railroad workers, among others.

41.6 percent in 2000 to 36.3 percent in 2009. Other sectors grew from 68,200 jobs in 2000 to 84,400 in 2009, adding 16,200 jobs.

Among freight generators, the manufacturing sector was hit particularly hard, losing 4,600 jobs. Other freight generating sectors fared better.

Within the manufacturing sector, specific industries did better than others, with some adding jobs but others shrinking considerably. The biggest winners were machinery (335 additional jobs), chemicals (227 new jobs), fabricated metal products (213 new jobs), computer and electronic products (146 new jobs), and transportation equipment (128 new jobs). More of the manufacturing industries added jobs than lost, but several of the declining industries were dominated by a few key types. First among these was paper manufacturing, where employment fell by 750 jobs, or more than one third of all jobs in that sector. Food processing lost 180 jobs, representing 16 percent of the workers in that sector, and wood products lost 42 jobs, or 6 percent of the total.

**TABLE 3. EMPLOYMENT BY INDUSTRY SECTOR IN CLARK COUNTY
(IN THOUSANDS)**

NAICS Industry	2000	2005	2006	2007	2008	2009	2000-2009 Change in emp.	CAGR
Freight Generators								
Const, Mining, and Logging	9.8	12.4	12.9	12.9	12.1	10.3	0.5	0.6%
Manufacturing	17.3	13.7	13.9	13.9	13.7	12.7	(4.6)	-3.4%
Wholesale & Retail Trade	17.9	20.1	21.1	21.6	21.5	20.8	2.9	1.7%
Transp, Warehousing & Utilities	3.6	3.8	3.9	4.0	4.1	4.2	0.6	1.7%
Subtotal Freight Generators	48.6	50.0	51.8	52.4	51.4	48.0	(0.6)	-0.1%
Percent of Total NonFarm	41.6%	38.9%	39.1%	38.8%	37.9%	36.3%		
Other Sectors								
Information	3.6	2.9	2.9	2.9	2.7	2.6	(1.0)	-3.6%
Financial Activities	4.9	6.6	6.4	6.6	6.5	6.3	1.4	2.8%
Professional and Business Svcs	12.6	14.3	14.9	15.0	15.3	14.6	2.0	1.7%
Education and Health Services	12.4	15.8	16.6	17.3	18.0	18.7	6.3	4.7%
Leisure and Hospitality	11.8	12.2	13.0	13.4	13.5	13.1	1.3	1.2%
All Other Services	3.7	4.3	4.4	4.4	4.5	4.4	0.7	1.9%
Government	19.2	22.5	22.6	23.1	23.7	24.7	5.5	2.8%
Subtotal Other Sectors	68.2	78.6	80.8	82.7	84.2	84.4	16.2	2.4%
Percent of Total NonFarm	58.4%	61.1%	60.9%	61.2%	62.1%	63.7%		
Total Nonfarm	116.7	128.5	132.6	135.1	135.5	132.3	15.6	1.4%

Source: Washington State Employment Security Department, 2009

Construction, mining and logging added 500 jobs. Within this category logging employment remained flat, while construction and mining added 500 jobs. Note that this data set does not provide separate estimates of construction and mining.

Wholesale and retail trade added 2,900 jobs. The wholesale/retail industry in Clark County grew rapidly between 2002 and 2008; the 1,500 new jobs represented total growth of more than 38

percent. Nearly half of these new jobs (i.e. 734) were in the durable goods sector. The electronics whole sale/retail sectors added 453 jobs, and the nondurable wholesale/retail sector added 318.

Transportation, warehousing and utilities added 600 jobs. Employment in the transportation and warehousing industry in Clark County grew by more than 10 percent between 2002 and 2008, adding 336 new jobs. Most of the jobs in this industry involve trucking, and in 2002 the trucking sector accounted for nearly two-thirds of transportation employment. However, the number of trucking jobs actually decreased by 10 percent between 2002 and 2008, dropping from more than 2,000 jobs to approximately 1,800¹².

The silver lining to the drop in trucking jobs is that growth in the other transportation sectors more than made up for the decline. With net growth of 336 jobs and a decline in trucking of 210 jobs, the other transportation sectors added 546 new jobs. Two sectors each added 181 new jobs, including support services for transportation and other transportation and warehousing.

The sectors of the economy generating the most employment were education and health services and government. The education and health services sector added 6,300 jobs and the government sector added 5,500 jobs. Within the education and health services sector the fastest-growing sub-sector was health care and social assistance, which accounted for 6,000 of the 6,300 new jobs. Most of the new government jobs were in local government, which added 4,200 of the 5,500 new jobs. Recent budget cutbacks are expected to decrease employment in the government sector.

Overall, Clark County has fared better this decade than has Washington State. While employment in Clark County grew at an annual average rate of 1.4 percent, employment in Washington declined by -0.6 percent per year. Clark County also outperformed the state in most major sectors, with the notable exception of manufacturing. Between 2000 and 2009 Washington added 60,000 manufacturing jobs, but at the same time Clark County lost 4,600. (See Table 4)

¹² Consolidated Freightways filed for bankruptcy in 2002 and was liquidated in the following years.

TABLE 4. EMPLOYMENT BY INDUSTRY SECTOR IN CLARK COUNTY (IN HUNDREDS)

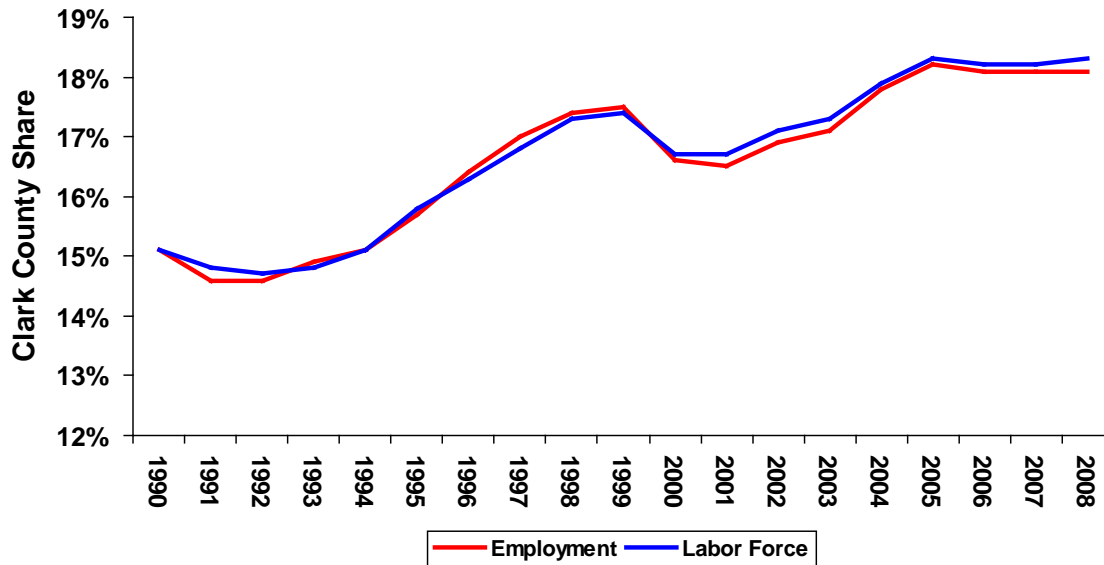
NAICS Industry	Clark County				Washington			
	2000	2009	Change	CAGR	2000	2009	Change	CAGR
Freight Generators								
Const, Mining, and Logging	9.8	10.3	0.5	0.6%	176.4	170.6	(5.8)	-0.4%
Manufacturing	17.3	12.7	(4.6)	-3.4%	271.1	331.9	60.8	2.3%
Wholesale & Retail Trade	17.9	20.8	2.9	1.7%	435.8	436.4	0.6	0.0%
Transportation, Warehousing & Utilities	3.6	4.2	0.6	1.7%	92.7	95.4	2.7	0.3%
						1,034.		
Subtotal	48.6	48.0	(0.6)	-0.1%	976.0	3	58.3	0.6%
	41.6	36.3						
Pct of Total NonFarm	%	%	-5.4%		34.2%	38.1%	4.0%	
Other Sectors								
Information	3.6	2.6	(1.0)	-3.6%	103.6	97.7	(5.9)	-0.6%
Financial Activities	4.9	6.3	1.4	2.8%	145.5	142.3	(3.2)	-0.2%
Prof. and Business Svcs	12.6	14.6	2.0	1.7%	326.4	303.8	(22.6)	-0.8%
Education and Health Svcs	12.4	18.7	6.3	4.7%	369.9	291.9	(78.0)	-2.6%
Leisure and Hospitality	11.8	13.1	1.3	1.2%	272.4	251.7	(20.7)	-0.9%
All Other Services	3.7	4.4	0.7	1.9%	104.6	106.2	1.6	0.2%
Government	19.2	24.7	5.5	2.8%	558.0	483.3	(74.7)	-1.6%
					1,880.	1,676.		
Subtotal Other Sectors	68.2	84.4	16.2	2.4%	4	9	(203.5)	-1.3%
	58.4	63.7						
Pct of Total NonFarm	%	%	5.4%		65.8%	61.9%	-4.0%	
					2,856.	2,711.		
Total Nonfarm	116.7	132.3	15.6	1.4%	3	3	(145.0)	-0.6%

Source: Washington State Employment Security Department, 2009

Clark County's Place in the Portland Metropolitan Area

Clark County is an integral part of the Portland metropolitan area, and as the regional economy grows, so will Clark County's. Many Clark County workers commute to jobs across the river, and as much as two-third of the Clark County truck traffic on I-5 is moving to or from the south. Clark County also has a large share of the land available for industrial development. In order to capitalize on the growth opportunities, Clark County must have a freight movement system designed to handle projected volumes.

Between 1990 and 1993 Clark County represented 15 percent or less of the Portland metropolitan area workforce, and 15 percent or less of employment. From 1993 through 1999 Clark County's share grew steadily, to more than 17 percent of both in 1998 and 1999. Following a drop in 2000 this climb resumed, and continued through 2005 before leveling off. Since 2005 Clark County has accounted for more than 18 percent of both the labor force and employment in the Portland metropolitan area. Clark County has consistently added more jobs to the Portland metropolitan region than other parts of the Portland metropolitan area. (See Figure 10)

FIGURE 10. CLARK COUNTY SHARE OF PORTLAND METROPOLITAN AREA EMPLOYMENT AND LABOR FORCE

Source: US Bureau of Labor Statistics, 2009

Workers do not always live in the county where their job is located; each county has some workers that work out of the county, and each county provides jobs to workers living in other counties. Data from both the 1990 and 2000 Census¹³ illustrate the extent to which workers in Clark County commute to jobs inside or outside the County.

According to Census data, in 1990 there were approximately 109,000 workers living in Clark County. By 2000 the number of workers living in Clark County had grown to more than 161,000, an increase of more than 52,000 workers.

In 1990, approximately 64 percent of the workers living in Clark County held jobs in the County, a share that increased slightly to approximately 65 percent in 2000. The number of workers living in Clark County who also worked in Clark County grew by nearly 35,000 between 1990 and 2000, while the number of Clark County residents working outside the County increased by more than 17,000.

The majority of the jobs that are located outside of Clark County but are held by Clark County residents are located in and around Portland. More than one of four Clark County residents work in Multnomah County, and although this share decreased somewhat between 1990 and 2000, the number of Clark County workers who commute to jobs in Multnomah County grew from approximately 30,000 to nearly 41,000. The Portland suburbs in Washington County and Clackamas County accounted for a combined 5 percent of Clark County workers in 1990 and 6 percent in 2000, while the total number of these workers doubled, from approximately 5,000 to 10,000. (See Table 5).

¹³ MCD/County-To-MCD/County Worker Flow Files, accessed from <http://www.census.gov/population/www/cen2000/commuting/mcdworkerflow.html#WA>, August 2009

TABLE 5. COUNTY OF WORK FOR CLARK COUNTY RESIDENTS

Workplace County	1990		2000		Increase/ Decrease
	Workers	Share of Total	Workers	Share of Total	
Clark Co. WA	69,855	64.1%	104,730	64.9%	34,875
Multnomah Co. OR	29,958	27.5%	40,984	25.4%	11,026
Washington Co. OR	2,801	2.6%	5,604	3.5%	2,803
Clackamas Co. OR	2,540	2.3%	4,316	2.7%	1,776
Cowlitz Co. WA	1,527	1.4%	2,483	1.5%	956
Other	2,264	2.1%	3,354	2.1%	1,090
Total	108,945	100.0%	161,471	100.0%	52,526

Source: US Census, 1990 and 2000

The same set of data can be used to show who is working at jobs in Clark County. As illustrated in Table 6, the majority of jobs in Clark County are filled by residents of Clark County, and this share increased slightly during the 1990's.

In 1990 approximately 70,000 of the nearly 82,000 jobs in Clark County were held by residents of the County, or 85.6 percent. By 2000 nearly 105,000 of the total 121,000 jobs in Clark County were held by local residents, or 86.5 percent.

Of the remaining workers, most came from the three counties in the Portland metropolitan area (i.e. Multnomah, Washington, and Clackamas). Between 1990 and 2000, the share of workers commuting from these counties dropped from 11.1 percent to 9.2 percent, although the actual number grew from approximately 9,000 to 11,000. In addition to these three counties, a small number of workers commute from Cowlitz County or Skamania County.

TABLE 6. COUNTY OF RESIDENCE FOR CLARK COUNTY WORKERS

Workplace County	1990		2000		Increase/ Decrease
	Workers	Share of Total	Workers	Share of Total	
Clark Co. WA	69,855	85.6%	104,730	86.5%	34,875
Multnomah Co. OR	5,410	6.6%	7,095	5.9%	1,685
Washington Co. OR	1,889	2.3%	2,016	1.7%	127
Clackamas Co. OR	1,764	2.2%	2,033	1.7%	269
Cowlitz Co. WA	960	1.2%	2,058	1.7%	1,098
Skamania Co. WA	547	0.7%	896	0.7%	349
Other	1,173	1.4%	2,237	1.8%	1,064
Total	81,598	100.0%	121,065	100.0%	39,467

Source: US Census, 1990 and 2000

2.6 Employment and Land Use

Industrial Land Supply

Clark County has a more land available for industrial development than any other county in the Portland region. However, without adequate access routes (especially for trucks), the potential to develop this land will not be realized, and the high-paying jobs associated with the development will go elsewhere.

Metro, the elected regional government of the Portland metropolitan area, completed the *Regional Industrial Land Study* (RILS) for the Portland-Vancouver Metropolitan Area in 1999¹⁴. It identified Clark County as having a significant portion of the land available for industrial development. As a result, a large portion of the industrial development projected to occur in the Portland metropolitan area is expected to occur in Clark County.

According to the industrial lands study, there were 9,198 net buildable acres within the six-county Portland-Vancouver Primary Metropolitan Statistical Area (PMSA). As shown in Table 7, nearly one-third of this land is located in Clark County.

TABLE 7. NET BUILDABLE INDUSTRIAL SUPPLY BY TIER PORTLAND-VANCOUVER PMSA

County	Tier A	Tier B	Tier C	Tier D	Total
Available Acres					
Clackamas	47	651	-	166	865
Multnomah	442	1,960	87	83	2,572
Washington	483	1,205	26	53	1,766
Columbia	70	590	-	223	883
Yamhill	-	238	-	5	243
Oregon Subtotal	<u>1,042</u>	<u>4,644</u>	<u>5,538</u>	<u>530</u>	<u>6,329</u>
Clark	1,345	1,163	71	290	2,869
Total	<u>2,387</u>	<u>5,807</u>	<u>184</u>	<u>820</u>	<u>9,198</u>
Share of Total					
Clackamas	2.00%	11.20%	0.00%	20.20%	9.40%
Multnomah	18.50%	33.80%	1.60%	10.10%	28.00%
Washington	20.20%	20.80%	0.50%	6.50%	19.20%
Columbia	2.90%	10.20%	0.00%	27.20%	9.60%
Yamhill	0.00%	4.10%	0.00%	0.60%	2.60%
Oregon Subtotal	<u>43.70%</u>	<u>80.00%</u>	<u>98.70%</u>	<u>64.60%</u>	<u>68.80%</u>
Clark	56.30%	20.00%	1.30%	35.40%	31.20%
Total	<u>100.00%</u>	<u>100.00%</u>	<u>100.00%</u>	<u>100.00%</u>	<u>100.00%</u>

Source: Metro RLIS, 1999

The RILS classified available properties into four tiers, depending on the size of the property and the constraints on development. Tier A land includes vacant sites over one acre with relatively few development constraints. Tier B land includes vacant sites that are over one acre, but which have significant development constraints. Tier C properties are vacant infill sites between one-half and one acre, while Tier D sites are constrained by existing uses.

At the time that this inventory was completed the majority of the Tier A land, or the large industrial properties most likely to be developed, was in Clark County. Of the 2,387 acres of Tier A land identified, 1,345 acres were located in Clark County, representing 56 percent of the available inventory. Clark County also accounted for 20 percent of the Tier B land, or the large

¹⁴ Otak Inc., December 1999

properties with development constraints. Combining the Tier A and Tier B properties, Clark County accounted for nearly one-third of the available supply of large industrial properties.

Importance of Port Districts

Clark County has three Port Districts, including the Port of Vancouver, Port of Camas-Washougal, and Port of Ridgefield. These Port Districts control a large share of the industrial land in Clark County, and each is actively developing industrial properties to attract freight-generating industries.

The Port of Ridgefield has two industrial sites, the Ridgefield Industrial Park and the Lake River Industrial Park. The Ridgefield Industrial Park is a 75-acre development located adjacent to I-5 that has so far attracted 11 firms, with more than 800 employees. The Lake River Industrial Park is a 41-acre brownfield redevelopment site near downtown Ridgefield that is currently undergoing remediation, but already houses several businesses.

The Port of Camas-Washougal has one existing industrial park and is developing a second. The existing Port of Camas-Washougal Industrial Park encompasses 310 acres, and is fully developed. Existing tenants currently employ nearly 1,000 workers. In order to accommodate future growth, the port is developing the 120 acre East Industrial Park.

The Port of Vancouver serves a wide variety of tenants. Many of these are related to the waterborne transportation industry, taking advantage of the port's marine terminals as well as the barge, road and rail systems that serve the terminals. Many tenants do not use the marine terminals, but are attracted by the proximity of the Port's land and buildings to I-5, SR14, and other major highways.

The Port of Vancouver has the developable land needed to meet the Metro job growth forecasts. In particular, the former Alcoa/Evergreen site has more than 200 acres of land available for heavy industrial tenants, while the Columbia Gateway site will contain more than 500 acres of land zoned for industrial uses. These properties represent a large share of the Tier A industrial land identified in the *Regional Industrial Lands Study*, and are the only sites in the region that bigger than 200 acres. Adequate truck access will be critical to the development of these properties.

Employment Forecast

Two recent forecasts project job growth by industrial sector in Clark County. The first of these, based on land use projections and produced by the Metro in conjunction with Clark County and the RTC, estimates job growth between 2005 and 2030. According to this forecast the total number of jobs in Clark County is expected to more than double, growing from approximately 123,300 in 2005 to nearly 284,000 in 2030.

According to the Metro forecast, nearly all sectors are projected to see increased employment, with the exception of transportation / communication / public utilities (TCU). The number of jobs in this sector is projected to drop by more than 700, or by approximately 9 percent.

In contrast, four sectors are projected to add more than 30,000 new jobs each, including manufacturing, retail trade, service, and government. With the exception of the TCU sector, industries that are heavy users of the freight transportation system are expected to see job

growth, including agriculture / forestry / mining, construction, manufacturing, and wholesale trade. (See Table 8)

TABLE 8. ES-202/CLARK COUNTY/RTC/METRO EMPLOYMENT PROJECTIONS

Sector	2005	2030	Increase (Decrease)	CAGR
Freight Generators				
Agriculture/Forestry/Mining	1,902	3,482	1,580	2.4%
Construction	10,047	19,383	9,336	2.7%
Manufacturing	15,975	48,434	32,459	4.5%
Transport/Comm/Public				
Utilities	7,799	7,080	-719	-0.4%
Wholesale Trade	5,562	13,339	7,777	3.6%
Retail Trade	23,380	54,813	31,433	3.5%
Subtotal Freight Generators	64,665	146,531	81,866	3.3%
Percent of Total	52%	52%	51%	
Other Sectors				
Financial/Insurance/Real				
Estate	5,699	10,019	4,320	2.3%
Service	46,765	90,547	43,782	2.7%
Government	6,223	36,771	30,548	7.4%
Subtotal Other Sectors	58,687	137,337	78,650	3.5%
Percent of Total	48%	48%	49%	
Total	123,352	283,868	160,516	3.4%

Source: 2005: ES-202 data; 2030: Clark County/RTC/Metro, 2005

Another recent employment forecast¹⁵ was produced by the ESD in 2009. This forecast uses 2006 as a base year, and runs through 2016.

In the past, ESD projections have tended to underestimate growth in Clark County because they are based on a proportion of expected growth in Washington State rather than taking into account the growth of Clark County within the Portland metropolitan area.

A comparison of the Metro and ESD forecast presented in Table 9 shows that the ESD forecast is more conservative than the Metro forecast. The ESD forecast projects total employment to grow from approximately 130,000 in 2006 to 153,000 in 2016, while the Metro forecast shows employment growing from 127,000 to 175,000.

The Metro forecast projects growth of nearly 25,000 jobs in freight generating sectors (including agriculture) while the ESD forecast projects an increase of 5,000 jobs in freight generating sectors between 2006 and 2016. The Metro forecast projects that other sectors will generate nearly 23,000 jobs while the ESD projects a gain of 17,700 jobs.

In several sectors the two forecasts are similar, including in the construction, finance / insurance / real estate, and service sectors. For several freight-generating sectors, however, the ESD projections are substantially lower than the Metro projections. For example, the Metro forecast

¹⁵ Annual Average Nonagricultural Wage and Salary Employment, Estimated 2006 and Projected 2011 and 2016, Washington State (in thousands), Washington Employment Security Department, June 2008

projects that manufacturing will add nearly 10,000 jobs, growing to more than 26,000 jobs in 2016. In contrast, the ESD forecast anticipates that manufacturing employment will decline slightly, ending with just 13,100 jobs in 2016. Given that Clark County has the largest amount of industrial land available in the Portland metropolitan area, it is likely that Clark County will see growth in manufacturing. However, it may not be as high as projected by the Metro.

In the wholesale trade sector both forecasts predict the number of jobs growing, but the Metro forecast anticipates 2,400 new jobs while the ESD anticipates 1,000 new jobs. Again, the availability of land in Clark County makes growth in this sector likely.

The two forecasts differ on expected growth in the transportation / communications / public utilities sector. The Metro forecast shows the number of jobs decreasing while the ESD shows them increasing. However, the base employment in 2006 is substantially different between the two forecasts: the Metro forecast uses an estimated base of 7,800 jobs, while the ESD uses a base of 4,100 jobs in 2006. This sector has performed well in the recent difficult economic conditions and is likely to show continued growth.

TABLE 9. COMPARISON OF METRO AND ESD EMPLOYMENT PROJECTIONS

Sector	RTC (interpolated)			ESD		
	2006	2016	Change	2006	2016	Change
Freight Generators						
Agriculture/Forestry/Mining	1,949	2,482	533	400	400	0
Construction	10,315	13,415	3,100	12,800	13,600	800
Manufacturing	16,700	26,025	9,325	13,700	13,100	-600
Transport/Comm/Public Utilities	7,769	7,474	-295	4,100	5,000	900
Wholesale Trade	5,760	8,173	2,413	5,400	6,400	1,000
Retail Trade	24,191	34,014	9,823	15,200	18,100	2,900
Subtotal Freight Generators	66,684	91,583	24,899	51,600	56,600	5,000
Percent of Total	52%	52%	52%	40%	37%	22%
Other Sectors						
Financial/Insurance/Real Estate	5,829	7,305	1,476	6,900	7,700	800
Service	48,017	62,543	14,526	49,200	62,600	13,400
Government	6,681	13,598	6,917	22,500	26,000	3,500
Subtotal Other Sectors	60,527	83,446	22,919	78,600	96,300	17,700
Percent of Total	48%	48%	48%	60%	63%	78%
Total	127,210	175,029	47,819	130,200	152,900	22,700

Source: Metro, 2005; ESD, 2008

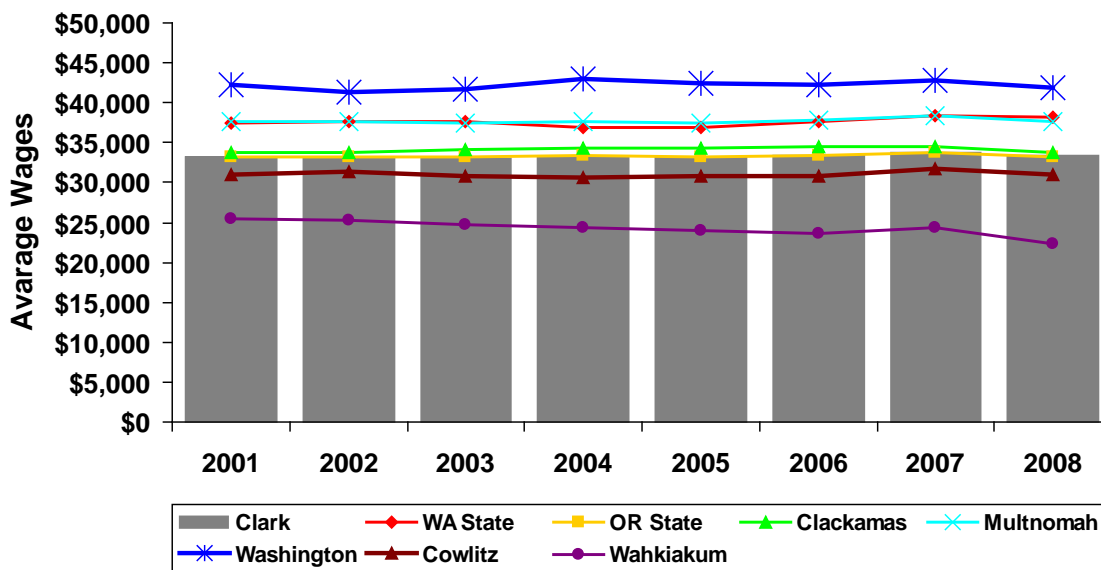
2.7 Wages

Average wages for workers in Clark County are essentially the same as those in Clackamas County, Oregon, as well as in Oregon as a whole. At the same time the average wage is substantially higher than in Cowlitz County or Wahkiakum County, but substantially lower than in Multnomah County or Washington County, Oregon, and Washington State. With the exception of Wahkiakum County, the growth in wages in each of these counties has been very similar.

According to data from the Bureau of Labor Statistics¹⁶, the average wage in Clark County grew from \$33,125 in 2001 to \$40,721 in 2008. This increase of nearly \$7,600 over eight years represented average annual growth rate (CAGR) of 2.6 percent. This was a faster rate of growth than in any of the other counties in the study area, but slightly lower than that in Washington State.

Washington County had the highest wages in the region in 2001, averaging \$42,222 per year. With CAGR of 2.4 percent, this average wage increased to \$51,137 in 2008. The average wage in Multnomah County was also higher than that in Clark County in 2001. In Multnomah County wages grew from \$37,688 in 2001 to \$46,004 in 2008, representing annual growth of 2.5 percent. (See Figure 11)

FIGURE 11. INFLATION-ADJUSTED AVERAGE WAGE



Source: US Bureau of Labor Statistics, 2009

Clackamas County wages were \$574 higher than in Clark County in 2001, but this difference dropped to \$414 in 2008. Statewide, Oregon’s average wage was just \$79 higher than Clark County’s in 2001, but by 2008 Clark County’s was \$237 higher than Oregon’s.

The average wage in Cowlitz County was approximately \$2,000 per year less than that in Clark County in 2001, but with a lower growth rate this differential increased to nearly \$3,000 in 2008. Wahkiakum County has fared much worse, and the difference between wages in Clark County and Wahkiakum County grew from \$7,700 in 2001 to more than \$13,000 in 2008.

Average wages in Washington State were higher than in Clark County in 2001, and also grew at a faster rate between 2001 and 2008. The difference between Washington State and Clark County wages grew from \$4,300 in 2001 to \$5,800 in 2008.

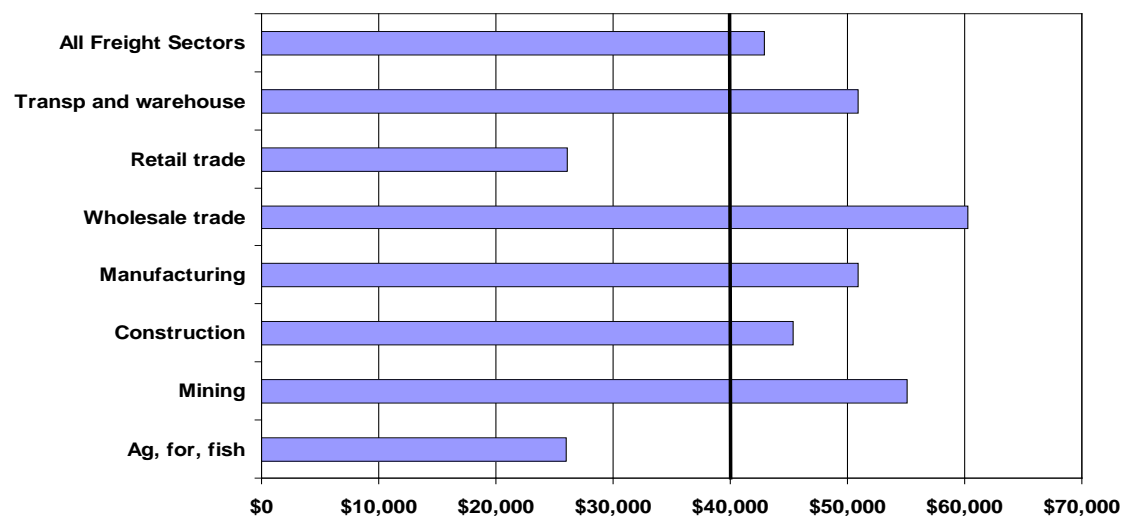
¹⁶ Bureau of Labor Statistics, <http://data.bls.gov/PDQ/outside.jsp?survey=en>, accessed August 2009

Despite the apparent growth in wages, when adjusted for inflation wages in both Washington, Oregon, and most of the counties in the study area were the same in 2008 that they were in 2001. The exception is Wahkiakum County, where inflation-adjusted wages in 2008 were substantially lower than they were in 2001.

2.8 Wages by Industry Sector

A key reason for supporting a robust freight transportation system in Clark County is that the jobs in freight-generating industries tend to pay better than in other industries. As shown in Figure 12, within the freight-generating category only the retail and agriculture sectors pay wages lower than the county average, while the other sectors pay substantially more than the county average.

FIGURE 12. INFLATION-ADJUSTED AVERAGE WAGE



Source: ESD, 2009

As shown in Table 9, with agriculture and retail included, the average annual wage in freight generating industries was nearly \$42,000 in 2008, compared with a County average across all other industries of less than \$41,000. The wholesale, manufacturing, construction, and transportation and warehousing sectors pay wages well above the County average. In 2002, both the mining and utilities sectors also paid substantially better than the County average, but figures for these sectors were not available for 2008 due to anonymity requirements.

TABLE 10. AVERAGE WAGE BY INDUSTRY SECTOR

NAICS	NAICS Description	2002	2008	Change
Freight Generators				
11	Agriculture, forestry, fishing and hunting	\$20,483	\$26,020	\$5,536
21	Mining	\$43,186	n/a	n/a
22	Utilities	\$48,802	n/a	n/a
23	Construction	\$37,180	\$45,377	\$8,197
31	Manufacturing	\$42,230	\$50,891	\$8,661
42	Wholesale trade	\$47,537	\$60,307	\$12,770
44	Retail trade	\$23,921	\$26,133	\$2,212
48	Transportation and warehousing	\$38,940	\$41,852	\$2,911
	Weighted average of freight generators	\$35,741	\$41,950	\$6,209
Other Sectors				
51	Information	\$45,484	\$54,803	\$9,319
52	Finance and insurance	\$43,426	\$54,030	\$10,604
53	Real estate and rental and leasing	\$24,875	\$34,132	\$9,257
54	Professional and technical services	\$62,798	\$68,685	\$5,887
55	Mgmt of companies and enterprises	\$47,272	\$68,058	\$20,786
56	Administrative and waste services	\$21,373	\$25,922	\$4,549
61	Educational services	\$19,141	\$22,537	\$3,396
62	Health care and social assistance	\$33,059	\$44,139	\$11,079
71	Arts, entertainment, and recreation	\$14,414	\$21,738	\$7,323
72	Accommodation and food services	\$12,202	\$14,630	\$2,427
81	Other services	\$18,543	\$22,244	\$3,701
92	Government	\$38,256	\$46,310	\$8,054
	Weight average other sectors	\$32,555	\$39,948	\$7,393
	Weighted average all sectors	\$33,764	\$40,694	\$6,930

Source: ESD, 2009

3. Freight Generation

3.1 Portland-Vancouver Region

Jobs in freight-generating industrial sectors depend on the ability to move freight and goods. Growth in these high-paying jobs will be affected, either positively or negatively, by the capacity of the freight and goods movement system in Clark County.

As noted previously, the economy of Clark County is closely tied to that of the Portland metropolitan area. The types of freight that move, and the ways in which they move, are similar on both sides of the river.

In 2006, the Port of Vancouver participated in an analysis with Port of Portland of freight movements in the Portland metropolitan area¹⁷, which includes Clark County. This report documents the volume of freight currently moving in the metropolitan area, including commodity type and mode of transportation, and also projects future freight volumes through the year 2035.

The forecast includes of several types of freight movements, including:

- Goods that originate in the region and move out of the region;
- Goods that originate outside the region and are delivered within the region; and
- Goods that start and end their journey in the region.
- Goods that pass through the region.

Note that goods that pass through the region are not included in this analysis. According to Heffron Transportation, approximately half of the trucks on I-5 and I-205 are through traffic.

According to this forecast, trucks account for two-thirds of all freight movements in the metropolitan area. Ocean shipping accounts for approximately 9 percent of the total, pipeline more than 8 percent, rail 6 percent, intermodal 4 percent, and barge 5 percent. (See Table 11)

**TABLE 11. METROPOLITAN PORTLAND FREIGHT FORECAST 2007
(1,000 SHORT TONS)**

Type of Move	Inbound	Internal	Outbound	Total	Share of Total tons
Air	243		238	481	0.2%
Barge	7,535	1,928	5,262	14,730	4.6%
Intermodal	7,177		6,927	14,114	4.4%
Ocean	10,119		18,437	28,634	8.9%
Pipeline	27,567			27,567	8.6%
Rail	16,918	287	2,031	19,243	6.0%
Truck	63,289	81,586	70,024	214,989	67.2%
Total	132,848	83,801	102,920	320,037	100.0%

Source: Global Insight, interpolated for 2007 from 2000 actual and 2010 reported, 2006

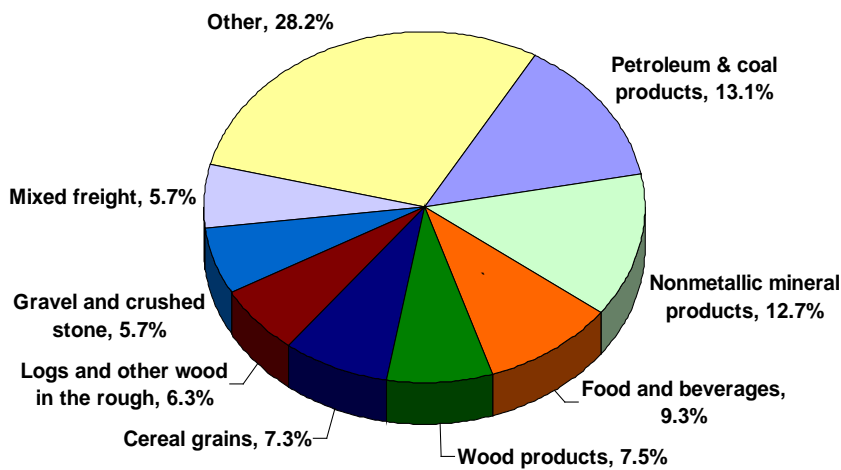
¹⁷ Global Insight, *Portland/Vancouver International and Domestic Trade Capacity Analysis Task 1*, July 2006

The largest share of freight, approximately 40 percent, moves into the metropolitan area from outside. The amount of freight that originates in the area and moves outside is approximately 35 percent. The remaining 25 percent is freight that both originates and terminates with the region.

3.2 Key Commodities

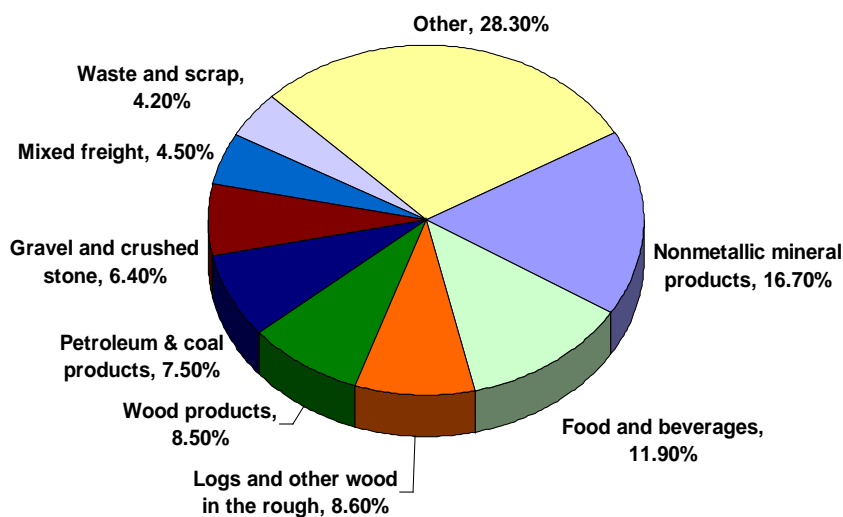
The top five commodity groups account for half of the freight moving in the Portland-Vancouver area, according to the Port of Portland freight forecast. These include: petroleum products, minerals, food and beverages, wood products, and grain. Other key commodities include logs, aggregates, and mixed freight. (See Figure 13)

FIGURE 13. COMMODITY COMPOSITION OF METROPOLITAN FREIGHT ALL MODES



Source: Global Insight, interpolated for 2007 from 2000 actual and 2010 reported, 2006

For freight carried by truck, the top five commodities also account for more than half of the volume moved, but the commodity mix is different. Non-metallic-minerals (cement, gypsum wallboard et al) account for the largest share of tonnage, followed by food and beverages, logs, wood products, and petroleum products. (See Figure 14)

FIGURE 14. COMMODITY COMPOSITION OF METROPOLITAN FREIGHT TRUCKS

Source: Global Insight, interpolated for 2007 from 2000 actual and 2010 reported, 2006

One interesting result of this analysis is the mixed freight, which includes containerized cargo, accounts for just 5.7 percent of all freight and 4.5 percent of truck freight. In contrast, nonmetallic minerals combined with gravel and crushed stone account for nearly one-quarter of the volume carried, while logs combined with other wood products account for 17 percent. Waste and scrap is nearly as large a category as mixed freight, with each accounting for less than 5 percent of the total tonnage moved by truck.

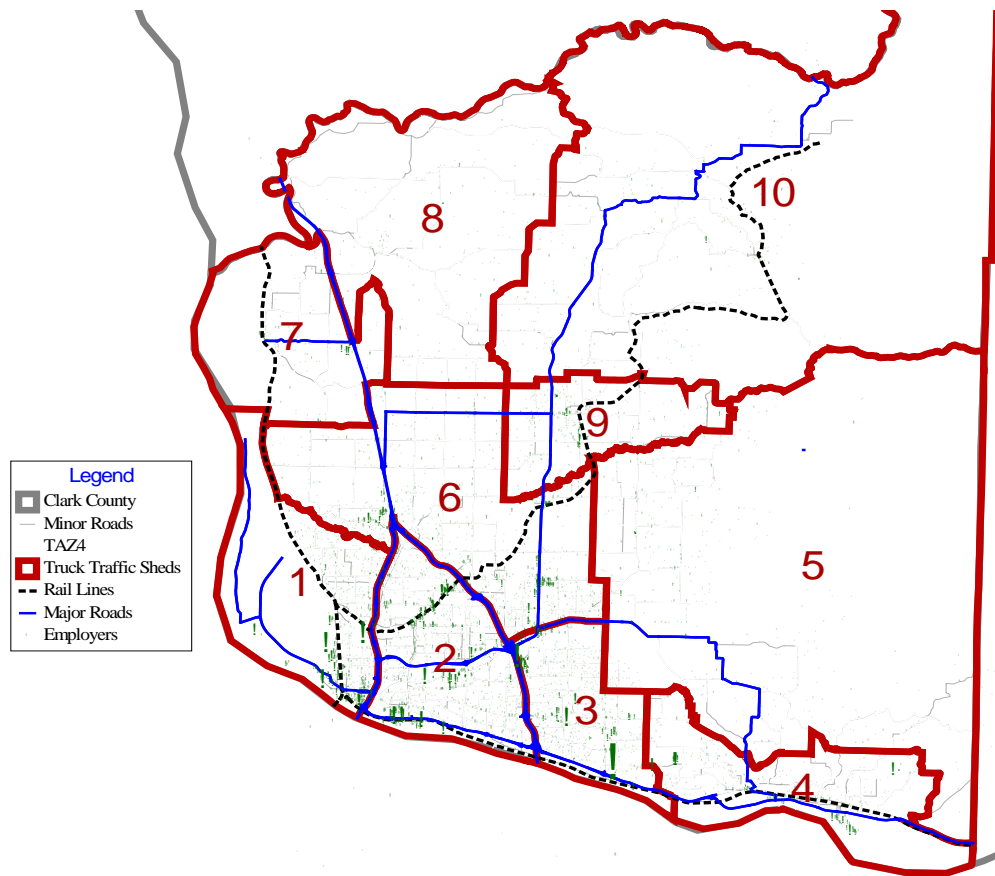
3.3 Location of Freight Generating Industries in Clark County

The majority of freight-generating jobs in Clark County are located within a few miles of the Columbia River, between the Port of Vancouver and City of Washougal.

According to Metro employment data, Truck Zone 2 (Central Vancouver) is currently the largest center of freight-generating jobs, accounting for more than 12,000 of the 41,000 freight-related jobs in Clark County, or approximately 30 percent of the total. Zones to either side of Zone 2 are also major centers of freight-related employment. Zone 3 (East Vancouver) currently accounts for 17 percent of these jobs, while Zone 1 (Port of Vancouver & Downtown) accounts for 15 percent. Two other areas account for 12 percent each, i.e. Zone 4 (Camas/Washougal) and Zone 6 (Central County). The remaining regions each account for less than 5 percent of freight-generating jobs.

Data from Dun & Bradstreet shows a similar distribution freight generating employment¹⁸. Figure 15 shows the location of employers in freight generating industries, with the exception of retail employment. In this figure the green circles represent specific employer locations, with the size of the circle proportional to the number of jobs.

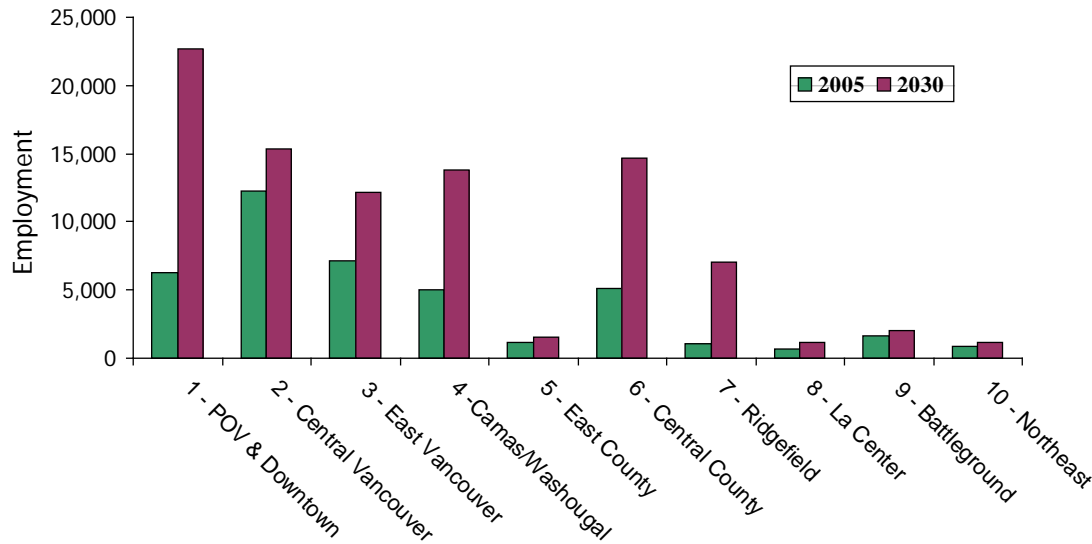
¹⁸ Dun & Bradstreet data, special data request by BST Associates, July 2009

FIGURE 15. LOCATION OF FREIGHT GENERATING EMPLOYMENT

Source: Dun & Bradstreet, 2009.

According to the Metro employment forecast, the total number of freight-generating jobs in Clark County is projected to grow by more than 50,000 by the year 2030. Of this total, approximately one-third is projected to occur in Truck Zone 1, which includes downtown Vancouver and the Port of Vancouver. As illustrated in Figure 16, the number of freight-generating jobs in this zone is anticipated to grow from 6,300 in 2005 to more than 22,000 in 2030. Assuming that this growth occurs, the Port of Vancouver-Downtown region will become the largest center of freight-generating jobs in Clark County

FIGURE 16. GROWTH IN FREIGHT GENERATING EMPLOYMENT



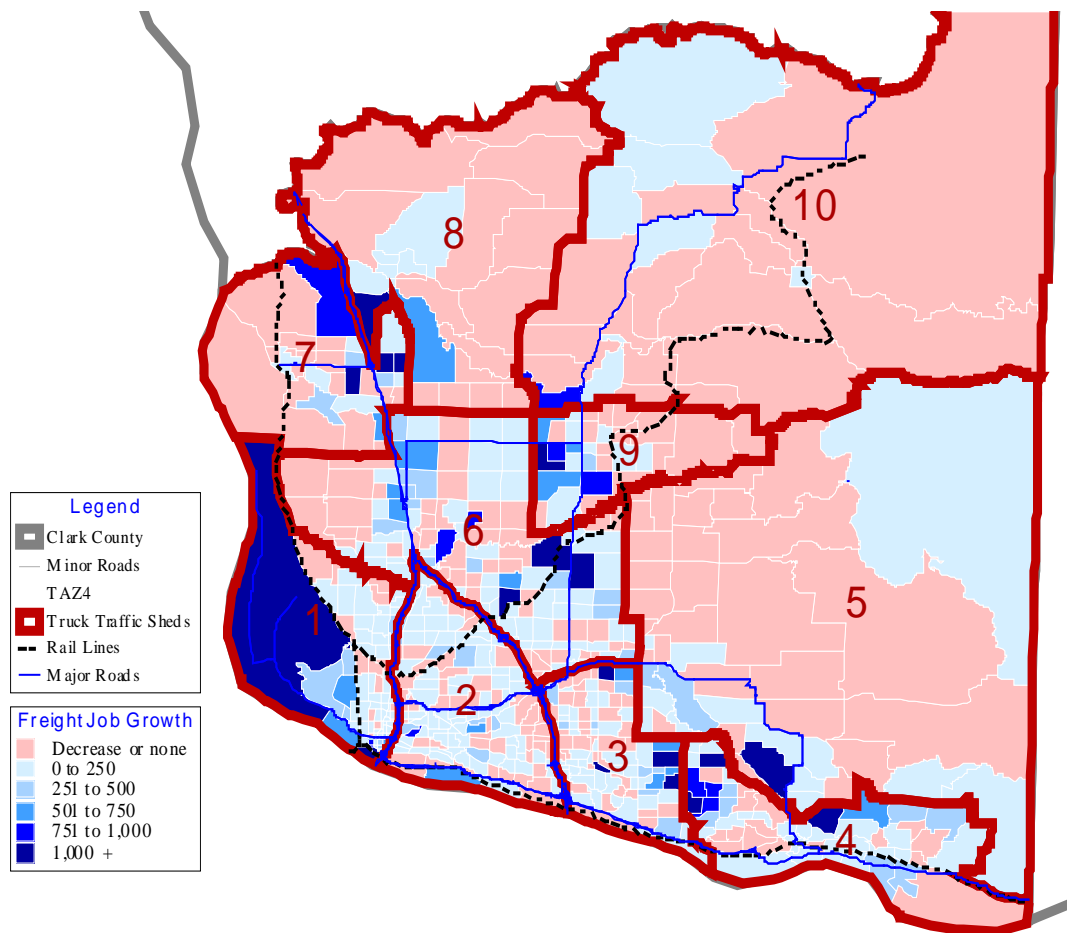
Source: Metro

Other zones expected to see especially strong job growth in freight-generating industries include Zone 6 (Central County), with 19 percent of the new jobs; Zone 4 (Camas/Washougal), with 17 percent of the new jobs; Zone 7 (Ridgefield), with 12 percent of the new jobs, and Zone 3 (East Vancouver), with 10 percent of the new jobs. In each of these zones the number of freight-generating jobs is projected to grow by a factor of two or three. This growth in freight-generating jobs will require a road system adequate to handle the increasing levels of truck traffic associated with the new jobs.

As illustrated in Figure 17, job growth is expected to be strong in the three regions to the east of downtown (i.e. Central Vancouver, East Vancouver, and Camas / Washougal), areas that have traditionally been the center of freight-generating employment. Trucks that serve the industries in these regions use many of the same interchanges as those serving Downtown Vancouver and the Port of Vancouver. It is critical that these interchanges, and the roads leading to them, be designed for the projected levels of truck traffic.

Figure 17 also illustrates the growing importance of the Ridgefield area and Camas-Washougal as centers of freight-generating economic activities.

**FIGURE 17. GROWTH IN FREIGHT GENERATING EMPLOYMENT BY TAZ
2005 TO 2030**



Source: 2005: ES-202 data; 2030: Clark County/RTC/Metro

3.4 Freight Originating and Terminating in Clark County

Freight movement in Clark County includes cargoes that originate in, terminate in, and move through Clark County. The freight that originates or terminates in the County is directly tied to jobs in the County, and preserving the multi-modal corridors used by these cargoes is crucial to preserving jobs.

Trucks account for the largest share of the freight that originates or terminates in Clark County. Trucks accounted for an estimated 55 percent of total freight tonnage in the County in 2007, with an estimated value of nearly 60 percent of the total. Ocean and rail accounted for 18 percent and 17 percent, respectively, of freight tonnage. The remaining freight tonnage was moved by barge (i.e. 7 percent), pipeline (2 percent), and air (0.1 percent). (See Table 12.)

TABLE 12. ESTIMATED FREIGHT MOVEMENTS BY MODE ORIGINATING AND TERMINATING IN CLARK COUNTY (2007)

Mode	Tons		Value		\$/Ton
	(1,000)	%	(\$1,000s)	%	
Ocean	5,943	18.3%	4,660,220	17.6%	784
Barge	2,269	7.0%	675,383	2.6%	298
Rail	5,625	17.3%	4,568,740	17.3%	812
Truck	17,920	55.2%	15,818,286	59.9%	883
Air	42	0.1%	433,668	1.6%	10,249
Pipeline	647	2.0%	252,517	1.0%	390
Total	32,446	100.0%	26,408,813	100.0%	814

Source: BST Associates, 2009

The Port of Vancouver is the most important freight generator in Clark County. All of the ocean freight, all of the pipeline freight, essentially all of the barge freight, and most of the rail freight either originates or terminates at the Port of Vancouver. These Port-related freight movements generate hundreds of high-paying jobs.

3.5 Description of Ocean Movements

The Port of Vancouver is a critical hub for waterborne transportation, with facilities that handle both ocean and barge movements of cargo. However, with a large share of the waterborne cargo moving in or out of the Port by truck, the ability of the Port to ship cargo by water is tied to adequate truck access.

This section describes the characteristics of the Columbia River deep draft navigation system and the ocean freight flows moving via the Port of Vancouver.

Deep Draft System Characteristics

The Columbia/Snake River System begins at the mouth of the Columbia River and extends to Lewiston, Idaho at the confluence of the Snake and Clearwater Rivers. The existing authorized navigation system provides for a 43-foot-deep by 600-foot-wide channel from inside the Columbia Bar to Vancouver, Washington on the Columbia River, a distance of 105 miles.

The system provides deep-water access to facilities at the Washington ports of Longview, Kalama, Woodland and Vancouver and to the Oregon ports of Astoria, St. Helens and Portland. (See Figure 18)

FIGURE 18. LOWER COLUMBIA RIVER DEEP DRAFT NAVIGATION PORTS¹⁹



Source: Pacific Northwest Waterways Association

Description of Lower Columbia River Freight Movements

Marine traffic in the Lower Columbia River (including ports in both Washington and Oregon) grew from 11.3 million tons in 1962 to 39.5 million tons in 2007²⁰. This amounts to annualized growth of 2.8 percent.

Foreign trade has experienced much stronger growth than domestic trade (coastwise receipts and shipments such as inbound petroleum products from refineries in Puget Sound and California), with imports growing at 4.8 percent and exports growing at 4.2 percent during this time period while domestic volumes have remained relatively constant. (See Figure 19)

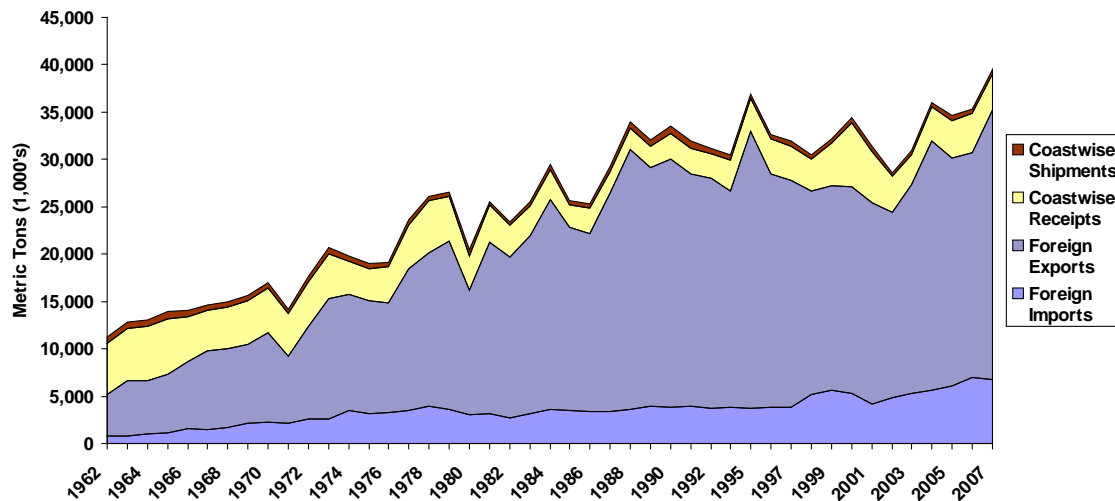
Imports mainly consist of consumer products and intermediate inputs for manufacturing. This includes fully assembled autos and trucks, containerized goods for regional consumers (furniture, toys, sporting goods, apparel, auto parts and other like products) as well as inbound forest products, metal products (primarily steel and aluminum), fertilizers and cement, among other commodities.

¹⁹ Pacific Northwest Waterway Association, http://www.pnwa.net/new/Articles/Columbia_River_Channel_Deepening.pdf, accessed November 2009

²⁰ *Waterborne Commerce of the United States*, US Army Corps of Engineers, 2009

Exports are dominated by grain exports (wheat, barley, corn, soybeans, and other products) and dry bulk exports (potash, soda ash, bentonite clay and copper concentrates among other commodities). In addition, the region exports regionally produced forest and agricultural products in containers. The volatility exhibited in the trends are due to changes in harvest patterns, competitive market conditions, exchange rates and other factors that affect shipments and receipts.

FIGURE 19. LOWER COLUMBIA RIVER OCEAN TRAFFIC (1,000 METRIC TONS)



Source: US Army Corps of Engineers Waterborne Commerce Statistics, 2009

Description of Port of Vancouver Ocean Freight Movements

According to waterborne commerce statistics from the U.S. Army Corps of Engineers²¹, the Port of Vancouver has generally accounted for 14 percent to 17 percent of the marine cargo generated in the Lower Columbia region during the past ten years.

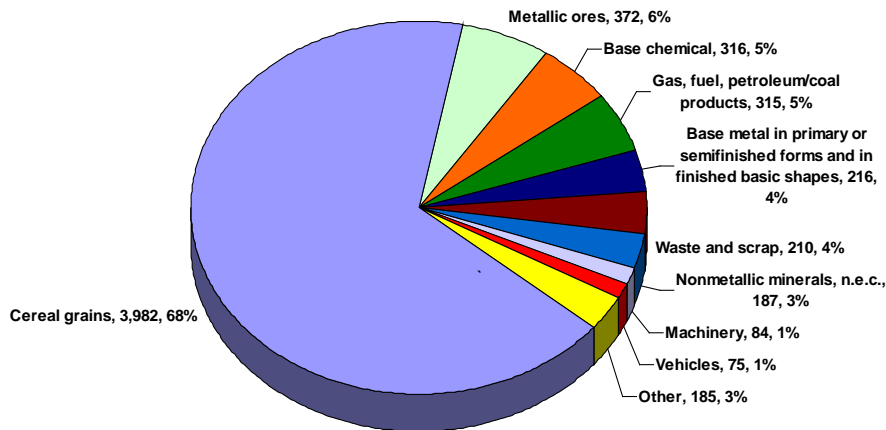
BST Associates obtained cargo statistics from the Port of Vancouver for 2007 and evaluated the mode of transportation by commodity.

In terms of weight, grain exports (mainly wheat and barley) are the dominant product transported via the Port of Vancouver, accounting for approximately 68 percent of total tonnage. The grain exports move via the United Grain export elevator.

Other key commodities include exports of metallic ores, base chemicals, waste and scrap as well as imports of chemicals/fertilizers, petroleum products, metal products, fully assembled autos and trucks, machinery and windmill turbines. These products individually account for between 1 percent to 6 percent of the Port's marine cargo tonnage. (See Figure 20)

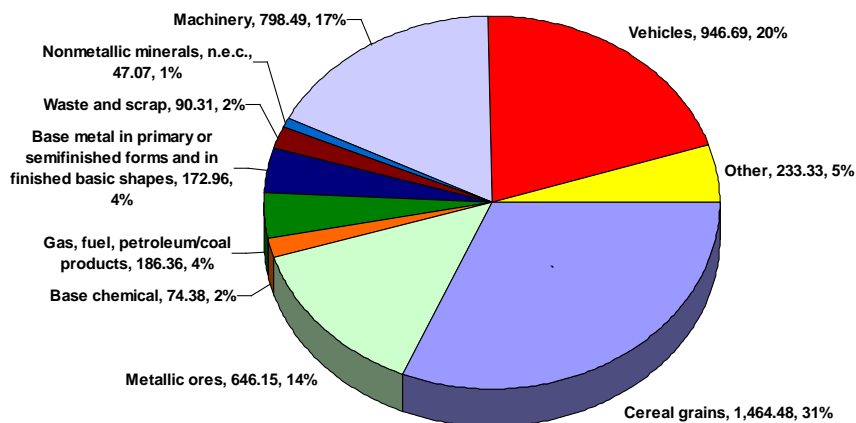
²¹ U.S. Army Corps of Engineers Waterborne Commerce Center, <http://www.iwr.usace.army.mil/ndc/wsc/portname07.htm>, accessed November 2009.

FIGURE 20. CLARK COUNTY OCEAN TRAFFIC IN 2007 (1,000 METRIC TONS)



Grain exports also dominate marine cargo by value, accounting for approximately 31 percent of the Port’s marine cargo traffic by dollar value. However, some of the Port’s marine cargoes have higher relative value (dollars per ton). In particular, auto/truck imports accounted for 20 percent of marine trade by value followed by machinery (windmill turbines and other equipment) at 17 percent and metallic ores at 14 percent. (See Figure 21)

FIGURE 21. CLARK COUNTY OCEAN TRAFFIC IN 2007 (MILLIONS OF 2007\$)



3.6 Description of Barge Movements

At the Port of Vancouver, grain shipped downriver from Washington, Idaho, and Oregon is transferred to ship for export, while gasoline and other products are loaded onto barges for shipment upriver.

This section describes the characteristics of the Columbia-Snake River shallow draft navigation system and the barge freight that flows via the Port of Vancouver.

Shallow Draft System Characteristics

There are eight dams and navigational locks in the Columbia and Snake River that facilitate barge traffic movements. The Columbia River locks are located at the Bonneville, The Dalles, John Day and McNary Dams. The Snake River locks are located at Ice Harbor, Lower Monumental, Little Goose and Lower Granite Dams. (See Figure 22)

The river system has typically been managed to approximately 4 to 5 feet above minimum pool depending on the pool, in order to maintain a minimum 14-foot depth within the channel. The barge system has evolved to take maximum advantage of the authorized minimum pool characteristics. “Jumbo” grain barges capable of carrying 3,600 tons of grain have become the mainstay of the wheat export fleet and are the largest vessels on the river system, drawing 13.5 feet. Container and other barges typically have a draft of 10 to 11 feet. Larger tugs typically push four barges and have a draft of 11 to 12 feet.

FIGURE 22. COLUMBIA SNAKE RIVER BARGE SYSTEM²²



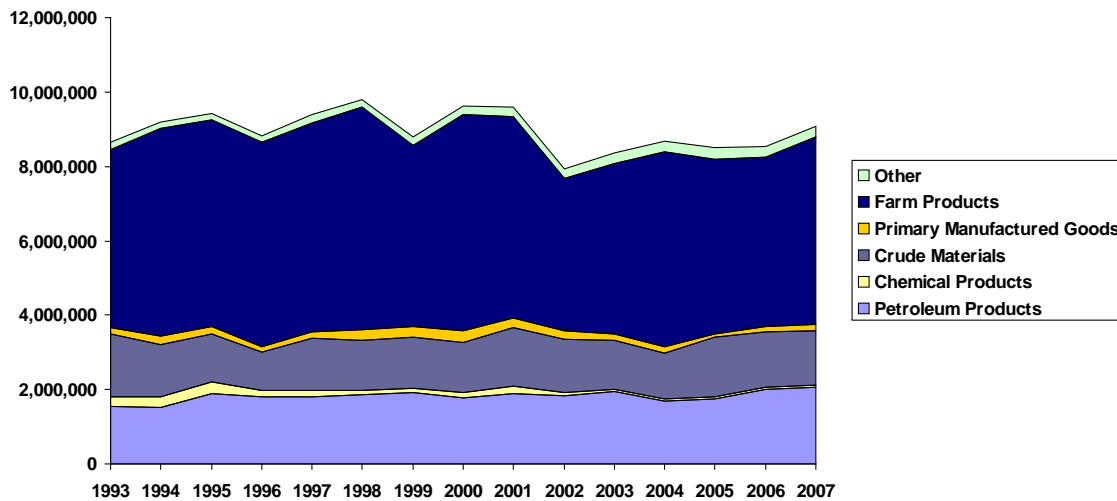
Source: Pacific Northwest Waterway Association, 2009

²² Pacific Northwest Waterway Association, <http://www.pnwa.net/new/Articles/CSRSFactSheet.pdf>, accessed November 2009

Description of Columbia-Snake River Freight Movements

Grain moving downstream is the lifeblood of the barge system on the Columbia/Snake River System. From 1993 through 2007, grain accounted for an average of 53 percent of all commodity tonnage moving on the Columbia River portion of the system, as measured at the Bonneville Lock & Dam²³. Upbound movements of petroleum products are also key, accounting for an average of 20 percent of cargo movements at Bonneville. Other commodities, such as forest products, sand and gravel, chemicals and fertilizer, and waste products (garbage and scrap) comprised the remainder. (See Figure 23)

FIGURE 23. CARGO TONNAGE AT BONNEVILLE LOCK & DAM



Source: U.S. Army Corps of Engineers Lock Performance Monitoring System, 2008

Description of Port of Vancouver Barge Freight Movements

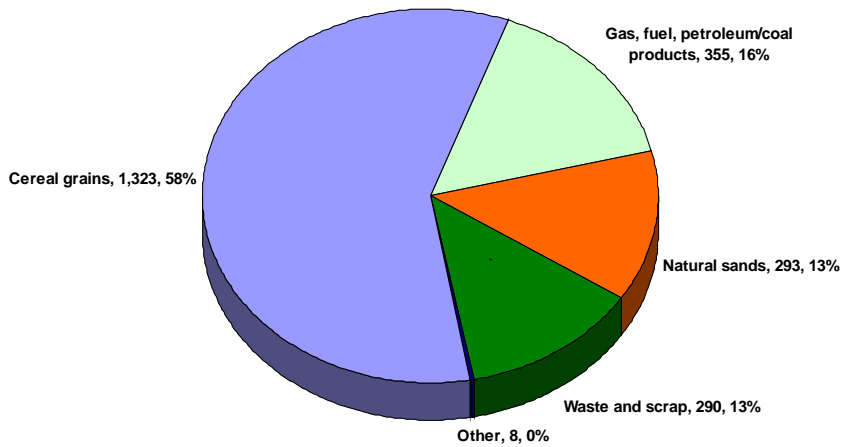
Barge traffic originates at or is destined for Port of Vancouver marine terminals. In addition, Tidewater Barge Lines, which is headquartered in Vancouver, has a terminal located adjacent to the Port of Vancouver. The Tidewater-Vancouver Terminal can handle containers and fertilizer, among other cargoes.

According to data from Corps of Engineers, approximately 1.3 million tons of grain was barged from upriver elevators to the United Grain export elevator in 2007, accounting for 58 percent of the barge traffic in Clark County. (See Figure 24)

There were also 355,000 tons of petroleum products shipped by barge to upriver communities in 2007 accounting for 16 percent of Clark County's barge traffic by weight. The rest of the barge traffic consisted of natural sands and waste and scrap.

²³ Lock Statistics from the Lock Performance Monitoring System, US Army Corps of Engineers, 2008

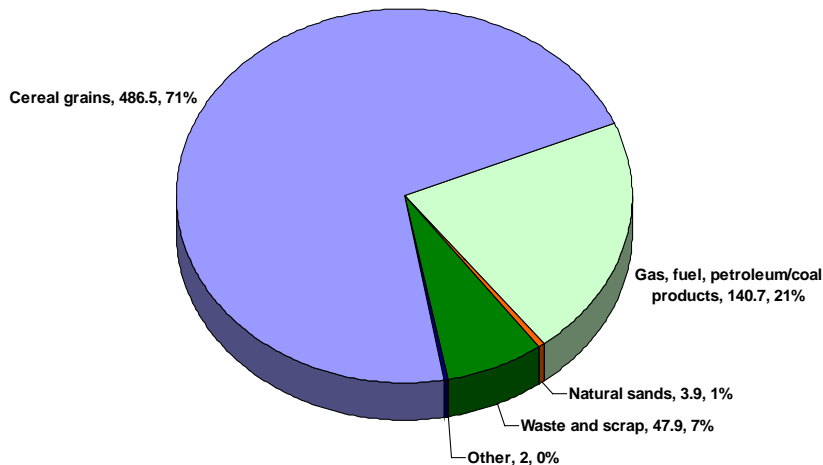
FIGURE 24. CLARK COUNTY BARGE TRAFFIC IN 2007 (1,000 METRIC TONS)



Source: US Army Corps of Engineers Waterborne Commerce Statistics, 2009

By value, grain receipts accounted for 71 percent of total marine cargo value. Petroleum products accounted for 21 percent of the barge traffic by value followed distantly by waste/scrap and natural sands. (See Figure 25)

FIGURE 25. CLARK COUNTY BARGE TRAFFIC IN 2007 (MILLIONS OF 2007\$)



Source: BST Associates, US Army Corps of Engineers Waterborne Commerce Statistics, 2009

3.7 Description of Rail Movements

Rail transportation is critical to industry in Clark County. Growth in rail movements of both cargo and passengers has strained system capacity, however, and conflicts between rail and road traffic at rail grade crossings impacts trains, trucks, and cars. Improvements to the rail system in Clark County are critical to continued growth freight-related jobs.

This section describes the characteristics of rail traffic originating in or terminating in Clark County.

Rail System Characteristics

The rail system in Clark County includes portions of two mainline rail corridors, one shortline railroad, and a key rail yard. The system serves a variety of industrial users, and is critical to the operations of the Port of Vancouver.

The Burlington Northern Santa Fe Railway (BNSF) owns and operates the Columbia Gorge route between Vancouver and Pasco (with connections to inland destinations). BNSF also owns the I-5 Corridor between Vancouver and Tacoma, with the Union Pacific Railroad (UP) operating over the corridor via trackage rights. The shortline railroad in Clark County is operated by the Portland Vancouver Junction Railroad (PVJR), although the rail line itself is owned by Clark County. (See Figure 26)

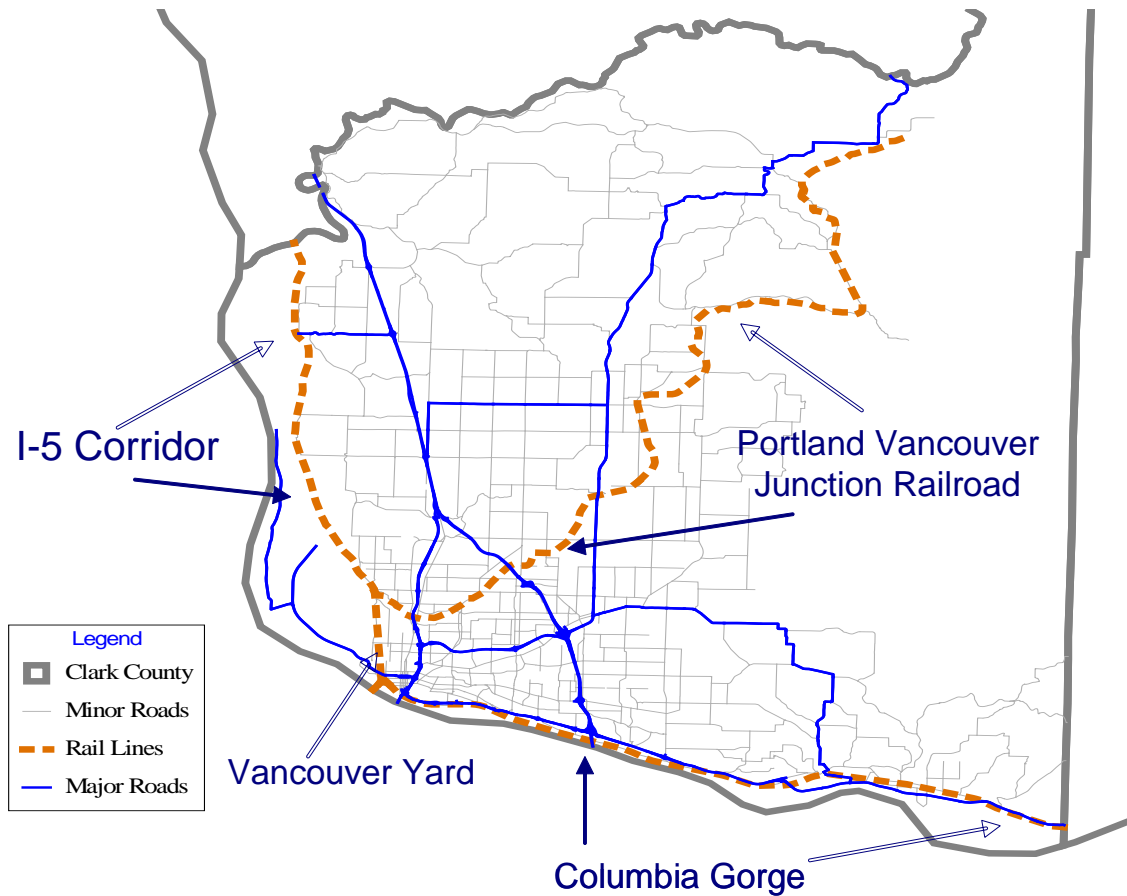
The PVJR began operating in 2004 with just 60 cars of freight handled on the line. Since that time, the traffic has increased to over 500 cars being shipped in 2008, with daily service offered. The PVJR corridor is relatively industrial, line runs past over 1,000 acres for expansion and development for heavy and light industrial, manufacturing, warehousing, research and business park uses. The PVJR owns a three-acre parcel on the line to help locate and grow the business.

Vancouver is a major point of congestion in Washington's rail system, for several reasons: the I-5 corridor ties to the Columbia Gorge rail corridor there, Port of Vancouver rail traffic moves through the area, and the BNSF operates a major rail yard in Vancouver. East-west traffic crosses north-south traffic at-grade, while local traffic moving at slow speeds consumes mainline capacity, slowing the more than 100 trains that pass through the Vancouver rail yard every day. Two projects are planned or under construction to alleviate these conflicts.

The first of these projects is the Vancouver Bypass. The Vancouver Bypass will provide a new mainline track around the Vancouver Yard that allows through trains to avoid moving through the yard. It also provides a grade separation between West 39th Street and the yard, improving vehicle and pedestrian safety. Construction of the siding tracks along the west side of the rail yard began in January 2009, and construction of the 39th Street Bridge is expected to begin in early 2009, to be completed by mid-2011. Full funding for the remaining rail elements of the plan is not yet in place.

The Port of Vancouver Freight Access Project would separate port traffic from mainline traffic by grade separating the primary route into the port. This would reduce the number of trains that need to cross over the mainlines. With port-related traffic exiting the Columbia Gorge route farther east, the project would also improve flow through the Vancouver Terminal area. Finally, the new configuration of yard tracks and leads within the port will increase the ability of the facility to handle longer trains.

FIGURE 26. RAIL SYSTEM IN CLARK COUNTY



Description of Clark County Rail Movements

The Washington State Department of Transportation is currently evaluating freight rail traffic in Washington State²⁴. As shown in Table 13, there were 5.6 million metric tons of cargo that originate and/or terminate in Clark County in 2007. Of this total, approximately 4.7 million tons terminated in Clark County with 4.0 million tons originating outside of Washington State and 746,000 tons originating within Washington State. The remaining 907,000 tons originated in Clark County with 747,000 tons going out of state and 160,000 tons remaining within the state.

²⁴ Source: *Freight Rail, Washington Economy, and State Roles*, Scott Witt, Director and George Xu, Ph.D., Economist at the Washington State Department of Transportation State Rail and Marine Office, August 5, 2009.

**TABLE 13. CLARK COUNTY RAIL TRAFFIC IN 2007
(1,000 METRIC TONS)**

Region	Clark County - 1,000 Metric Tons		
	Originating	Terminating	Total
Out of State	747.1	3,971.9	4,719.1
Within State	160.1	745.5	905.5
Total	907.2	4,717.4	5,624.6

Source: WSDOT Rail and Marine Office, 2009

The WSDOT review of rail freight traffic by county provided an envelope for rail freight shipments to and from Clark County. BST Associates evaluated Port of Vancouver marine terminal cargo statistics by mode of transport, as well as rail traffic generated by tenants of the Port of Vancouver but not related to marine terminals. In addition, BST Associates interviewed the PVJR to estimate rail freight generated on this line.

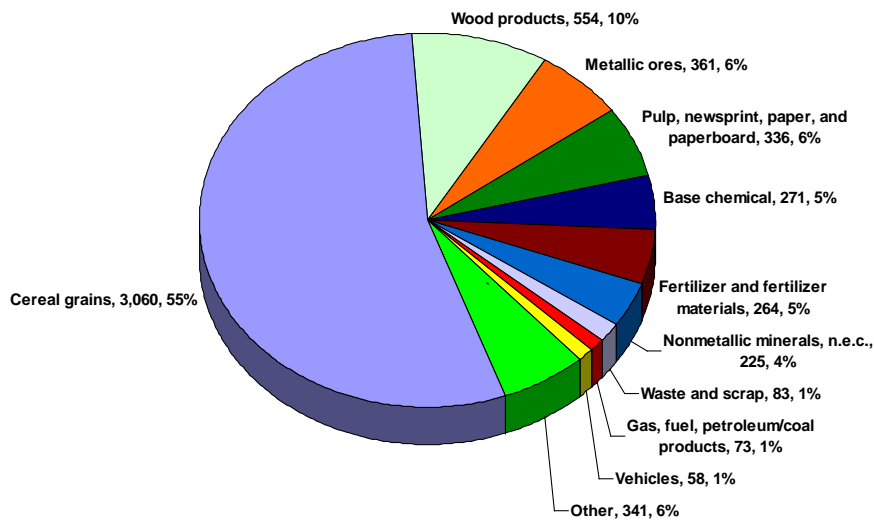
This process accounted for 70 percent of rail freight traffic in Clark County. The remaining 30 percent was distributed by commodity based upon rail freight data for the Portland-Vancouver BEA Region from the Surface Transportation Board for 2007²⁵.

The resulting distribution by type of commodity is presented in Figure 27 (by tonnage) and Figure 28 (by value). Grain is the largest commodity terminating in Clark County, accounting for 55 percent of all rail traffic. Most of this grain is exported, but some is also used by local food processors such as Great Western Malt and Commodities Plus.

The next largest commodities by weight were:

- Wood products accounted for 10 percent of rail traffic,
- Metallic ores (copper concentrate exports) accounted for 6 percent of rail traffic,
- Pulp and paper shipments (from large manufacturers such as Boise Cascade at Camas) accounted for 6 percent of rail traffic,
- Base chemicals accounted for 5 percent of rail traffic,
- Fertilizer accounted for 5 percent of rail traffic, and
- Nonmetallic minerals (cement) accounted for 4 percent of rail traffic.

²⁵ The Surface Transportation Board

FIGURE 27. CLARK COUNTY RAIL TRAFFIC IN 2007 (1,000 METRIC TONS)

Source: STB, WSDOT, BST Associates, 2009

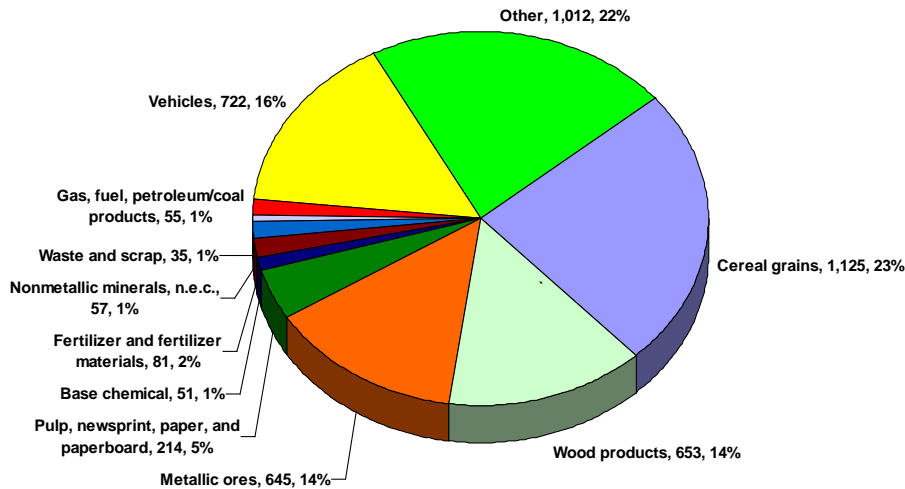
These leading commodities account for an estimated 85 percent of Clark County's rail traffic by weight. Other commodities account for the remaining 15 percent but each commodity only accounts individually for only 1 percent or less of Clark County's rail traffic.

By value, grain is also the largest commodity moved by rail in Clark County. As shown in Figure 28, grain accounted for 23 percent of the rail traffic in Clark County by value.

The next largest commodities by value were:

- Vehicles (imported autos and trucks) accounted for 16 percent of rail traffic,
- Wood products accounted for 14 percent of rail traffic,
- Metallic ores (copper concentrates) accounted for 14 percent of rail traffic.

These leading commodities account for an estimated 67 percent of Clark County's rail traffic by value. Other commodities account for the remaining 33 percent but each commodity only accounts individually for 5 percent or less of Clark County's rail traffic.

FIGURE 28. CLARK COUNTY RAIL TRAFFIC IN 2007 (MILLIONS OF 2007\$)

Source: STB, WSDOT, BST Associates, 2009

3.8 Description of Air Movements

Air freight in Clark County is tied to Portland International Airport, and the ability of Clark County shippers to use air freight depends on the ability of trucks to move between the airport and Clark County businesses.

There are no databases that provide detailed air cargo statistics at the county level. As a result, air traffic was estimated based upon Clark County's market share of employment by industry type within the Portland-Vancouver region as applied to air cargo volumes generated in the Portland-Vancouver Region, which mainly utilize the Portland International Airport.

The resulting estimates are presented in Figure 29 and Figure 30.

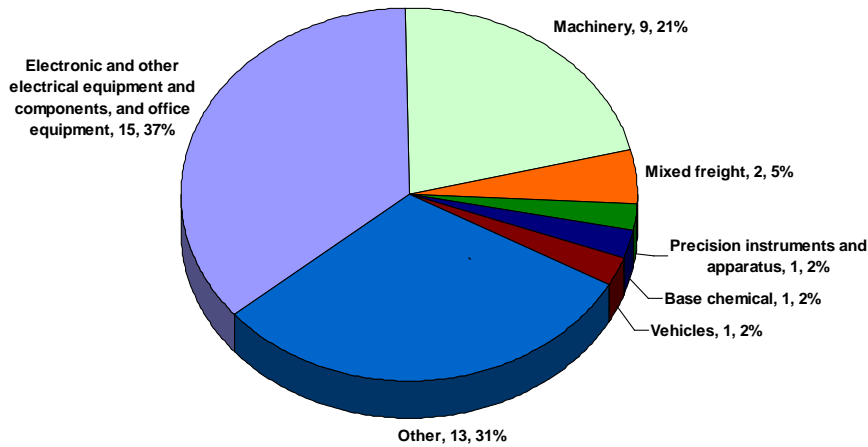
By tonnage, air freight consists mainly of electronic and electrical equipment. As shown in Figure 29, shipments of electronic and electrical equipment accounted for an estimated 37 percent of the air cargo traffic generated in Clark County by weight.

The next largest commodities by weight were:

- Machinery accounted for 21 percent of air cargo traffic, and
- Mixed freight (miscellaneous consumer products) accounted for 5 percent of air cargo traffic.

These leading commodities account for an estimated 63 percent of Clark County's rail traffic by weight. Other commodities account for the remaining 37 percent but each commodity only accounts individually for 2 percent or less of Clark County's air cargo traffic.

FIGURE 29. CLARK COUNTY AIR TRAFFIC IN 2007 (1,000 METRIC TONS)



Source: BST Associates, 2009

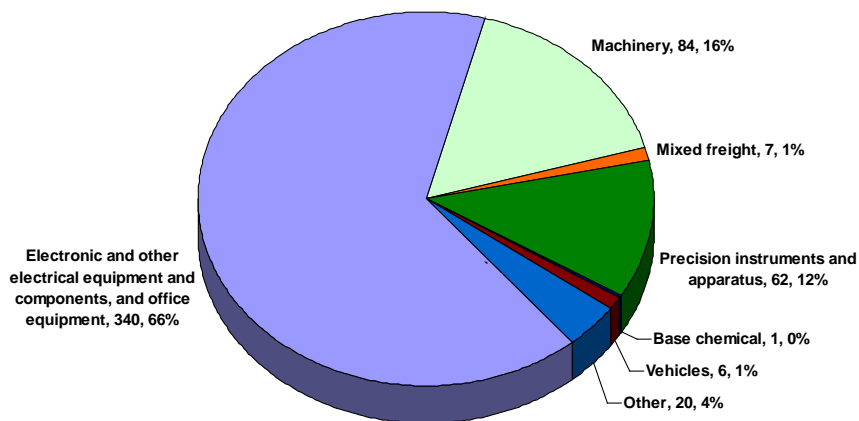
By value, electronic and electrical equipment is also the largest commodity moved by air cargo to/from Clark County, accounting for 66 percent of the air cargo traffic in Clark County.

The next largest commodities by value were:

- Machinery accounted for 16 percent of air cargo traffic, and
- Precision instruments and apparatus accounted for 12 percent of air cargo traffic.

These leading commodities account for an estimated 94 percent of Clark County’s rail traffic by value. Other commodities account for the remaining 6 percent of Clark County’s air cargo traffic.

FIGURE 30. CLARK COUNTY AIR TRAFFIC IN 2007 (MILLIONS OF 2007\$)



Source: BST Associates, 2009

3.9 Description of Pipeline Movements

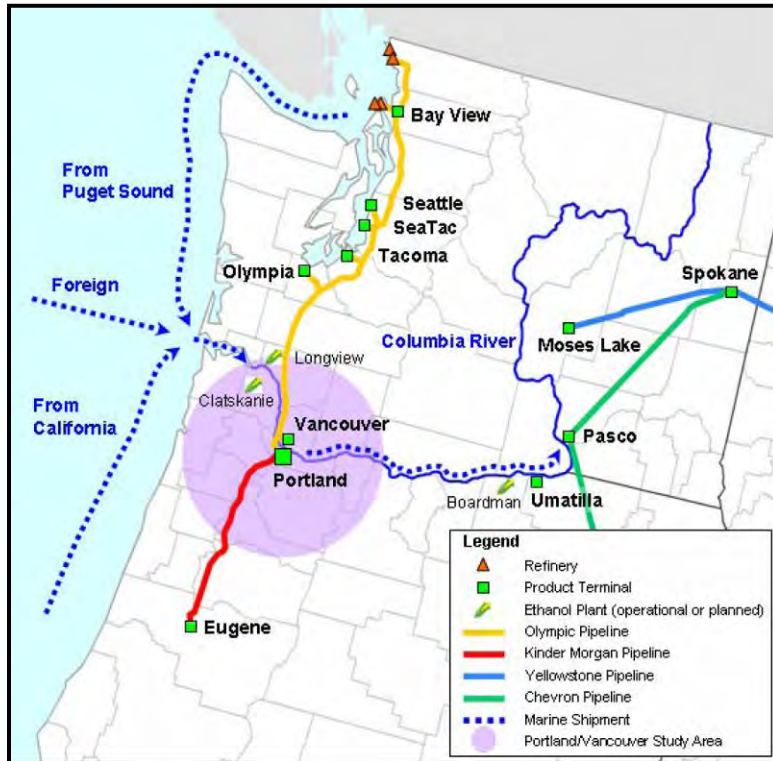
Vancouver is a key node in the pipeline system of the Pacific Northwest. Petroleum products refined on Puget Sound are piped to the terminal in Vancouver, and from Vancouver these products are moved by truck to local retailers or by barge to upriver destinations. The region depends on the tanker trucks having good access to the pipeline terminal.

The Portland-Vancouver area receives petroleum products by pipeline and by water. Product shipped by pipeline originates at refineries on Puget Sound, and moves via the Olympic Pipeline. Marine shipments move by both ship and barge, from Puget Sound, California and foreign sources. Petroleum products are also shipped from the Portland-Vancouver by pipeline and barge. The Eugene, Oregon market is supplied via the separate Kinder Morgan Pipeline from the Portland-Vancouver area, while upriver markets such as Umatilla, Oregon and Pasco/Tri-Cities, Washington are supplied by barge from Vancouver.

The Olympic Pipe Line Company, operated by BP Pipelines, North America, runs along a 299-mile corridor from Blaine, Washington to Portland, Oregon. The pipeline system transports gasoline, diesel, and jet fuel, which originates at four Puget Sound refineries (two in Whatcom County and two in Skagit County). Products are delivered to Seattle's Harbor Island, Seattle-Tacoma International Airport, Olympia and Vancouver, Washington, and Portland, Oregon²⁶. (See Figure 31.)

²⁶ Olympic Pipeline website; <http://www.olympicpipeline.com>, accessed November 2009

FIGURE 31. PACIFIC NORTHWEST PETROLEUM FLOW MAP²⁷

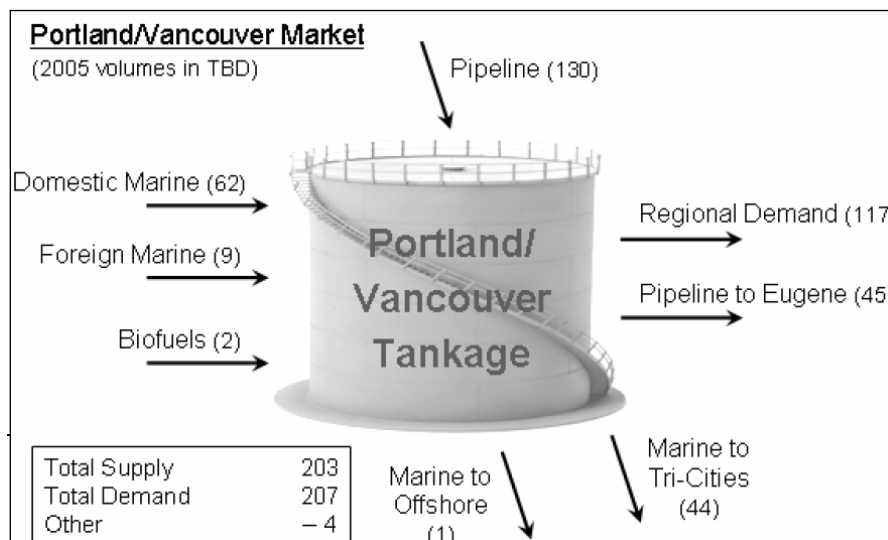


Source: ICF International, 2007

The flow of petroleum products is illustrated in Figure 32. Inbound petroleum products arrive via pipeline or water. The Olympic Pipeline accounts for approximately 64 percent of the inbound petroleum products followed by 31 percent by barge/vessel from domestic sources (mostly from refineries in Puget Sound and California) and 4 percent from foreign sources.

Of the product shipped to the Portland-Vancouver area, approximately 57 percent is consumed locally; 22 percent moves by pipeline (Kinder Morgan Pipeline) to Eugene, and 21 percent is transported by barge to upriver destinations.

FIGURE 32. PORTLAND/VANCOUVER MARKET SUPPLY & DEMAND OVERVIEW



roleum Fuels, Natural Gas and Energy Facility Site Evaluation

(1,000 BARRELS PER DAY)²⁸

Source: IFC International, 2007

The Port of Vancouver plays an active role in these liquid bulk operations. The Port's Liquid Bulk Dock (Terminal 2 Berth 5), which is operated by both NuStar and Tesoro Refining and Marketing Company, has three pipelines that run between the dock and several tank farms. These tank farms have total capacity of over three million barrels. NuStar expanded its facilities at the port by five acres, adding additional storage tanks to handle another 350,000 barrels of liquid bulk storage. Tesoro Refining and Marketing Company, a subsidiary of Tesoro Petroleum Corporation, markets and distributes refined petroleum products and provides marine logistics services. Tesoro has a throughput capacity of about 275,000 barrels per day²⁹.

Pipeline flowage via the Olympic Pipeline into the Portland-Vancouver area amounted to approximately 6.1 million tons in 2007 (i.e. 130,000 barrels per day for 365 days at 7.8 barrels per ton). The tankage capacity at the Port of Vancouver represents approximately 10.6 percent of the total tankage capacity in the Portland-Vancouver area³⁰. Assuming that inventory turnover is similar at all facilities, the share of product arriving by pipeline that either flows through Clark County facilities for consumption in Clark County, or that passes through Port facilities to upriver destinations, is estimated at 647,000 tons. According to US Maritime Administration³¹, the average value of imported petroleum products in the Portland-Vancouver region was \$390 per metric ton. The estimated value of petroleum products utilizing facilities in Clark County is \$252 million (647,000 tons at \$390 per ton).

3.10 Distribution of Truck Movements

Trucks move the majority of freight in Clark County. High-paying jobs in freight-generating industries depend on the road system being designed and built for truck traffic. Without such a road system, these jobs may locate elsewhere.

The volume of freight moved by truck and the value of that freight was estimated through the use of a spreadsheet model that incorporated data from a number of different sources. The data sources used and the results of this model are presented below.

Truck Counts

First, estimates of the number of trucks originating or terminating in different parts of Clark County were created. These were based on existing truck counts, as well as on geographic regions developed by BST Associates and Heffron Transportation.

The regions used are illustrated in Figure 33. These regions were created by grouping Traffic Analysis Zones (TAZ). The TAZ's were first grouped into 37 "truck traffic analysis zone", and then further consolidated into ten truck zones in order to better describe where freight is generated.

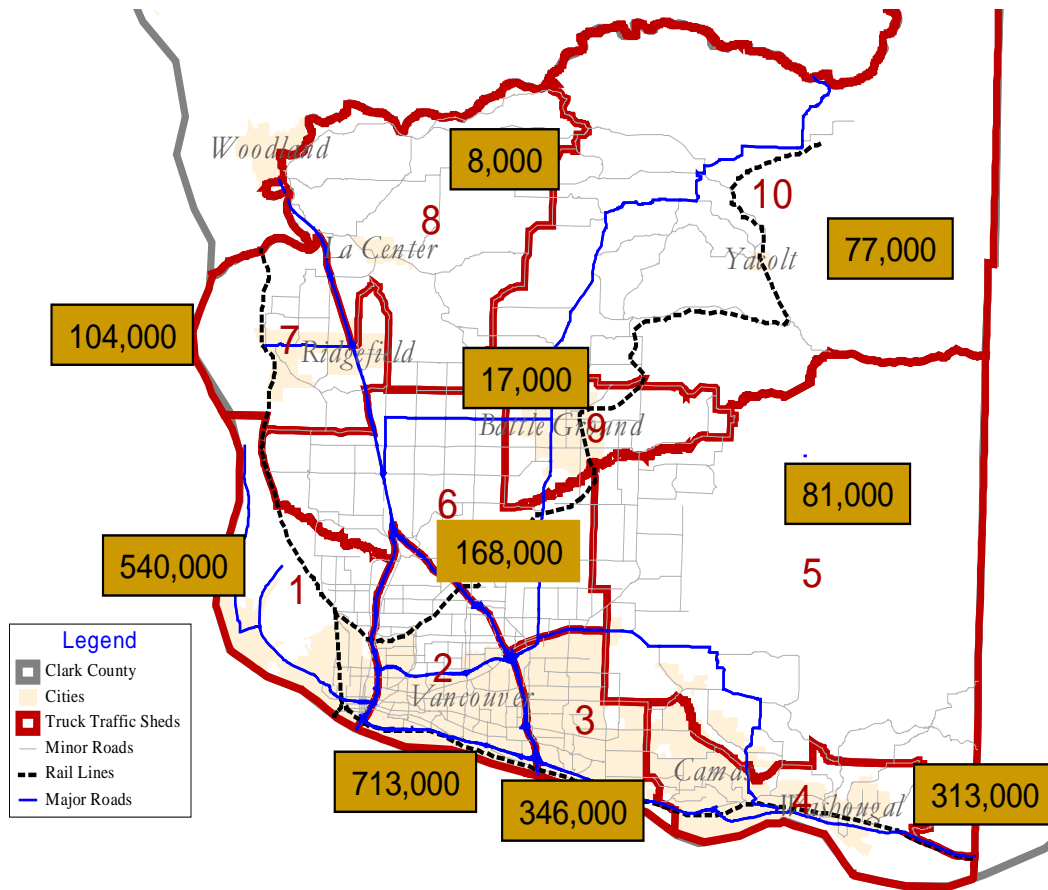
²⁸ ICF International, Page 11, November 2007

²⁹ Port of Vancouver, <http://www.portvanusa.com/marine-terminals/liquid-bulk>, accessed November 2009

³⁰ ICF International, Page 12, November 2007.

³¹ Waterborne Databanks, Maritime Administration, issued March 2008

FIGURE 33. TRUCK REGIONS

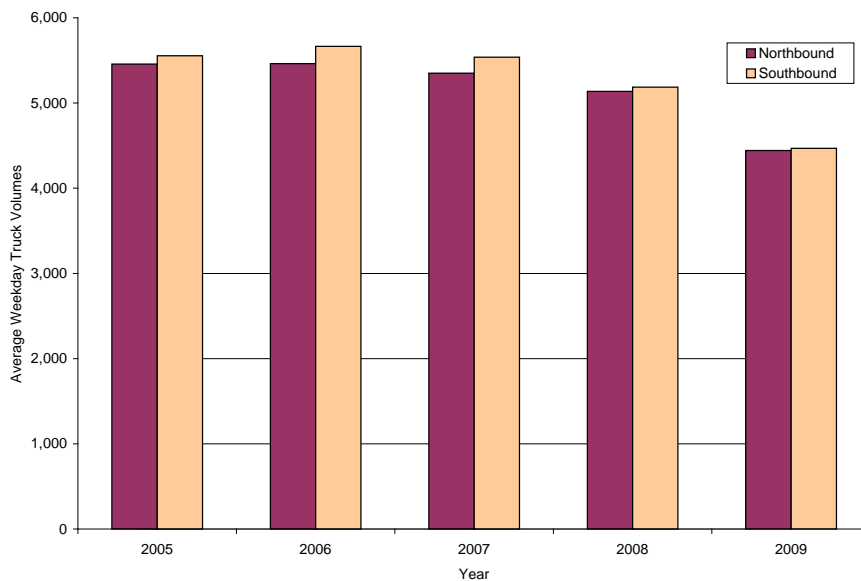


Source: BST Associates, Heffron Transportation, 2009

Existing average weekday truck counts were analyzed to separate through traffic from truck traffic originating or terminating in Clark County. The majority of these counts were taken for the Columbia River Crossing project, and included direction of travel. These counts were taken at multiple locations on I-5, I-205, and the state route system, as well as on the primary access route to and from the freeway system.

The majority of the counts were taken in 2006, but some were also added in 2007, 2008, and 2009. It was assumed that 2007 represented an average year for truck volumes, as illustrated in Figure 34. Because data from 2007 was the most recent available for several of the other modes of transportation, this was the year used for the analysis.

**FIGURE 34. AVERAGE WEEKDAY TRUCK VOLUMES BY YEAR
INTERSTATE 5 AT NORTH COUNTY LINE**



Source: Heffron Transportation, 2009

Two key assumptions were made concerning which counts to use, and how to use them. First, by focusing on the counts from the primary freeway access routes, the counts on I-5 and I-205 could be ignored. Second, for the state route system, it was assumed that the difference in truck volumes between adjacent counters represented traffic originating or terminating between the counters. Each pair of adjacent counters was analyzed to determine the number of trucks originating or terminating along each road segment.

The result of this step was estimates of average *weekday* truck traffic. In order to convert weekday truck counts to average *daily* counts the average of originating and terminating traffic was calculated, and then multiplied by 0.9. These daily counts were then expanded to annual counts by multiplying times 365.

It should be noted that truck zone 8 (La Center) did not have any existing counts, so a number was estimated. Zone 8 is a relatively rural area, with the exception of the town of La Center, and has little freight-generating industry. A truck count for this zone was estimated based on the ratio of freight-generating employment in this zone to that of the adjacent truck zone 9 (Battleground), and the truck counts for truck zone 9.

Truck Zone 1 is bordered on the west and south by the Columbia River, on the east by I-5, and on the north by the Salmon Creek Greenway. Zone 1 contains the Port of Vancouver and downtown Vancouver, as well as numerous industrial properties. As described above, most or all of the ocean, barge, rail, and pipeline traffic originates or terminates in and around the Port of Vancouver.

Based on traffic counter data and information from the Port of Vancouver, an estimated 1,500 to 1,800 trucks move into and out of Zone 1 on an average weekday. Adjusting for weekend traffic levels, it is estimated that nearly 540,000 trucks move into and out of Zone 1 each year. This level of truck traffic makes it imperative that adequate truck routes be developed and maintained

in Zone 1. Furthermore, the amount of industrial land available for development in Zone 1 increases the likelihood that truck traffic into and out of Zone 1 will continue to grow.

Truck Zone 2 is located between I-5, I-205, and the Columbia River. According to traffic counter data, more truck traffic originates and terminates in this zone than in Zone 1, making Zone 2 the largest center of truck traffic in Clark County. An estimated 2,000 to 2,300 trucks originate and terminate in Zone 2 on an average weekday. On an annual basis, 713,000 trucks are estimated to originate or terminate each year.

The industrial park located between SR14 and the Columbia River is a major generator of truck traffic in Zone 2, but there are also truck-generating uses spread throughout the zone.

Zones 3 and 4 also generate significant amounts truck traffic. Firms in Zone 3 (East Vancouver) generate more than 1,000 originating or terminating truckloads each way on an average weekday, or 346,000 per year. Firms in Zone 4 (Camas-Washougal) generate approximately 950 originating or terminating each way on an average weekday, or 313,000 per year.

Truck Zones 5 and 10 are located along the eastern edge of Clark County. These areas consist mainly of forest and farm land, and generate relatively small number of trucks. Firms in Zone 5 (East County) generate an estimated 81,000 truckloads per year, while firms in Zone 10 (Northeast County) generate a similar number, of 77,000 truckloads per year.

Zone 9 is located between Zone 5 and Zone 10, and includes the City of Battleground. This zone generates relatively little truck traffic, with an estimated 17,000 truckloads originating or terminating per year.

Zone 6 (Central County) is located to the north and east of the I-5 / I-205 confluence. This area has seen significant residential development in recent years, but contains enough industry to generate an estimated 168,000 trucks per year.

Most of Zone 7 (Ridgefield) is located west of I-5, and is bordered by the Lewis River, Columbia River, and approximately NW 199th St. This zone generates an estimated 104,000 truckloads per year.

Zone 8 is primarily rural, but also includes La Center. This zone generates an estimated 8,000 truckloads per year.

Truck Tonnage and Value

Truck tonnage was calculated using factors developed in the Portland Freight Data Collection (PFDC) effort³². The PFDC categorized commodities into 15 groups (based on SCTG commodity codes), and calculated an average tonnage per truck for each commodity group.

BST Associates estimated the number of trucks generated, by Standard Classification of Transported Goods (SCTG) commodity group and by truck zone. This estimate involved several steps.

- First, the PFDC commodities were matched to SCTG³³ commodities.

³² *Portland Freight Data Collection Phase II Draft Report*, Page 4-4, Cambridge Systematics, July 2006

- Second, Dun & Bradstreet data was used to determine the number of freight-related jobs in SCTG code and by truck zone.
- Third, the number of truck trips in each truck zone was allocated among the SCTG categories, based on the Dun & Bradstreet employment.
- Fourth, it was assumed that each truck trip included a load in one direction and an empty truck in the other direction, creating a “full factor” or 0.5.
- Tons were estimated, by truck zone and SCTG commodity, by multiplying the allocated truck trip, the average tonnage per truck, and the full factor.

The value of truck traffic was estimated using dollar per ton figures from the 2007 Commodity Flow Survey³⁴, STB Rail Waybill Sample³⁵, and MARAD waterborne commerce data. Estimated tonnages from the previous step were multiplied by the value per ton to create estimates of value by SCTG commodity and by truck zone.

The resulting distribution by type of commodity is presented in Figure 35 (by tonnage) and Figure 36 (by value).

As shown in Figure 35, wood products are the primary commodity moving by truck in Clark County, accounting for 23 percent of all truck traffic in Clark County.

The next largest commodities by weight were:

- Non-metallic minerals accounting for 11 percent of total truck traffic,
- Machinery accounting for 9 percent of total truck traffic,
- Electronics and electrical equipment accounting for 7 percent of total truck traffic,
- Petroleum products accounting for 6 percent of total truck traffic,

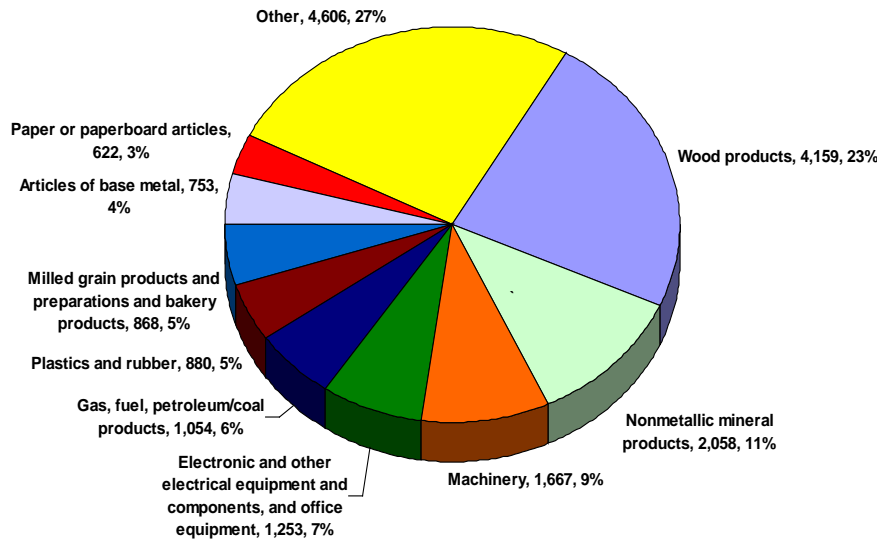
These leading commodities account for an estimated 56 percent of Clark County’s truck traffic by weight. Other commodities account for the remaining 44 percent but each commodity only accounts individually for only 5 percent or less of Clark County’s truck traffic.

³³ Standard Classification of Transported Goods (SCTG) codes are a U.S.-Canada initiative, designed to provide categories for the 1997 U.S. Commodity Flow Survey (CFS) and to improve the integration of transportation data from different modes.

³⁴ *2007 Commodity Flow Survey*, US Bureau of Transportation Statistics and US Census Bureau, released December 2008

³⁵ *2007 Public Use Waybill Sample*, Surface Transportation Board, released November 2008

FIGURE 35. CLARK COUNTY TRUCK TRAFFIC IN 2007 (1,000 METRIC TONS)

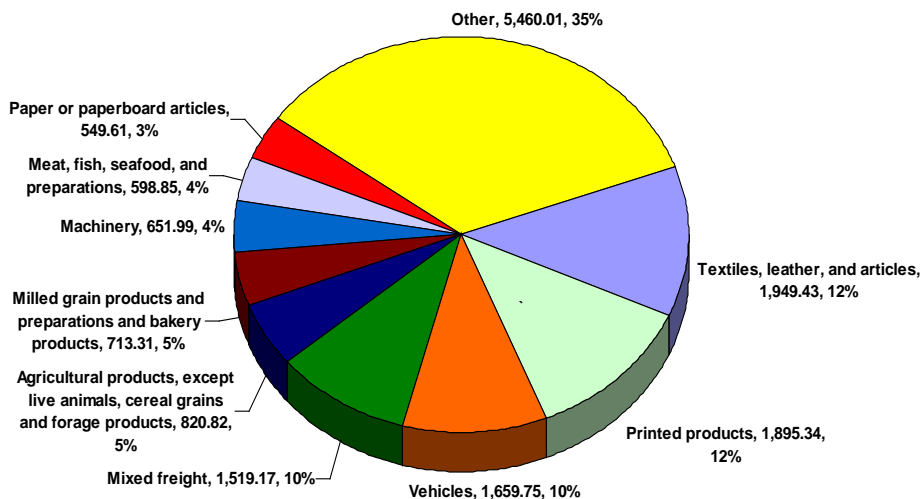


By value, apparel and printed products are the largest commodities moved by truck in Clark County. As shown in Figure 36, these commodities each accounted for 12 percent of the truck traffic in Clark County by value.

The next largest commodities by weight were vehicles (imported autos and trucks) and mixed freight each accounted for 10 percent of total truck traffic, and agricultural products and milled grain products each accounted for 5 percent of truck traffic.

These leading commodities account for an estimated 54 percent of Clark County’s truck traffic by value. Other commodities account for the remaining 46 percent but each commodity only accounts individually for 4 percent or less of Clark County’s truck traffic.

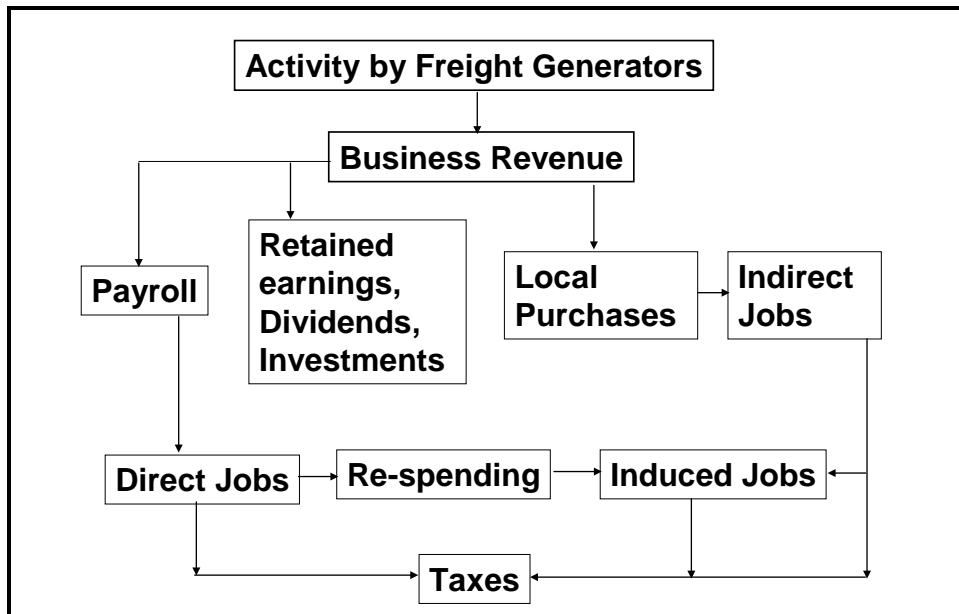
FIGURE 36. CLARK COUNTY TRUCK TRAFFIC IN 2007 (MILLIONS OF 2007\$)



4. Economic Impact

The flow of economic activities is illustrated in Figure 37. Economic activity by freight generators creates business revenues, which in turn, creates spending on payrolls for people working directly for these firms; retained earnings/dividends/investments; and local purchases of supplies, materials, and outside labor. The local purchases by firms create indirect jobs (defined below). Payroll for direct employees creates additional expenditures, which creates induced jobs (defined below). Finally, income associated with direct, indirect and induced activity generates state and local taxes.

FIGURE 37. FLOW OF IMPACTS



The process for estimating economic impacts included a review of secondary data sources (including Dun & Bradstreet, the Washington State Department of Revenue and the Washington State Employment Security Department, among others) to determine direct impacts.

Economic impact is typically estimated through the use of an input-output (I-O) model. One of the most widely used of these is the IMPLAN model. Based upon the direct impacts, BST Associates estimated the indirect and induced impacts using the IMPLAN model³⁶, which estimates the multiplier effects of inter-industry purchases. Indirect impacts refer to expenditures by the user/tenant on outside goods and services. Induced impacts refer to purchases based on the employment earnings from direct and indirect economic activities. As wages are paid out, workers' families spend their income on a wide array of goods and services, much of which are supplied by the local economy. The total industry purchases of commodities, services, employment compensation, value added, and imports are equal to the value of the commodities produced.

³⁶ Please see appendix for additional information on the Implan model.

IMPLAN is used by many public agencies in Washington, including the Department of Community, Trade, and Economic Development, Department of Ecology, Department of Health, Department of Revenue, Department of Transportation, and others.

Total impact is equal to the sum of direct, indirect, and induced impacts. Impacts are measured for output (the value of production or sales by firms located in a geographic study area), income (payroll and proprietor's income), and employment.

The *direct impact* is equal to the reported value of output, income, and employment.

In addition to the direct impact, sales have broader impacts on the economy due to the re-spending of money collected from these sales, referred to as the *multiplier effect*. The multiplier effect has two primary components, indirect and induced.

The *indirect impact* is created by producing firms spending on inputs. Producing firms purchase inputs such as materials, components, equipment from their suppliers, and the value of these purchases constitutes the indirect impact of output. The employment created at the firms supplying the inputs is the indirect impact of employment, and the payroll associated with this indirect employment is the indirect income.

The employees of both the producing firms and the firms from whom they purchase inputs spend their income on consumer goods and services. The value of these purchases comprises the *induced impact* of output. The firms selling the consumer goods and services also employ and pay workers, creating the induced impacts of employment and income.

The sum of the direct, indirect, and induced impacts is referred to as the *total impact*. Total impacts incorporate the sum of direct, indirect, and induced impacts. It is important to note that these effects are limited for any region because of spending "leakages" at each round of inter-industry and household purchases. That is, the goods and services required at each stage are partly purchased from outside the study area, thus reducing the total supplies provided locally. The IMPLAN model is designed to calculate the multiplier effects of the designated regions: Clark County, and Washington State.

4.1 Summary of Impacts

The economic impact associated with freight generation in Clark County is summarized in this section.

As shown in Table 14, the freight generating sectors located in Clark County have a direct impact of 66,057 employees with an income of \$3.2 billion. The total impact (direct, indirect and induced effects) in Clark County is 130,072 employees with a total income of \$6.1 billion. The total impact (direct, indirect and induced effects) in Washington State is 138,370 employees with a total income of \$6.3 billion.

Each job in the freight generating sector in Clark County creates 0.97 additional jobs in Clark County and 1.09 additional jobs in Washington State.

Each dollar in wages and salaries in the freight generating sector in Clark County creates \$0.91 in additional income in Clark County and \$0.99 in additional income in Washington State.

TABLE 14. ECONOMIC IMPACTS OF FREIGHT GENERATORS IN CLARK COUNTY

Industry	Outlays	Direct Emp Clark County	Total Emp Clark County	Total Emp Washington
Employment Impact	\$ millions	Number of Jobs		
Agriculture	\$155.3	1,252.9	1,914.5	1,947.7
Mining	\$359.5	1,102.5	3,301.4	2,994.5
Construction	\$2,510.4	17,396.3	34,329.9	35,804.7
Manufacturing	\$4,357.6	13,378.0	38,115.8	43,338.5
Wholesale	\$1,127.1	5,931.3	12,326.2	12,311.7
Retail	\$1,359.3	20,953.7	28,232.8	29,779.2
Transportation	\$880.5	6,042.6	11,851.7	12,193.8
Subtotal	\$10,749.6	66,057.3	130,072.1	138,370.0

	Outlays	Direct Income Clark County	Total Income Clark County	Total Income Washington
Income Impact (\$ millions)				
Agriculture	\$155.3	\$28.9	\$56.8	\$55.8
Mining	\$359.5	\$48.9	\$155.1	\$115.1
Construction	\$2,510.4	\$896.3	\$1,636.8	\$1,729.0
Manufacturing	\$4,357.6	\$869.9	\$2,046.4	\$2,134.3
Wholesale	\$1,127.1	\$432.6	\$713.7	\$751.5
Retail	\$1,359.3	\$578.5	\$887.3	\$931.6
Transportation	\$880.5	\$316.7	\$569.2	\$587.7
Subtotal	\$10,749.6	\$3,171.9	\$6,065.3	\$6,304.9

Source: BST Associates, IMPLAN

4.2 Purchases of Inputs (Indirect Impacts)

The indirect impact of freight-generating industries is greater than that of non-freight generating industries, because freight-generators purchase more inputs than non-freight generating industries. On average, freight generating industries in Clark County spend more than 57 percent of their total output on purchases from other firms. In comparison, non freight-generating industries spend less than 37 percent on inputs. Freight-generating industries account for nearly half of all output in Clark County (i.e. 48 percent), but account for 59 percent of industry purchases.

According to data from IMPLAN, manufacturing firms in Clark County spend an average of 73 percent of their total sales on buying inputs from other firms. Over all industry types, manufacturing accounts for 30 percent of industry purchases.

The mining industry spends a higher share of its sales on inputs than does manufacturing (i.e. 75 percent versus 73 percent), but is a much smaller industry in Clark County than is manufacturing.

The construction industry is the second-largest freight-generating industry in Clark County, terms of sales. On average, the construction industry spends 57 percent of its sales on purchases from other firms, and accounts for more than 13 percent of all industry purchases in the County.

Of the non freight-generating industry types, only two spend more than half of their sales on purchases from other industries. The utilities industry spends an average of 68 percent of sales, while the education industry spends 52 percent.

The majority of spending by freight-generating firms is on inputs purchased from other freight-generating firms. In Clark County this type of spending accounts for nearly 69 percent of industry purchase. The remaining 31 percent of purchases by freight generating industries is spread among a variety of non freight-generating industries, including professional services, management, real estate, finance, and other services.

4.3 Importance of Transportation Costs in Economic Development

This section describes the importance of transportation in promoting economic development by assessing the cost of transport as a percentage of product price and the

Transport Cost as a Percent of Product Price

In the United States, the estimated cost of logistics was \$1.3 trillion in 2008³⁷, representing 9.4 percent of the U.S. Gross Domestic Product (GDP). Transportation costs via all modes (intercity trucks, local trucks, railroads, water carriers, oil pipelines and air carriers as well as freight forwarders) accounted for 6.0 percent of the GDP. Other related-transportation costs accounted for an additional 3.4 percent of GDP, including inventory carrying costs, shipper related costs and logistics administration. (See Table 15)

TABLE 15. TOTAL US LOGISTICS COST (BILLIONS OF DOLLARS IN 2008)

Category	2008	Percent GDP
Inventory Carrying Costs	\$421	2.9%
Transportation Costs	\$864	6.0%
Shipper related costs	\$8	0.1%
Logistics Administration	\$52	0.4%
TOTAL	\$1,345	9.4%

Source: CSCMP

The percentage of the transportation cost to the purchaser price (retail price paid by consumers and businesses) varies widely across products, depending on the:

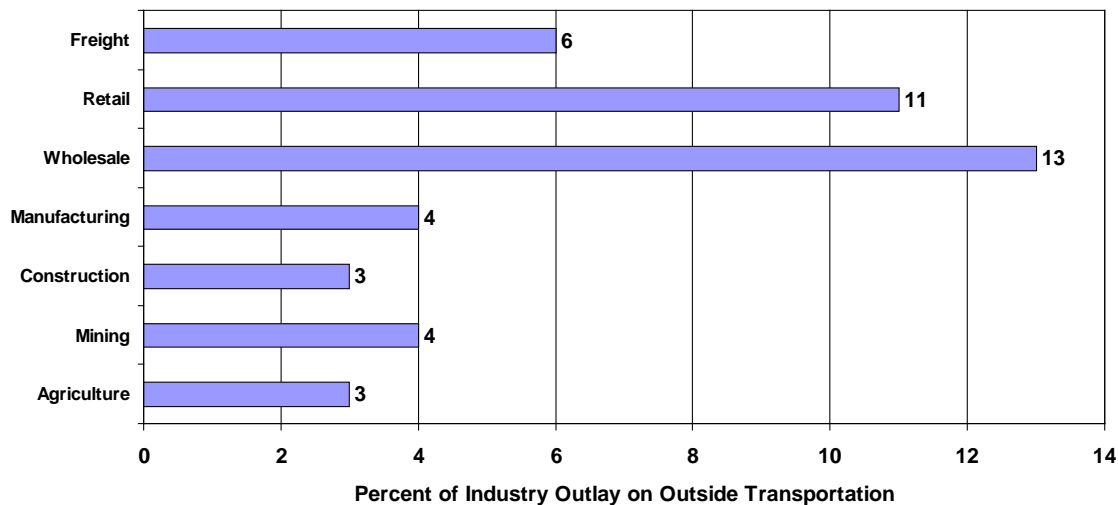
- Value of the product - the lower the product value, the higher the transport costs as a percent of retail prices,
- Cost of transportation - some products (such as chilled and frozen foods) require more expensive refrigerated containers, which results in higher transportation costs, and
- Speed of delivery – time sensitive cargoes (like perishables, apparel, electronics et al) require faster delivery to preserve product quality or meet retail store schedules, which typically increases the transportation cost, among other factors.

³⁷ *State of Logistics Report 2008*, Council of Supply Chain Management Professionals (CSCMP)

As an example, in the U.S.³⁸, the cost to transport tools is approximately 1.2 percent of its retail price in stores while the cost to transport fresh vegetable is approximately 9.9 percent of its retail price.

In Clark County, the expenditures³⁹ on outside transportation range from 3 percent for firms in the agriculture and construction sectors to as much as 11 percent and 12 percent for firms in the retail and wholesale sectors. (See Figure 38) This estimate does not include internally provided transportation costs, inventory carrying costs or other logistics costs.

FIGURE 38. OUTLAY BY CLARK COUNTY FIRMS ON OUTSIDE TRANSPORTATION (PERCENT)



Importance of Transport Costs in Economic Development

Firms are seeking to lower transportation costs in order to preserve or enhance operating margins and profits. This is becoming increasingly difficult to accomplish due to the current economic recession. However, this is an excellent time for Clark County and its partners to evaluate how to improve the multi-modal transportation system in the County.

Transportation improvements can have the following impacts: “Improvements in freight carriage can be expected to have important economic effects. Lower costs or better service, or both, in freight movement have a positive effect on all firms engaged in the production, distribution, trade and/or retail sale of physical goods. Reducing the per-mile cost of goods carriage means that any production or distribution facility can serve a wider market area, with potential gains from scale efficiencies. It also means a factory can draw supplies from a wider area with potential gains in terms of the cost and/or quality of parts and materials coming to the factory. Managers of businesses are paying ever closer attention to efficiency in goods movement and

³⁸ Source: U.S. Benchmark Input-Output Accounts, 2002; By Ricky L. Stewart, Jessica Brede Stone, and Mary L. Streitwieser, October 2007

³⁹ Source: IMPLAN model results for Clark County, See Table 15 below.

tighter control of inventory and the whole supply chain. Logistics costs comprise transportation costs, costs of owning and operating warehouses, ordering costs, and carrying costs of inventory (principally interest and insurance). In recent years, trucking costs have been falling and reliability has been improving. Businesses have tended to respond by buying more transportation and using it to reduce the other components of logistics costs (e.g., through fewer warehouses or lower inventories). As we shall see, the tendency of managers to respond this way to lower costs and/or improved quality of freight transportation is a fundamental source of the economic benefits stemming from improvements in the freight transportation system⁴⁰.”

Improvement to transportation infrastructure has a direct relationship to retaining existing freight generators and attracting new freight generators. When companies select an industrial site, they evaluate numerous criteria. Transportation is one of the key considerations, including:

- Reasonable distance and transit time from suppliers and markets
- Accessibility to the alternative modes (via ocean and barge carriers, trucks, railroads, pipelines and air cargo)
- Competitive freight rates via all modes under consideration
- Low level of congestion on transportation routes to and from the site
- Adequate availability of equipment (trucks and rail et al) to meet distribution requirements, among other criteria.

There is a direct link between an efficiently functioning multi-modal transportation system and economic growth. There are several economic development opportunities that are available in Clark County if the right decisions are made.

The current severe recession coupled with prior unprecedented increases in fuel costs is causing shippers, carriers and developers to change their operations. Cost containment is a central theme to these efforts, across all modes of transportation as well as for commercial and industrial firms. These conditions will linger for the near-term future (around 5 years). However, the focus of this study is on the long term system needs for the next 30 years. This is a perfect time to begin to address these issues so as to be ready for opportunities as they arise.

The multimodal transportation system in Clark County needs improvements:

- Trucks handle the largest volume of traffic in Clark County. The key issues for truckers are congestion and a need for additional capacity on key routes. This includes improvements across the Columbia River and at key routes within Clark County (I-5, I-205, SR 14 among others).
- Rail traffic is the next largest generator of traffic in Clark County. Key issues also include congestion, port access and mainline capacity limitations. The proposed Vancouver Bypass and the Port of Vancouver Freight Access Project will greatly improve rail traffic flows. Improvements to the shortline operation in Clark County will also benefit shippers.

⁴⁰ Source: Economic Effects of Transportation: The Freight Story by ICF Consulting and HLB Decision-Economics for the Federal Highway Administration, 2002, page 1.

- All three ports in Clark County are expanding their portfolios of commercial/industrial lands. Private developers are also positioning their properties for the economic upturn. Improvements in truck and rail access are required to make these efforts successful, particularly improved freeway access.
- Barge operators need improvements in the navigation channel and will also benefit from road and highway improvements.

Decision makers have an opportunity to set the groundwork for these improvements. Failure to do so will lead to a familiar pattern. An increase in transportation costs and decrease in system reliability will lead to diversion of traffic and loss of commercial and industrial development. This will lead to a loss of revenues and ultimately to a loss of jobs.

The purpose of this report is to clarify the issues impacting freight movement in Clark County to assist decision makers to make informed decisions.

**TABLE 17. ESTIMATED MODAL SPLIT BY COMMODITY
(1,000 METRIC TONS)**

SCTG	Description	Metric Tons (1,000s)						Total
		Ocean	Barge	Rail	Truck	Air	Pipeline	
1	Live animals and live fish	-	-	-	109.6	-	-	109.6
2	Cereal grains	3,981.6	1,322.7	3,059.8	1.7	-	-	8,365.7
3	Agricultural products, except live animals, cereal grains and forage products	-	-	3.1	436.1	-	-	439.1
4	Animal feed and feed ingredients	-	-	34.5	48.3	0.0	-	82.9
5	Meat, fish, seafood, and preparations	-	-	1.4	171.4	-	-	172.8
6	Milled grain products and preparations and bakery products	-	-	7.0	868.0	0.0	-	875.0
7.8	Foodstuffs and alcoholic beverages	-	-	43.1	329.9	0.4	-	373.5
9	Tobacco products	-	-	-	-	-	-	-
10	Monumental or building stone	-	-	-	-	-	-	-
11	Natural sands	-	293.0	44.3	-	-	-	337.3
12	Gravel and crushed stone	-	-	-	-	-	-	-
13	Nonmetallic minerals, n.e.c.	187.3	-	225.0	49.8	-	-	462.1
14	Metallic ores	372.1	-	360.5	-	-	-	732.7
15	Coal	-	-	-	-	-	-	-
16	Crude Petroleum Oil and Oil from Bituminous Materials	-	-	-	-	-	-	-
20	Base chemical	315.7	-	270.6	124.9	1.0	-	712.2
21	Pharmaceutical products	-	-	-	214.2	0.2	-	214.4
22	Fertilizer and fertilizer materials	70.2	5.4	264.3	6.0	-	-	346.0
23	Chemical products and preparations, n.e.c.	-	-	14.7	139.0	0.5	-	154.2
24	Plastics and rubber	-	-	12.2	880.2	0.9	-	893.4
25	Logs and other wood in the rough	-	2.7	-	-	-	-	2.7
26	Wood products	71.2	-	553.6	4,158.7	0.8	-	4,784.3
27	Pulp, newsprint, paper, and paperboard	41.5	-	336.1	41.6	0.2	-	419.5
28	Paper or paperboard articles	-	-	-	622.2	-	-	622.2
29	Printed products	-	-	-	271.9	0.3	-	272.3
30	Textiles, leather, and articles	-	-	-	186.7	0.4	-	187.1
31	Nonmetallic mineral products	-	-	38.2	2,058.1	-	-	2,096.3
32	Base metal in primary or semifinished forms and in finished basic shapes	215.8	-	36.8	220.1	0.0	-	472.8
33	Articles of base metal	-	-	5.6	753.0	0.5	-	759.1
34	Machinery	84.3	-	31.0	1,666.6	9.3	-	1,791.3
35	Electronic and other electrical equipment and components, and office equipment	-	-	-	1,253.1	14.9	-	1,268.0
36	Vehicles	75.4	-	57.5	223.3	1.0	-	357.2
37	Transportation equipment, n.e.c.	0.5	-	2.5	225.6	-	-	228.6
38	Precision instruments and apparatus	-	-	-	341.3	1.1	-	342.4
39	Furniture, mattresses and mattress supports, lamps, lighting fittings, and illuminated signs	-	-	-	128.9	0.2	-	129.1
40	Miscellaneous manufactured products	-	-	-	129.0	0.5	-	129.5
41	Waste and scrap	210.5	290.3	83.3	25.6	-	-	609.7
43	Mixed freight	1.4	-	-	358.6	2.1	-	362.2
44	Mail and Express Traffic	-	-	66.4	-	7.8	-	74.2
60	Empty Containers, etc	-	-	-	-	-	-	-
17.18.19	Gas, fuel, petroleum/coal products	315.3	354.7	73.0	1,053.7	0.0	647.5	2,444.2
	Total	5,943.0	2,268.9	5,624.6	17,919.8	42.3	647.5	32,446.1
	Percent	18.3%	7.0%	17.3%	55.2%	0.1%	2.0%	100.0%

Source: BST Associates

**TABLE 18. ESTIMATED VALUE BY MODE AND COMMODITY
(\$ MILLIONS)**

SCTG	Description	Millions of 2007 Dollars						Total
		Ocean	Barge	Rail	Truck	Air	Pipeline	
1	Live animals and live fish	-	-	-	8.6	-	-	8.6
2	Cereal grains	1,464.5	486.5	1,125.4	0.7	-	-	3,077.1
3	Agricultural products, except live animals, cereal grains and forage products	-	-	5.2	820.8	-	-	826.0
4	Animal feed and feed ingredients	-	-	8.2	12.6	0.0	-	20.8
5	Meat, fish, seafood, and preparations	-	-	4.5	598.9	-	-	603.4
6	Milled grain products and preparations and bakery products	-	-	5.2	713.3	0.0	-	718.5
7.8	Foodstuffs and alcoholic beverages	-	-	45.1	229.5	0.5	-	275.2
9	Tobacco products	-	-	-	-	-	-	-
10	Monumental or building stone	-	-	-	-	-	-	-
11	Natural sands	-	3.9	0.6	-	-	-	4.5
12	Gravel and crushed stone	-	-	-	-	-	-	-
13	Nonmetallic minerals, n.e.c.	47.1	-	56.6	7.3	-	-	110.9
14	Metallic ores	646.2	-	645.3	-	-	-	1,291.5
15	Coal	-	-	-	-	-	-	-
16	Crude Petroleum Oil and Oil from Bituminous Materials	-	-	-	-	-	-	-
20	Base chemical	74.4	-	50.7	120.2	0.6	-	245.9
21	Pharmaceutical products	-	-	-	30.5	5.6	-	36.1
22	Fertilizer and fertilizer materials	18.4	1.7	80.9	8.5	-	-	109.5
23	Chemical products and preparations, n.e.c.	-	-	44.0	96.3	1.3	-	141.6
24	Plastics and rubber	-	-	10.7	127.0	2.5	-	140.1
25	Logs and other wood in the rough	-	0.3	-	-	-	-	0.3
26	Wood products	92.4	-	653.1	548.7	0.4	-	1,294.6
27	Pulp, newsprint, paper, and paperboard	26.1	-	214.1	27.8	0.2	-	268.2
28	Paper or paperboard articles	-	-	-	549.6	-	-	549.6
29	Printed products	-	-	-	1,895.3	1.3	-	1,896.6
30	Textiles, leather, and articles	-	-	-	1,949.4	3.9	-	1,953.4
31	Nonmetallic mineral products	-	-	21.1	189.0	-	-	210.0
32	Base metal in primary or semifinished forms and in finished basic shapes	173.0	-	56.5	332.7	0.0	-	562.2
33	Articles of base metal	-	-	35.6	122.8	1.5	-	159.9
34	Machinery	798.5	-	292.9	652.0	84.3	-	1,827.7
35	Electronic and other electrical equipment and components, and office equipment	-	-	-	325.8	340.1	-	665.9
36	Vehicles	946.7	-	722.0	1,659.8	6.2	-	3,334.7
37	Transportation equipment, n.e.c.	96.2	-	482.0	106.7	-	-	684.9
38	Precision instruments and apparatus	-	-	-	72.2	61.8	-	134.0
39	Furniture, mattresses and mattress supports, lamps, lighting fittings, and illuminated signs	-	-	-	38.1	1.1	-	39.2
40	Miscellaneous manufactured products	-	-	-	442.1	1.9	-	444.1
41	Waste and scrap	90.3	47.9	35.3	5.5	-	-	179.0
43	Mixed freight	0.3	-	-	1,519.2	6.7	-	1,526.1
44	Mail and Express Traffic	-	-	-	-	-	-	-
60	Empty Containers, etc	-	-	-	-	-	-	-
17.18.19	Gas, fuel, petroleum/coal products	186.4	140.7	55.1	110.7	0.0	252.5	745.4
	Total	4,660.2	681.0	4,650.2	15,818.3	520.0	252.5	26,582.2
	Percent	17.5%	2.6%	17.5%	59.5%	2.0%	0.9%	100.0%

Source: BST Associates