



Washington State Transportation
Commission

Statewide Rail Capacity and System Needs Study
Task 2.1.A – Economic Growth and Demand

Technical

Memorandum

prepared for

Washington State Transportation Commission

by

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with

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Task 2.1.A – Economic Growth and Demand

■ Summary

This Task 2.1.A technical memorandum addresses economic growth and demand in Washington, the Pacific Northwest region of the U.S., and the U.S. economy as a whole. The approach taken in this task was to review the economic analysis and forecasts used in previous studies in Washington State and the region, as well as updated economic forecasts from Global Insight's own economic forecasting models to provide new forecasts that capture the trends affecting the economy over the long term. Findings included the observation that long-term economic growth in Washington State is expected to be greater than growth in the country as a whole, driven by strong growth in the services sector, especially information services. The value of output from agriculture and manufacturing in Washington State will eventually fall into decline, yet Pacific Northwest regional manufacturing and agriculture output growth will remain positive, and the need for freight transportation to carry the output will be undiminished with the growing importance of international trade to the State and the Pacific Northwest Region. Economic growth at the regional level will be close to that of Washington State, though with slightly slower growth in services and greater growth in transportation-dependent manufacturing and agriculture.

International trade through Washington State, the Pacific Northwest region, and the United States as a whole will continue to grow faster than the overall economy, with exports rebounding and import growth from Asia continuing to increase in importance. Overall, U.S. trade with Asia continues to increase as a share of the total, increasing pressure on West Coast ports, including Washington State ports. Long-term growth in trade is projected to grow faster than overall freight transportation and faster than the economy as a whole. Off a smaller base, the real value of exports of goods is projected to increase faster than the real value of merchandise imports. Finally, investments in and improvements to the productivity of transportation system capacity to handle the projected increase in freight transportation demand will be necessary to achieve the growth in demand through 2025.

■ Objective

The objective of this task technical memorandum is to describe the growth trends and structural changes in the state, regional, and national economy over the next 10 and

20 years. The state of the economy is critical to the future demand for freight transportation, so it is important to quantify the future economic activity in the State to better understand the projections for rail freight transportation derived from it. This complements the perspectives from stakeholders being collected as part of the Washington State Transportation Commission (WTC) Rail Study work plan.

■ Methodology

The findings and conclusions reported in this technical memorandum were developed in the following steps described below.

In this task, the consultants examined recent economic and trade forecasts for Washington State, the Pacific Northwest, and the United States focusing particularly on Pacific Rim trade that will determine much of the volume of import containers and exports (grains, fertilizers, food products, wood products, etc.) moving by rail in the State. Among the forecasts reviewed were the Marine Cargo Forecast produced in 2004 for the Washington Public Ports Association, which utilized economic and trade forecasts developed by consulting team member Global Insight, as well as individual trade forecasts developed for the Port of Tacoma and the Port of Seattle. Also reviewed were the Lower Columbia River cargo forecasts produced for the Port of Vancouver, Washington, and the Port of Portland, Oregon in 2002; and the Oregon State Commodity Flow forecasts done for the Oregon Department of Transportation (DOT) in 2004. Global Insight used its own forecasts and local sources to develop and adapt economic forecasts for industries that are domestic and local rail shippers. From these and other relevant economic forecasts, Global Insight synthesized economic growth conditions and trend projections, making adjustments and extensions, where appropriate, to bracket the most likely growth rates (and freight forecasts) for Washington State. The resulting forecasts are annual long-term forecasts out 10 and 20 years, capturing the path of growth between 2005 and 2025, as well as the forecast endpoint level of projected economic activity and trade.

■ Findings

The major findings described in more detail in each chapter are the following:

1. The long-term economic forecast for Washington State from 2005 to 2015 is for the real Gross State Product (GSP) to increase at an average compound annual growth rate of 3.54 percent and at an average compound annual growth rate of 3.46 percent to 2025.
2. The long-term economic forecast for the Pacific Northwest region to 2015 is for combined real gross regional product to increase at an average compound annual growth rate of 3.6 percent and at an average compound annual growth rate of 3.5 percent to 2025.

3. The long-term national economic forecast for the United States to 2015 is for Gross Domestic Product (GDP) to increase at an average compound annual growth rate of 2.94 percent and at an average compound annual growth rate of 2.93 percent to 2025.

See the detailed technical materials in the appendices for more information.

■ Washington State Economic Growth

In Washington, most economic activity is concentrated in the Puget Sound region. Four of the State's nine-largest metropolitan areas – Bellingham, Olympia, Seattle-Bellevue-Everett, and Tacoma – are in the western part of the State, with the major metropolitan areas in their neighbors – Vancouver, British Columbia and Portland, Oregon – also in the west. East of the Cascades, the State is predominantly rural. The economic center of eastern Washington is Spokane, which continues to serve as the regional commercial and agricultural center for both eastern Washington and northern Idaho. Due to variations in economic conditions, resources, and conditions, Washington's business costs vary considerably within the State. In the Puget Sound area, business costs are greatest and land is relatively most expensive. In the central, eastern, and southern parts of Washington, available land is less expensive and wages tend to be much lower. In 2000, Washington's average annual wages per employee ranked seventh highest in the nation; the State's 4.8 percent annual wage growth from 1990 to 2000 ranked first.

Industry sectors in Washington that are dependent on transportation include a broad manufacturing base that requires substantial transportation of materials as inputs to manufacturing, as well as to carry product shipments. Manufacturing companies in Washington include industry leaders in electronic machinery, aerospace, and transportation equipment manufacturing. The State, as the largest agricultural producer in the Northwest, also needs freight transport to serve the farming and logging sectors. The economy of Washington also has a prominent high-technology sector, including major business-services and biotechnology firms. Washington's high-technology sector is centered in the Puget Sound region, encompassing Boeing's massive aerospace operations; Microsoft's huge Redmond headquarters; Amazon.com; and a host of Internet, software, computer-services, and biotechnology companies, and semiconductor manufacturers. Even with the loss of its headquarters, Boeing remains Washington's largest employer, and the economy is sensitive to swings in the aerospace industry. International trade is also a major component of the state economy. Washington ranks third among all states in annual export value and first in export value per capita. Aircraft, lumber, and wood products are among the largest value commodities produced within the region. One-half of the population and jobs in the State are based in the Puget Sound region, which encompasses the metropolitan areas of Bremerton, Seattle, Tacoma, and Olympia. The region is an international transportation services hub, including maritime ports and Sea-Tac airport.

Growth in the Washington State economy has rebounded from the 2001 recession following the bust of the tech boom. Overall, real GSP growth is projected to average

3.7 percent annually through 2010, and then slow slightly in the first one-half of the next decade. The average long-term growth over the entire period from 2005 to 2025 will be 3.5 percent; and including the recession period back to 2000, long-term growth from 2000 to 2025 will average 3.3 percent.

Growth across the Washington State economy is uneven, with some sectors growing much faster than others. As shown in Table 1, information technology is projected to have the highest average annual growth over the forecast period, followed by business and professional services and education and health services. In contrast, even though they are all experiencing growth during the next few years, the mining, agriculture, and manufacturing sectors will eventually shrink in the share of real value of output in the State, with absolute declines in the value of the output of these sectors over the long-term forecast period.

Table 1. Washington State GSP Growth by Sector
2000 to 2025

Real GSP by Sector	Average Annual Growth					
	2000- 2005	2005- 2010	2010- 2015	2015- 2020	2020- 2025	2000- 2025
Total Washington State GSP	2.5	3.7	3.4	3.5	3.3	3.3
Agriculture	0.0	0.2	-0.2	-0.6	-1.0	-0.3
Manufacturing	-0.9	0.4	0.1	-0.2	-0.6	-0.2
Mining	-2.4	0.5	-0.2	-0.7	-1.1	-0.8
Construction	-0.2	2.5	2.0	1.7	1.2	1.4
Trade, transportation, & utilities	3.7	2.9	2.4	2.1	1.7	2.6
Information	2.0	8.9	8.1	8.0	7.0	6.8
Financial activities	3.5	3.0	2.5	2.1	1.6	2.5
Prof. & business services	4.0	6.2	5.6	5.6	5.0	5.3
Education & health services	3.8	5.2	4.6	4.5	4.1	4.4
Leisure & hospitality	2.5	4.0	3.7	3.6	3.1	3.4
other services	2.6	3.2	2.7	2.1	1.7	2.5
State & local govt.	1.6	1.9	1.6	1.0	0.6	1.3
Federal Govt.	3.6	0.4	-0.3	-0.6	-1.2	0.4

Reflecting the growth in the value of service sector output, the outlook for employment in Washington is expected to be led by its professional and business services sector through the forecast period. (This is typical of the pattern found nationally, as manufacturing and

agriculture employment continues to decline in importance.) As shown in Table 2, Washington State employment will vary significantly by sector over the 2005 to 2025 forecast period. The professional and business services sector employment is projected to see an average 2.3 percent growth in average annual job gains. This increase in employment leads to an increasing share of total jobs represented by this sector growing from 10.5 percent back in 1998 to 13 percent by 2015 and 14.5 percent by 2025. Nationwide, this phenomenon is occurring mostly at the expense of the manufacturing sector. Such is the case in Washington, as Boeing and others shed or move jobs elsewhere. This means that manufacturing is no longer the number-one source of jobs for Washington State, as employment is projected to contract 1.2 percent annually over the forecast period. Manufacturing employment will decline from 14 percent of total jobs in 1998 to 8 percent by 2015 and 6 percent by 2025. Despite a decline in early 2006, the long-term outlook for the Washington State unemployment rate is for little change, with little significant improvement during the forecast period, as employment growth is roughly counterbalanced by a rapidly growing labor force. The jobless rate will hold quite steadily around 5.3 percent through the forecast period.

Washington State, including its ports, will continue to see trade growing with traditional Northeast Asian trading partners, such as Japan, China (including Hong Kong), South Korea, and Taiwan, as well as with the growing economies of Southeast Asia. Non-Asian regions are also important for products shipped through Washington ports, especially grain exports and other noncontainerized commodities. The expected growth in Asian and North American economies creates a good opportunity for increased trade. Washington State's world exports rebounded sharply in 2005, moving it back to the fourth-largest exporting state behind Texas, California, and New York. Slight declines over the 2002 to 2004 period had led to the State being overtaken by Michigan in 2004, but the 12.3 percent increase of 2005 reversed that change. For the year, the State exported over \$37.9 billion to the world. In terms of total exports, Japan remains the number one customer for Washington State's products at \$6.4 billion, with Canada (\$5.2 billion) and China (\$5.1 billion) close behind. If the 2005 growth trend continues, China could become top importer from Washington soon. While Japan's purchases from Washington State increased by just 0.9 percent in 2005, exports to China rose 64 percent, almost \$2 billion. Also moving up quickly was the United Arab Emirates, which bought over \$1.5 billion from Washington State, mostly in aircraft from Boeing. This trend in state exports is projected to continue; especially given the success of Boeing in attracting new orders for aircraft to be delivered in future years.

Table 2. Washington State Employment Growth by Sector
2000 to 2025

Washington Long-Term Outlook Establishment Employment	Average Annual Growth					
	2000-2005	2005-2010	2010-2015	2015-2020	2020-2025	2000-2025
Total non-agricultural	0.4	1.2	0.8	1.0	1.0	0.9
Manufacturing	-4.3	-0.5	-0.6	-0.3	-0.5	-1.2
Durables	-4.6	-0.5	-0.8	-0.5	-0.8	-1.4
Fabricated metals	-1.1	2.4	1.1	0.0	-0.6	0.4
Machinery	-3.3	1.9	1.8	1.8	1.5	0.7
Comp. & elec. prod.	-8.9	-4.6	-0.2	0.0	0.3	-2.7
Transportation equip.	-4.8	-0.2	-2.4	-1.4	-1.7	-2.1
Nondurables	-3.6	-0.5	-0.2	0.3	0.1	-0.8
Food manufacturing	-3.2	0.0	0.7	1.4	1.0	0.0
Non-manufacturing	0.9	1.3	1.0	1.1	1.1	1.1
Construction & mining	1.3	1.2	0.9	1.4	1.4	1.2
Trade, trans., & utilities	0.0	1.0	0.4	0.6	0.6	0.5
Wholesale trade	-0.1	0.6	0.6	1.3	1.2	0.7
Retail trade	0.3	1.1	0.1	0.1	0.2	0.4
Transportation & warehousing	-0.6	1.4	1.3	1.1	1.0	0.8
Utilities	-1.7	-2.4	-1.0	-0.6	-0.8	-1.3
Information	-0.8	2.7	2.3	2.4	2.6	1.8
Financial activities	1.5	0.3	0.1	-0.3	-0.4	0.2
Finance & insurance	1.4	0.2	0.1	-0.6	-1.0	0.0
Real estate & rental	1.6	0.6	0.2	0.4	0.5	0.7
Professional & business services	0.7	3.0	2.8	2.5	2.4	2.3
Professional, scientific, & technical	0.0	2.9	2.4	3.3	3.3	2.4
Management	2.4	0.5	0.9	0.7	0.9	1.1
Administrative & waste services	1.0	3.7	3.6	2.1	1.8	2.4
Education & health services	2.4	1.6	1.1	1.6	1.7	1.7
Educational services	0.4	0.7	-0.2	0.8	1.0	0.5
Health care	2.7	1.7	1.2	1.7	1.8	1.8
Leisure & hospitality	0.6	1.0	0.0	0.2	0.2	0.4
Arts, entertainment, & recreation	-0.1	1.9	0.2	1.5	1.2	0.9
Accommodation & food services	0.7	0.8	-0.1	-0.1	-0.1	0.2
Other services	-0.8	0.4	0.1	0.4	0.3	0.1
Government	1.8	1.0	0.8	0.7	0.6	1.0
Federal	0.0	0.7	-0.3	0.6	-0.4	0.1
State & local	2.0	1.0	0.9	0.7	0.7	1.1

■ The Pacific Northwest Economic Growth

The economy of the Pacific Northwest region (Washington and Oregon) is quite strong currently, reflecting the continued recovery from the recession of 2001. The growth in the real value of the region's economy, measured as gross regional product, increased 4.8 percent in 2005. The outlook for growth for the region, as with growth in Washington State, is for a longer-term reduction in the rate growth from today's pace. The real value of the region's economy is projected to increase at a 3.6 percent average annual growth rate from 2005 to 2015, and for growth to average 3.5 percent from 2005 to 2025. Growth will be slower for the manufacturing sector in the region, with the real value of output forecast to average 2.9 percent from 2005 to 2015 and 2.5 percent from 2005 to 2025.

**Table 3. Pacific Northwest Gross Regional Product Growth by Sector
2000 to 2025**

Real Gross Regional Product by Sector	Average Annual Growth				
	2000-2005	2005-2010	2010-2015	2015-2020	2020-2025
Total Pacific Northwest gross regional product	2.9	2.5	3.7	3.5	3.4
Agriculture	0.0	2.8	2.9	3.0	3.1
Manufacturing	1.6	2.5	3.2	2.8	2.3
Mining	-2.3	0.8	0.2	-0.2	-0.5
Construction	-0.7	3.2	2.8	2.6	2.2
Trade, transportation & utilities	3.7	3.3	2.8	2.5	2.2
Information	2.5	8.4	7.7	7.6	6.7
Financial activities	3.2	3.2	2.8	2.4	2.0
Prof. & business services	3.3	5.7	5.2	5.1	4.6
Education & health services	4.3	4.7	3.9	4.2	4.0
Leisure & hospitality	2.4	3.9	3.5	3.3	2.9
Other services	2.5	2.4	2.0	1.6	1.3
State & local govt.	1.5	1.9	1.7	1.1	0.8
Federal govt.	2.7	0.2	-0.4	-0.7	-1.2

Employment growth in the Pacific Northwest remains strong now, with total nonfarm jobs increasing 2.6 percent in 2005 after 1.7 percent growth in 2004. This employment growth is a reversal of the 2001 to 2003 declines in employment that followed the recession in 2001. The outlook is for total employment growth to average 1.01 percent annually

from 2005 to 2015, and to average 0.89 percent over the entire 2005 to 2025 period as declines in manufacturing offset the growth from jobs in the services sector. The unemployment rate in the Pacific Northwest decreased nearly a full percentage point from 6.8 percent in 2004 to 5.9 percent in 2005, but stayed above the U.S. average of 5.1 percent. This pattern is projected to continue in the forecast period with unemployment forecast to fall to just 5.8 percent in 2015 and 5.7 percent in 2025, as almost 1 million new jobs are created in the region by 2025.

Recent employment growth in the Pacific Northwest has been broad-based, with nearly all the major sectors adding jobs from 2004 to 2005. Growth in manufacturing has occurred in both Washington State and Oregon, posting a net gain of 9,000 jobs, up 1.9 percent for the region. This is expected to be the peak for regional construction employment for the next 20 years, with total regional manufacturing employment suffering from structural decline, falling at an average annual rate of -0.3 percent from 2005 to 2015 and -0.25 percent from 2005 to 2025. Recently, the construction sector has been booming, leading all sectors with annual growth of 7.2 percent in 2005 adding 17,000 jobs compared to 2004. This pace of construction job growth will not continue over the long term, with average annual growth of 1.4 percent in this sector projected from 2005 to 2015 and 1.3 percent from 2005 to 2025. In general, it is the services sector that will lead in providing regional job growth over the forecast period, with subsectors within services expected to see the strongest growth of any employment categories in the economy over the long term. Sectors with the strongest average annual growth forecast over the 2005 to 2025 period are professional and business services (2.6 percent); professional, scientific, and technical services (2.7 percent), and information services (2.1 percent).

The long-term outlook for the Pacific Northwest region's unemployment rate is for little change, averaging 5.8 percent over the entire 2005 to 2025 period, as employment growth is matched by growth in the labor force and labor productivity increases continue across the industries in the region.

■ United States Economic Growth

Highlights

- Real GDP growth in the United States will average 2.9 percent per year over the forecast period to 2025.
- The outlook for inflation remains moderate. Consumer Price Index (CPI) inflation is projected to average 2.5 percent per year over the forecast period.
- High investment and a slower growing labor force are projected to result in higher productivity growth. Nonfarm business productivity growth is projected to average 2.3 percent over the forecast period, compared with the 2.2 percent average experienced since 1953.

- The U.S. current account deficit is projected to be negative through 2025, though shrinking over time with both imports and exports increasing.
- Real oil prices are projected to slowly decline over the forecast period. The inflation-adjusted price of imported crude oil is forecast to decline from \$43.90 per barrel in 2005 to \$32.90 per barrel in 2025.
- The labor market improves over the forecast period, with the unemployment rate eventually settling at 4.7 percent. More new jobs come from services than from manufacturing.
- The U.S. Federal budget is projected to remain in deficit throughout the forecast period.

Introduction

Over the long-term, the rise in per capita income in the United States has been driven by productivity growth and work force participation. While economists agree that education and new technologies eventually make workers more productive, many questions remain about the mechanism and pace of technological progress. In this long-term forecast of the U.S. economy, it is assumed that the productivity boom that came from the revolution in information technologies will not be sustained at the same levels as seen during the economic recovery in 2002 to 2004. While there are many promising new technologies in development, it is assumed here that productivity growth rates will settle back to a rate of increase higher than during the 1970s and 1980s, but slower than in the second half of the 1990s. Federal monetary and fiscal policy will accommodate growth with moderate inflation. Trade policy will enable further growth in globalization of the economy. The overall outlook for U.S. GDP is for average annual growth to be 2.9 percent over the forecast period to 2025 with service sector growth outpacing manufacturing growth.

The 20-Year Forecast Outlook

The outlook assumes that under the Federal Reserve Board will soon make explicit commitments to keep inflation low. It may even adopt inflation targets. It will not, however, allow inflation to creep up. With moderate to low inflation, interest rates are projected to remain relatively low. The 10-year Treasury bond rate is projected to average 5.67 percent over the forecast period. The unemployment rate is projected to average 4.83 percent over the forecast period to 2025.

Long-Term Forecast Highlights

Real GDP. The trend projection assumes that the U.S. economy experiences no major mishaps between now and 2025. The projection represents Global Insight's best estimate of the economy's path over the 2005 to 2016 period. Beyond 2016, the projection should be

interpreted as the mean of all possible “near-full-employment” paths the economy could follow. The smooth-growth characteristics of the long-term forecast can be described as a trend projection, which makes it most useful for analysis of government policy and planning capacity additions – tasks largely impervious to short-term cyclical fluctuations. Annual real GDP growth averages 2.9 percent in 2004 to 2025, about the same rate as the average of the past 25 years. The economy’s underlying growth will slow after 2011, as baby boomers begin to retire, slowing labor force growth. Potential output growth should hold up fairly well in the future, with greater business fixed investment and research and development (R&D) spending offsetting the slowdown in labor force growth. Eventually, though, the effects of weaker labor force growth become dominant and, in a sense, self-perpetuating. As output growth drops off, business fixed investment rises more slowly, limiting capital stock growth and, thus, future output gains.

Employment. Slower long-run increases in the labor force indicate more moderate long-run employment growth in the future. Total civilian employment will rise at an average annual rate of 1.0 percent from 2005 to 2025. Total establishment employment will rise from 133.5 million in 2005 to 162.6 million in 2025, an increase of 22 percent. Manufacturing’s share of total employment will continue to decline over the forecast period, falling to 7.9 percent in 2025, from 10.7 percent in 2005. The broad service sector will generate an increasing share of employment growth in the forecast period, although the Federal government’s share of employment will decline during the forecast period.

Inflation. Over the long run, inflation is a monetary phenomenon. Its future course will be determined mostly by policies implemented by the Federal Reserve Board, which is assumed to continue to try to contain inflation over the forecast period. The CPI is expected to average 2.5 percent annual increases in 2005 to 2025, somewhat less than the 4.2 percent average in 1975 to 2005. The broader-based GDP deflator will rise at an average rate of 2.0 percent per year.

Consumption. Expenditures, in the long term, are primarily determined by the growth of real permanent income, demographic influences, and changes in relative prices. The share of personal consumption expenditures in GDP is forecast to stabilize at about 70 percent of GDP. Real consumption growth is projected to average 2.7 percent per year over the forecast period. In per capita terms, growth will advance about 2.1 percent per year, down 0.1 percentage point from the 1978 to 2004 rate. The share of consumption devoted to services will increase, mainly because of rising health expenditures, while that for goods will fall over the forecast period.

The long-term outlook for auto and light-truck sales calls for a slowdown in the rate of increase relative to past performances. Vehicle sales growth will average close to 0.8 percent over the next 20 years. Light-vehicle sales are forecasted to reach 19.7 million units by 2025. Although the number of vehicles per person has increased significantly in the past 20 years, the United States is approaching a saturation point in the rate of vehicle ownership. Future growth in vehicle sales will be primarily driven by growth in population and demand for replacement vehicles. Automobile sales should be relatively strong throughout the projection period, averaging 7.7 million units per year.

Energy conservation efforts will continue. This stems partly from a stock/flow phenomenon: despite the until-recent trend toward more minivans and sport utility vehicle purchases, for example, the average new vehicle is still more fuel-efficient than the existing stock. Gasoline usage per vehicle should fall for several more years, even if relative energy prices remain flat. Similar considerations apply to business capital and housing stocks. The ongoing employment shift from manufacturing to services also implies lower energy usage per unit of output.

Real personal disposable income, which climbed 3.2 percent in 1970 to 2003, will rise 3.0 percent annually over the next 20 years. This does not take into account the rising volume of withdrawals from existing retirement plans.

Housing. Household growth clearly depends on population growth, but real incomes, employment, the age distribution of the population, and societal values also influence it. Net additions to the housing stock are closely linked to household growth, which is the primary driver of housing starts. Many analysts tend to overlook another key factor for housing starts: the geographic location of the demand for net additions.

The 25 to 34-age cohort is key for the demand for new housing. This is the age group where individuals typically purchase their first home. The demand for new housing was boosted by the large gains in this age group in the late 1960s and 1970s, as the baby-boom generation entered the housing market. Unfortunately for the housing sector, the baby-boom generation began to pass through this age bracket in the mid-1980s, limiting the demand for additions to the housing stock. The number of households in this cohort will begin a modest increase after 2005. The overall head-of-household age will gradually increase toward older segments due to the shift in the age composition.

The demographic demand for housing will be a bit stronger over the next 20 years than over the past 30 years. Thus, housing starts are projected to average 1.77 million units annually in 2006 to 2025, compared with 1.53 million for 1973 to 2004. Meanwhile, the housing stock (excluding mobile homes) will climb from 112.1 million units in 2005 to 136.8 million units in 2025.

Business Fixed Investment. Good profitability and solid demand growth should keep investment healthy over the next 20 years. The share of GDP devoted to business fixed investment will hover around 10.5 to 11.5 percent of GDP through most of the forecast period. The effective capital stock (in 2000 dollar terms) is projected to increase 3.4 percent annually, below the average growth rate recorded for 1970 to 2004. Inventory investment will remain a small percentage of GDP. Although inventories have played significant roles during past business cycles, in the long-term trend, forecast inventory investment represents an average and is, thus, smoother than is likely to be realized. Capital inflow will contribute to net domestic investment throughout the forecast period, although the Federal debt clearly hurt it in the later years of the forecast. The government saving projection assumes that state and local governments continue to run modest operating surpluses.

International Trade. A decline in the dollar relative to industrialized-country-currencies, combined with modest unit labor cost growth, will stimulate U.S. exports abroad and

result in an eventual improvement in the U.S. current account balance. The forecast is for real exports to expand at an average annual rate of 7.6 percent over the entire period. The real exports of goods are projected to expand at an average annual rate of 8.46 percent. Real imports, meanwhile, will grow at an average annual rate of 5.1 percent and real imports of goods will increase at an average annual rate of 5.1 percent.

Long-Term Forecast Assumptions

In this long-term forecast, it is assumed that the economy will not sustain any severe external shocks. Economic output will eventually converge towards its potential level, with all resources close to being fully utilized. As a result, the growth rates of output, real incomes, real expenditures, and the general standard of living of the population are determined by the growth rate of potential GDP. The long-range economic outlook is dominated by supply factors, such as population growth and demographics, labor force participation rates, average weekly hours worked, national saving and capital stock accumulation, and productivity growth.

Population and Demographics

This long-term forecast is made using the U.S. Census Bureau's latest population projections, which were released in May 2004. Since the Census Bureau's projections for 2001 to 2004 are not the same as its latest long-term population estimates, their long-term projections were spliced together with the latest population estimates.

The "middle" projections of population used here are based on specific assumptions about immigration, fertility, and mortality rates. According to the Census Bureau, the fertility rate (the average number of births per woman upon completion of childbearing) will gradually rise, while the mortality rate should continue to improve, with life expectancy for men and women rising steadily. Net immigration (including undocumented immigration) is estimated to increase as well. Based on the Census Bureau assumptions, the U.S. population will average 0.8 percent growth per year through 2025, down from the 1.1 percent pace during the last 30 years. Thus, total population will rise from 282.8 million in 2000 to 350.8 million in 2025. The age distribution of the population is also an important factor in the long-term outlook. As baby boomers begin to retire, the share of the U.S. population aged 65 years and over will increase, pushing up outlays for Social Security, Medicare, and Medicaid. In addition, the growth rate of the working-age population will slow more than that of the overall population.

Productivity and Aggregate Supply

It is the economy's ability to increase supply in the long run that determines its potential growth path. Growth in aggregate supply depends on the increase in the labor force, the growth of the capital stock, and improvements in productivity.

The long-term forecast is for productivity growth to average 2.3 percent per year in 2005 to 2025. This is lower than the stellar 2.9 percent average annual growth achieved during the 1960s or the first years (2002 to 2004) of the current recovery, yet higher than the 2.0 percent annual growth rate for entire 1975 to 2005 period. The rate of productivity growth, particularly over the next decade, is largely due to robust growth in equipment spending and adoption of new technologies. The real effective capital stock is projected to see average annual growth of 3.4 percent from 2005 to 2025, compared with 4.0 percent in 1975 to 2005. The declining price of capital goods relative to other inputs accounts for the robust capital stock growth rates.

Government Policy

The Federal budget deficit exceeded \$400 billion in 2004, as the 2003 tax act reduced receipts and the war on terrorism boosts spending. In the 2006 to 2012 period, the Federal budget deficit is projected to shrink, but never disappears, as taxes rise in the second half of the decade. It is not expected that Congress will increase tax revenues by letting the tax cuts sunset as scheduled, regardless of who may be in the White House or in control of Congress. One way or another, the well-off will be forced to pay more, perhaps by applying the Social Security tax to all incomes, as well as by raising marginal rates of taxation. With the economy growing faster than the pace of government spending, the government sector's share of GDP will decline over the forecast period. The state and local government maintains the dominant share of total government purchases, increasing from 63 percent in 2004 to 65 percent in 2025. At the Federal level, the military accounts for 67 percent of Federal purchases in 2005, and slowly drops to 62 percent in 2025.

Monetary Policy and Financial Markets

The Federal Reserve Board is trying to achieve a “steady-state” rate of inflation. Monetary policy can cause inflation to accelerate by being overly accommodative. Alternatively, it can cause inflation to decelerate by being restrictive. It is assumed in this forecast that the monetary authorities choose to keep short-term interest rates slightly below their equilibrium levels in the early years of the forecast, causing a slow increase in inflation. Over the long term, the inflation rate stabilizes at about 2.4 percent. Bond yields are projected to generally move parallel to the Federal funds rate over the forecast interval, but run somewhat higher. The yield on 10-year maturity treasury bonds stays below 5.75 percent through 2010. It averages 5.75 percent over the rest of the forecast period. The forecast implies a real Federal funds rate of about 2.8 percent and a real long-term bond rate of 3.3 percent.

Oil Prices

Energy. Global Insight's Energy Service expects the average acquisition price of foreign crude oil to remain above \$40.00 per barrel over the forecast period. With worldwide

demand steadily increasing, the Organization of the Petroleum Exporting Countries (OPEC) cartel will maintain some oil pricing power. Although it is impossible to predict the precise timing of energy price changes, the long-term forecast assumes that imported oil prices will average \$44.80 in 2010 to 2020. In the long run, the cost of a barrel of oil depends on the cost of extracting the marginal unit (marginal cost). Technological innovations bring unit costs down, and depleting a limited resource raises them. The assumption in the long-term forecast is that technological innovations will not be enough to keep real energy costs from rising, but that this increase will happen after 2025.

Foreign Trade

The major U.S. industrialized nation trading partners are assumed to follow an economic growth pattern similar to that in the United States, with the pace of growth averaging 2.0 percent over the forecast period, down from an average 2.6 percent over the past 30 years. With some regional variation, this slowdown reflects demographic forces in these countries similar to those operating in the United States. The developing countries that trade with the United States will grow 4.0 percent, down 1.0 percentage point from the rate of the past 30 years. The dollar is expected to depreciate steadily against foreign currencies throughout the forecast period in order to keep the U.S. current account deficit from growing too fast. Over the forecast period, the real U.S. trade-weighted dollar relative to industrialized country currencies depreciates 0.6 percent annually. Sufficient investment in infrastructure and productivity of the transportation system to handle this growth in trade is expected to be made, driven by market forces aided, not impeded by government policy and planning. This assumption is critical to achieving the forecast growth in trade, but not a change from recent practice nor a departure from previous expectations.

■ Conclusions

The major conclusions are discussed below.

We conclude that freight transportation activity will grow faster than the overall growth in the Washington State and regional economy. This is true for the United States as a whole as well.

Industry sectors of the economy tied to transportation are important contributors to the economic growth of the State and the region. The economic sectors dependent on transportation are forecast to grow over the forecast period and remain important to the employment and productivity of the economy.

Growth in U.S. international merchandise trade continues, with the most significant volume of trade growth coming from Asia. This Asian trade is naturally handled by West Coast, and increasingly, Washington state ports. Long-term growth in trade is projected

to grow faster than overall freight transportation and faster than the economy as a whole. Off a smaller base, the real value of exports of goods is projected to increase faster than the real value of merchandise imports.

Investments in and improvements to the productivity of transportation system capacity to handle the projected increase in freight transportation demand will be necessary to achieve this growth through 2025.

Appendix A. Economic Growth Forecast Methodology

■ Introduction

This appendix details the assumptions and methodology of the long-term economic growth projections from Global Insight’s U.S. macroeconomic and U.S. regional forecasting models discussed in the technical memorandum.

The long-term economic forecasts used in this study can be considered the most likely baseline projections of economic activity. The long-term forecasts are a trend projection between 2016 and 2025. The forecasts assume that the economy suffers no major shocks between now and 2025. While the business cycle is projected through 2015, after 2016 economic activity is forecast to grow smoothly, in the sense that actual economic output follows potential output relatively closely. These projections are best described as depicting the mean of all possible paths that the economy could follow in the absence of major disruptions. Such disruptions could include large oil price shocks, untoward swings in macroeconomic policy, or excessively rapid increases in demand. This long-term trend approach smoothes out the impacts of recessions or booms that could occur over the long run. Because it is not possible to predict the exact timing of business cycles much in advance, it is unwise to focus on specific years in long-term planning.

■ Key Forecast Assumptions

Demographics. Demographic factors are a primary driving force in any long-term economic projection. The population’s growth rate and changes in its composition have considerable impacts on the labor force, the full-employment unemployment rate, housing demand, and other spending categories – most notably at the state or regional level, consumption of health services, and purchases by state and local governments.

The population projections in Global Insight’s long-term forecast are built on the U.S. Census Bureau’s latest “interim” population projections, which were released in May 2004. These projections are labeled “interim,” because the basic fertility, mortality, and migration assumptions are not up to date. (The Census may update these assumptions later in 2006). Since the Census Bureau’s interim projections for 2001 to 2004 are not the same as its latest population estimates, their long-term projections were spliced together with the latest population estimates.

The “middle” projections of population used here are based on specific assumptions about immigration, fertility, and mortality rates. According to the Census Bureau, the fertility rate (the average number of births per woman upon completion of childbearing) will gradually rise, while the mortality rate should continue to improve, with life expectancy for men and women rising steadily. Net immigration (including undocumented immigration) is estimated to increase as well. Based on the Census Bureau assumptions, the U.S. population will average 0.8 percent growth per year through 2025, down from the 1.1 percent pace during the last 30 years. Thus, total population will rise from 282.8 million in 2000 to 350.8 million in 2025. The age distribution of the population is also an important factor in the long-term outlook. As baby boomers begin to retire, the share of the U.S. population aged 65 years and over will increase, pushing up outlays for Social Security, Medicare, and Medicaid. In addition, the growth rate of the working-age population will slow more than that of the overall population.

Fiscal Policy. It is expected that Federal spending on defense, transfer payments, and Federal aid to state and local governments consume a substantial share of U.S. GDP. As a result, the Federal government should post deficits in the unified Federal government budget over the forecast period. In the forecast, the deficit averages 0.8 percent of GDP in 2005 to 2025. In the long run, the baby boomers’ retirement will cause deficits to grow, despite some increases in the Social Security tax rate.

Monetary Policy and Inflation. Monetary policy remains important in the long-term projections, not so much in determining the level of output, but rather in determining the rate of inflation. Ultimately, the Federal Reserve Board decides on the “steady-state” rate of inflation. Monetary policy can cause inflation to accelerate by being overly accommodative and pushing the unemployment rate temporarily below the rate at which inflation is stable. Alternatively, it can cause inflation to decelerate by being restrictive and pushing the unemployment rate temporarily above the rate at which inflation is stable.

In this forecast it is assumed that the Federal Reserve Board’s ultimate goal is a stable inflation rate. The U.S. Consumer Price Index inflation rate rises in the early years of the forecast, and eventually settles to about 2.4 percent. Bond yields will generally move parallel to the funds rate over the forecast interval, but run somewhat higher. The yield on 10-year Treasury bonds rises slowly, and eventually converges to about 5.75 percent. The forecast implies a real Federal funds rate of about 2.8 percent and a real long-term bond rate of 3.3 percent.

Energy. Global Insight’s Energy Service projects the average acquisition price of foreign oil to remain above \$40.00 per barrel over the forecast period. With worldwide demand steadily increasing, the OPEC cartel will maintain some pricing power. Although it is impossible to predict the precise timing of energy price changes, the trend projection assumes that annual crude oil prices will drop from current high levels and hover around \$40.00 to \$50.00 per barrel through the end of 2022. Thereafter, the forecast shows oil prices climbs through 2025. The West Texas Intermediate price for crude oil is projected to be \$59.50 per barrel by 2025, compared with the average price of \$56.60 in 2005.

In the long run, scarcity tends to bid energy prices up, while new technologies tend to hold them down. In the end, we project that scarcity will win out, with the real price of imported oil rising from about \$21.50 per barrel in 2001 to \$32.90 in 2025.

Long-term energy price projections also are a trend forecast, rather than imposing cyclical pricing. It is likely that there will be periods, possibly of several years at a time, when energy prices are either above or below the trend. An energy price outcome higher than the projected trend could result from stronger demand growth (perhaps notably in China) and/or weaker supply (more disappointments in non-OPEC and loss of productive capacity in OPEC due to political upsets). An energy price outcome lower than the projected trend could arise from recession, enforcement of higher efficiency standards, or better than expected supply prospects.

International. In the long-term forecast, the major U.S. trading partners are assumed to follow a growth pattern similar to that in the United States, with the pace of growth (in real consumption) averaging 2.0 percent over the forecast period, down from an average 2.6 percent over the past 30 years. This slowdown reflects demographic forces similar to those operating in the United States, as well as the maturation of many developing economies. Owing to steady pressure from the current account deficit, the dollar will fluctuate, but on average, depreciate throughout our long-term forecast.

Demand Mix. Although the overall level of output is determined by supply conditions, many mixes of aggregate demand are consistent with that level of output. Over the forecast period, the demand mix will be dominated by the need to boost exports to balance the current account. Over the forecast period, the share of GDP from exports rises from 10.7 percent in 2005 to 17.2 percent in 2025. The share of GDP that is reduced by imports increases from 16.4 percent in 2005 to 24.1 percent in 2025. The growth in these shares reflect the continued globalization of the U.S. economy and the fact that the sum of the remaining shares of GDP are forecast to decline to make room for the rising share devoted to trade.

Appendix B. Economic Growth Forecast Tables

This appendix contains detailed long-term annual forecast data of economic growth for the U.S., the Pacific Northwest, and for Washington State from Global Insight, Inc. The economic indicators in the table reflect the composition of the economy, plus some additional key economic indicators that depict the characteristics of the forecast growth. Components of the economy are given as annual percent change or average annual percent change over a period of years, in real terms (that is they are adjusted for inflation.) The units for the additional key indicators are noted with each indicator, some as levels, some as rates or annual percent change. For the U.S. national data, there are separate pages for each successive period of time from the year 2000 out to the end of the forecast horizon in 2025.

Table B.1 Long-Term Forecast of the U.S. Economy

Year	2000	2001	2002	2003	2004	2005	2006	2007
Composition of Real GDP, Percent Change								
Gross Domestic Product	3.7	0.8	1.6	2.7	4.2	3.5	3.3	2.7
Total Consumption	4.7	2.5	2.7	2.9	3.9	3.6	3.4	2.6
Durables	7.3	4.3	7.1	6.6	6.0	4.4	3.7	2.8
Nondurables	3.8	2.0	2.5	3.2	4.7	4.4	3.9	2.2
Services	4.5	2.4	1.9	2.0	3.0	2.9	3.1	2.8
Nonresidential Fixed Investment	8.7	-4.2	-9.2	1.3	9.4	8.5	9.0	7.1
Equipment & Software	9.4	-4.9	-6.2	3.2	11.9	10.8	9.4	6.7
Information Processing Equipment	17.4	-1.8	-4.7	5.1	13.6	13.1	12.4	10.7
Industrial Equipment	7.7	-8.5	-7.7	0.3	3.4	6.8	6.8	3.9
Transportation equipment	-4.1	-11.2	-11.8	-2.3	12.7	12.8	6.7	0.9
Aircraft	2.8	2.8	-28.6	-5.4	-10.2	-21.4	8.2	16.9
Other Equipment	3.6	-3.3	-3.1	6.3	14.8	6.5	5.9	3.8
Structures	6.8	-2.3	-17.1	-4.2	2.2	1.9	8.0	8.3
Commercial & Health Care	6.3	-5.3	-15.7	-6.4	2.2	0.0	4.1	7.4
Manufacturing	-6.1	-10.3	-41.6	-7.4	4.8	15.6	5.8	12.2
Power & Communication	14.7	3.0	-2.4	-14.1	-11.7	-9.6	4.9	14.1
Mining & Petroleum	27.8	17.8	-23.3	17.4	16.4	16.5	19.0	7.3
Residential Fixed Investment	0.8	0.4	4.8	8.4	10.3	7.2	-3.2	-6.1
Exports	8.7	-5.4	-2.3	1.8	8.4	6.7	6.3	8.6

Year	2000	2001	2002	2003	2004	2005	2006	2007
Imports	13.1	-2.7	3.4	4.6	10.7	6.2	6.2	4.5
Federal Government	0.9	3.9	7.0	6.9	5.2	2.0	2.8	1.1
State & Local Government	2.7	3.2	3.1	0.6	0.4	1.5	1.3	1.9
Prices, Percent Change, Annual Rate								
GDP Deflator	2.2	2.4	1.7	2.0	2.6	2.8	2.6	1.9
Consumer Prices	3.4	2.8	1.6	2.3	2.7	3.4	2.5	1.8
Other Key Measures								
Oil – WTI (\$ per barrel)	30.35	25.96	26.11	31.12	41.47	56.56	61.50	59.00
Productivity (%change)	2.6	2.6	4.0	3.8	3.4	2.6	2.3	1.9
Industrial Production (% change)	4.3	-3.5	0.1	0.6	4.1	3.1	3.5	2.6
Factory Operating Rate	80.3	74.1	73.3	73.7	77.1	78.8	79.9	79.2
Nonfarm Invent. Change (Bil. of 2000 \$)	57.8	-31.8	15.2	15.4	49.9	21.9	34.3	32.1
Light Vehicle Sales (Million units)	17.34	17.12	16.82	16.64	16.87	16.82	16.59	16.65
Housing Starts (Million units)	1.573	1.601	1.710	1.854	1.950	2.066	1.898	1.813
Unemployment Rate (%)	4.0	4.7	5.8	6.0	5.5	5.1	4.8	4.9
Federal Surplus (Unified, FY, bil. \$)	237	127	-158	-377	-413	-318	-367	-309
Current Account Balance (Bil. \$)	-416	-389	-475	-520	-668	-817	-929	-942
Federal Funds Rate (%)	6.24	3.89	1.67	1.13	1.35	3.21	4.67	4.75
10-Year Treasury Note Yield (%)	6.03	5.02	4.61	4.02	4.27	4.29	4.80	4.98
Exchange Rate, Major Trading Partners	1.000	1.060	1.044	0.916	0.840	0.825	0.809	0.753
Personal Income (% change)	8.0	3.5	1.8	3.2	5.9	5.4	6.2	5.4
Real Disposable Income (% change)	4.8	1.9	3.1	2.4	3.4	1.4	3.8	3.0
Saving Rate (%)	2.4	1.8	2.4	2.1	1.7	-0.5	-0.1	0.3
Disposable Income (%change)	7.5	4.1	4.6	4.3	6.1	4.2	6.1	5.0
Long-Term Forecast of the U.S. Economy								
Year	2008	2009	2010	2011	2012	2013	2014	2015
Composition of Real GDP, Percent Change								
Gross Domestic Product	2.9	3.2	3.0	2.8	2.7	2.8	3.0	3.0
Total Consumption	2.8	3.1	3.2	2.8	2.5	2.5	2.7	2.8
Durables	3.7	5.1	5.2	4.6	3.9	3.7	4.2	4.5
Nondurables	2.4	2.8	2.8	2.4	2.2	2.3	2.4	2.5
Services	2.8	3.0	3.0	2.7	2.4	2.4	2.6	2.7
Nonresidential Fixed Investment	3.7	4.7	4.2	3.6	4.2	4.8	5.0	4.7

Year	2000	2001	2002	2003	2004	2005	2006	2007
Equipment & Software	5.4	5.9	5.2	4.6	4.8	5.3	5.7	5.5
Information Processing	8.5	8.8	8.2	7.8	8.0	7.9	7.8	7.5
Equipment								
Industrial Equipment	2.2	1.6	0.7	0.3	0.9	2.4	3.2	3.4
Transportation equipment	2.4	5.1	3.9	1.9	1.4	2.5	3.7	3.6
Aircraft	11.6	7.7	6.4	5.2	3.5	3.3	3.8	4.0
Other Equipment	2.3	1.9	1.5	1.3	1.5	2.0	2.6	2.7
Structures	-1.1	1.3	1.1	0.7	2.5	3.4	3.0	2.5
Commercial & Health Care	3.2	0.4	1.1	1.2	2.4	3.2	3.4	2.7
Manufacturing	17.5	18.5	10.1	7.3	5.7	4.5	3.5	2.9
Power & Communication	-0.4	0.5	5.0	0.7	2.3	2.8	2.3	1.5
Mining & Petroleum	-15.1	-7.2	-11.3	-11.3	-3.3	1.4	-0.3	0.4
Residential Fixed Investment	-2.4	-1.9	0.6	1.6	-0.1	0.3	1.7	2.3
Exports	9.9	9.3	7.6	7.5	8.0	7.8	7.4	7.2
Imports	3.6	5.4	5.5	4.7	4.4	4.5	4.8	4.9
Federal Government	0.9	0.7	1.1	0.5	1.0	0.9	0.9	0.9
State & Local Government	1.3	1.9	1.4	1.5	1.3	1.6	1.6	1.6
Prices, Percent Change, Annual Rate								
GDP Deflator	2.0	2.1	2.0	2.0	2.0	2.0	1.9	1.9
Consumer Prices	2.0	1.9	1.9	2.0	2.1	2.2	2.2	2.1
Other Key Measures								
Oil - WTI (\$ per barrel)	56.92	53.55	50.33	48.75	47.95	48.41	49.48	50.52
Productivity (%change)	2.2	2.4	2.5	2.6	2.6	2.6	2.6	2.7
Industrial Production (% change)	2.3	3.0	2.7	2.8	3.1	3.2	3.4	3.4
Factory Operating Rate	78.8	79.1	78.8	78.7	78.9	79.0	79.0	78.9
Nonfarm Invent. Change (Bil. of 2000 \$)	31.7	45.8	44.8	44.1	45.0	48.5	53.3	55.9
Light Vehicle Sales (Million units)	16.84	17.07	17.46	17.74	17.85	17.94	18.02	18.08
Housing Starts (Million units)	1.755	1.692	1.680	1.683	1.648	1.637	1.649	1.676
Unemployment Rate (%)	4.9	4.9	4.9	5.0	5.1	5.1	5.0	4.9
Federal Surplus (Unified, FY, bil. \$)	-328	-317	-307	-291	-255	-272	-293	-324
Current Account Balance (Bil. \$)	-903	-886	-892	-885	-864	-848	-845	-844
Federal Funds Rate (%)	4.81	5.00	5.23	5.25	5.25	5.25	5.25	5.25
10-Year Treasury Note Yield (%)	5.28	5.55	5.75	5.75	5.75	5.75	5.75	5.75
Exchange Rate, Major Trading Partners	0.725	0.742	0.750	0.746	0.739	0.732	0.726	0.720

Year	2000	2001	2002	2003	2004	2005	2006	2007
Personal Income (% change)	5.5	5.8	5.6	5.1	5.0	5.2	5.3	5.4
Real Disposable Income (%change)	3.4	3.5	3.3	2.7	2.6	2.8	3.0	3.2
Saving Rate (%)	0.8	1.0	1.1	1.0	1.0	1.2	1.5	1.9
Disposable Income (%change)	5.5	5.5	5.3	4.8	4.8	5.0	5.2	5.3

Year	2016	2017	2018	2019	2020
Composition of Real GDP, Percent Change					
Gross Domestic Product	3.1	3.0	3.0	2.9	2.9
Total Consumption	2.9	2.8	2.7	2.7	2.6
Durables	4.7	4.6	4.4	4.2	4.0
Nondurables	2.7	2.7	2.7	2.7	2.8
Services	2.8	2.6	2.5	2.4	2.3
Nonresidential Fixed Investment	4.5	4.4	4.3	4.3	4.3
Equipment & Software	5.3	5.2	5.2	5.3	5.4
Information Processing Equipment	7.2	7.4	7.2	7.0	7.0
Industrial Equipment	3.1	2.9	3.1	3.6	3.6
Transportation equipment	3.5	2.7	2.8	2.8	3.0
Aircraft	4.2	4.3	4.5	4.4	4.6
Other Equipment	2.7	2.6	3.0	3.3	3.8
Structures	2.4	2.1	1.8	1.6	1.5
Commercial & Health Care	3.1	2.7	3.2	1.6	1.3
Manufacturing	1.7	1.2	1.6	1.8	1.0
Power & Communication	1.8	1.3	1.0	1.2	1.5
Mining & Petroleum	-0.5	-1.0	-4.9	0.1	0.6
Residential Fixed Investment	1.8	0.6	0.5	0.6	0.5
Exports	7.2	7.4	7.4	7.3	7.3
Imports	5.1	4.8	4.7	4.8	4.8
Federal Government	1.0	1.0	1.0	1.1	1.3
State & Local Government	1.7	1.6	1.5	1.4	1.5
Prices, Percent Change, Annual Rate					
GDP Deflator	1.8	1.9	1.9	1.9	1.9
Consumer Prices	2.1	2.1	2.1	2.1	2.1
Other Key Measures					
Oil - WTI (\$ per barrel)	50.85	51.15	51.42	51.68	51.96
Productivity (%change)	2.7	2.4	2.2	2.2	2.4
Industrial Production (%change)	3.4	3.4	3.5	3.5	3.6
Factory Operating Rate	78.9	79.0	79.2	79.2	79.4
Nonfarm Inventory Change (Bil. of 2000 \$)	58.4	58.4	61.4	64.1	66.7
Light Vehicle Sales (Million units)	18.09	18.13	18.31	18.59	18.79

Year	2016	2017	2018	2019	2020
Housing Starts (Million units)	1.684	1.675	1.668	1.656	1.638
Unemployment Rate (%)	4.8	4.8	4.7	4.7	4.6
Federal Surplus (Unified, FY, bil. \$)	-351	-380	-415	-445	-479
Current Account Balance (Bil. \$)	-836	-808	-762	-707	-646
Federal Funds Rate (%)	5.25	5.25	5.25	5.25	5.25
10-Year Treasury Note Yield (%)	5.75	5.75	5.75	5.75	5.75
Exchange Rate, Major Trading Partners	0.714	0.711	0.709	0.708	0.708
Personal Income (% change)	5.4	5.4	5.5	5.4	5.3
Real Disposable Income (%change)	3.2	3.2	3.2	3.1	3.1
Saving Rate (%)	2.1	2.5	2.9	3.3	3.7
Disposable Income (%change)	5.4	5.4	5.5	5.4	5.3

Year	2021	2022	2023	2024	2025
Composition of Real GDP, Percent Change					
Gross Domestic Product	2.8	2.8	2.8	2.9	3.0
Total Consumption	2.6	2.6	2.6	2.6	2.6
Durables	3.7	3.9	4.0	4.1	4.1
Nondurables	2.8	2.9	2.9	2.9	2.9
Services	2.3	2.3	2.2	2.3	2.3
Nonresidential Fixed Investment	4.4	4.5	4.6	4.6	4.8
Equipment & Software	5.5	5.6	5.7	5.9	6.1
Information Processing Equipment	7.1	7.1	7.0	7.0	7.1
Industrial Equipment	3.5	3.6	3.7	3.7	3.9
Transportation equipment	3.2	3.5	3.9	4.4	4.7
Aircraft	4.6	4.8	4.9	5.1	5.3
Other Equipment	4.0	4.5	5.0	5.4	6.0
Structures	1.4	1.7	1.6	1.5	1.6
Commercial & Health Care	1.0	1.2	1.3	1.0	1.4
Manufacturing	1.0	1.0	0.7	0.6	0.7
Power & Communication	1.8	1.9	2.1	2.5	2.7
Mining & Petroleum	0.9	3.1	2.1	1.3	0.0
Residential Fixed Investment	-0.1	0.1	0.2	1.1	2.2
Exports	7.3	7.2	7.3	7.2	7.2
Imports	4.7	5.1	5.2	5.3	5.5
Federal Government	0.6	1.0	1.0	1.0	1.0
State & Local Government	1.4	1.4	1.4	1.5	1.5
Prices, Percent Change, Annual Rate					
GDP Deflator	2.0	2.0	2.0	2.0	2.0
Consumer Prices	2.2	2.2	2.2	2.2	2.2

Other Key Measures

Oil – WTI (\$ per barrel)	53.78	55.05	56.71	58.08	59.49
Productivity (%change)	2.3	2.3	2.3	2.3	2.4
Industrial Production (%change)	3.6	3.7	3.8	3.8	3.9
Factory Operating Rate	79.6	79.9	80.0	80.1	80.3
Nonfarm Inven. Chg. (Bil. of 2000 \$)	67.8	72.6	76.4	81.2	86.9
Light Vehicle Sales (Million units)	18.91	19.09	19.26	19.47	19.69
Housing Starts (Million units)	1.605	1.585	1.567	1.572	1.595
Unemployment Rate (%)	4.6	4.6	4.6	4.7	4.7
Federal Surplus (Unified, FY, bil. \$)	-489	-517	-548	-578	-605
Current Account Balance (Bil. \$)	-569	-493	-411	-323	-237
Federal Funds Rate (%)	5.25	5.25	5.25	5.25	5.25
10-Year Treasury Note Yield (%)	5.75	5.75	5.75	5.75	5.75
Exchange Rate, Major Trading Partners	0.709	0.710	0.710	0.711	0.711
Personal Income (% change)	5.3	5.3	5.3	5.4	5.4
Real Disposable Income (%change)	2.9	3.0	2.9	2.9	3.0
Saving Rate (%)	4.1	4.4	4.8	5.1	5.5
Disposable Income (%change)	5.2	5.3	5.3	5.3	5.4

Table B.2 Long-Term Outlook for Pacific Northwest

Real Gross Regional Product, NAICS Based	Average Annual Growth				
	2000-2005	2005-2010	2010-2015	2015-2020	2020-2025
Total Gross Regional Product	2.9	2.5	3.7	3.5	3.4
Agriculture	0.0	2.8	2.9	3.0	3.1
Manufacturing	1.6	2.5	3.2	2.8	2.3
Mining	-2.3	0.8	0.2	-0.2	-0.5
Construction	-0.7	3.2	2.8	2.6	2.2
Trade, Transportation, & Utilities	3.7	3.3	2.8	2.5	2.2
Information	2.5	8.4	7.7	7.6	6.7
Financial Activities	3.2	3.2	2.8	2.4	2.0
Prof. & Business Services	3.3	5.7	5.2	5.1	4.6
Education & Health Services	4.3	4.7	3.9	4.2	4.0
Leisure & Hospitality	2.4	3.9	3.5	3.3	2.9
Other Services	2.5	2.4	2.0	1.6	1.3
State & Local Govt.	1.5	1.9	1.7	1.1	0.8
Federal Govt.	2.7	0.2	-0.4	-0.7	-1.2
Housing					
Total Housing Starts	5.0	-4.6	-0.4	-1.3	-0.7
Single-Family	6.8	-4.9	-1.0	-1.8	-1.5
Multifamily	-1.1	-3.5	1.8	0.5	1.3

Real Gross Regional Product, NAICS Based	Average Annual Growth				
	2000-2005	2005-2010	2010-2015	2015-2020	2020-2025
Resident Population					
Total Population	1.2	1.1	1.0	1.0	0.9
Net Migration	-1.9	0.3	0.7	0.4	1.3
Households	1.4	1.4	1.2	1.1	1.0
Personal Income					
Total Personal Income	3.8	5.8	5.6	6.2	6.3
Real Personal Income	1.6	3.6	3.0	3.4	3.4
Real Disposable Income	3.5	2.4	2.8	3.4	3.4
Real Per Capita Income	0.4	2.5	1.9	2.3	2.4
Avg. Household Income	2.3	4.4	4.4	5.0	5.1
Avg. Annual Wage	2.5	4.4	4.1	4.9	5.1
By Place of Work					
Wages and Salaries	3.1	5.7	5.0	5.9	6.1
Manufacturing	-1.0	4.8	4.4	5.3	5.2
Construction & Mining	3.0	3.6	3.0	4.0	4.0
Trade, Trans., & Utilities	2.7	5.5	4.6	5.5	5.6
Information	-0.7	7.2	6.4	7.4	7.7
Financial Activities	5.6	4.6	3.8	3.7	3.6
Prof & Business Svcs.	3.7	9.4	8.3	8.9	8.9
Educ & Health Services	5.9	7.0	5.5	7.1	7.4
Leisure & Hospitality	4.1	6.1	4.3	5.4	5.4
Other Services	2.3	5.4	4.3	5.5	5.5
Government	4.4	3.9	3.3	3.7	3.6
Other Labor Income	7.3	5.6	5.8	6.4	6.4
By Place of Residence					
Property Income	-0.3	6.5	6.5	6.7	6.5
Proprietor's Income	6.4	6.2	6.0	6.3	6.1
Farm Proprietor	6.8	-8.2	-4.9	-3.7	-4.8
Business Proprietor	6.4	6.2	6.0	6.3	6.1

Table B.3 Long-Term Outlook for Washington

Real GSP, NAICS Based	Average Annual Growth				
	2000-2005	2005-2010	2010-2015	2015-2020	2020-2025
Total GSP	2.5	3.7	3.4	3.5	3.3
Agriculture	0.0	0.2	-0.2	-0.6	-1.0
Manufacturing	-0.9	0.4	0.1	-0.2	-0.6
Mining	-2.4	0.5	-0.2	-0.7	-1.1
Construction	-0.2	2.5	2.0	1.7	1.2
Trade, Transportation, & Utilities	3.7	2.9	2.4	2.1	1.7
Information	2.0	8.9	8.1	8.0	7.0
Financial Activities	3.5	3.0	2.5	2.1	1.6
Prof. & Business Services	4.0	6.2	5.6	5.6	5.0
Education & Health Services	3.8	5.2	4.6	4.5	4.1
Leisure & Hospitality	2.5	4.0	3.7	3.6	3.1
Other Services	2.6	3.2	2.7	2.1	1.7
State & Local Govt.	1.6	1.9	1.6	1.0	0.6
Federal Govt.	3.6	0.4	-0.3	-0.6	-1.2
Housing					
Total Housing Starts	3.9	-4.8	-1.3	-1.8	-1.5
Single-Family	6.8	-5.4	-1.9	-3.0	-2.8
Multifamily	-4.0	-2.6	0.8	1.3	1.2
Resident Population					
Total Population	1.2	1.0	1.0	1.0	0.9
Net Migration	-5.9	0.8	1.3	0.7	2.2
Households	1.4	1.4	1.1	1.1	1.0
Personal Income					
Total Personal Income	3.7	5.8	5.6	6.4	6.6
Real Personal Income	1.5	3.6	3.0	3.6	3.7
Real Disposable Income	3.5	2.3	2.8	3.6	3.7
Real Per Capita Income	0.3	2.5	2.0	2.6	2.8
Avg. Household Income	2.3	4.4	4.4	5.2	5.5
Avg. Annual Wage	2.5	4.9	4.5	5.4	5.6
By Place of Work					
Wages and Salaries	3.1	6.0	5.2	6.3	6.5
Manufacturing	-1.4	4.7	4.0	5.1	4.9
Construction & Mining	3.6	3.3	2.7	3.5	3.5
Trade, Trans., & Utilities	2.7	5.7	4.8	5.8	5.9
Information	-1.0	7.9	6.9	7.9	8.1
Financial Activities	6.6	4.7	3.9	3.8	3.7
Prof & Business Svcs.	3.7	9.9	8.7	9.5	9.5
Educ & Health Services	5.0	7.7	6.1	7.8	8.0

Real GSP, NAICS Based	Average Annual Growth				
	2000-2005	2005-2010	2010-2015	2015-2020	2020-2025
Leisure & Hospitality	4.1	6.5	4.6	6.0	6.0
Other Services	1.1	5.8	4.5	5.9	6.0
Government	4.9	3.8	3.3	3.6	3.5
Other Labor Income	7.6	4.6	4.9	5.6	5.6
By Place of Residence					
Property Income	-0.4	5.3	5.6	6.3	6.6
Proprietor's Income	6.7	6.0	6.1	6.3	6.1
Farm Proprietor	-0.4	-5.3	-3.0	-2.2	-3.6
Business Proprietor	6.9	6.2	6.2	6.3	6.1
Transfer Payments	6.2	6.4	6.9	7.4	7.5

Appendix C. Review of Agricultural Sector Forecast

Memorandum

Date: August 1, 2006

From: Andreas Aeppli
Paul Bingham
Global Insight, Inc.

To: Michael Fischer
Cambridge Systematics, Inc.

Cc: Jefferson Clarke
Global Insight

Subject: Washington Rail Capacity Study - Agricultural Sector Forecast

This memorandum is in response to some questions that have been raised about Global Insight's forecast for the agricultural sector in the Washington State Rail Capacity study. Specifically, we have been asked to relate it to the December 2005 *Washington State Labor Market and Economic Report*, and other available information on projected agricultural production and employment. Forecasting agricultural production is complex, in that it is heavily dependent on exogenous factors such as government policies, competitive effects, and weather that are difficult to predict over a longer period in ways that are not present in most other economic sectors. As a result, while there is a plethora of historical production data, there is little in the way of general long-term forecasts.

Given the general lack of comparable data, Global Insight undertook an analysis that sought to illuminate these issues in several ways:

- 2005 industrial sector employment and projections were compared between the *Washington State Labor Market and Economic Report* and the Global Insight forecast. This comparison identified the similarities and differences in base year data and the forecasts, and provides a context for the agriculture forecast.
- Agricultural production data and forecasts from other sources were examined and compared with Global Insight's own forecasts.
- Finally, through interviews with individuals that are familiar with Washington State agriculture, we sought to corroborate the forecast data and identify any trends and issues that could influence our conclusions about the prospects for Washington's agricultural sector.

Throughout our effort, we were not able to find any information that materially contradicts Global Insight's forecast for Washington State's agricultural production through the next twenty years. In fact, the very difficulty of forecasting agricultural production makes long-term

forecasts a rarity, and, when they are done, they are usually performed on a one-time basis for a particular crop such as apples, etc.

Sector Employment Projections

Comparisons of the projections of state employment made by the Washington State Employment Security Department, as published in their December, 2005 *Washington State Labor Market and Economic Report* show differences from Global Insight's Washington State Regional model forecasts, where they can be compared. For purposes of the Rail Capacity study, the state's six-year projections out to 2012 do not provide a long enough time series for use as inputs to longer-term transportation infrastructure demand analysis. The projections of employment also do not provide matched long-term projections of the real value of production by sector, which is especially important in capital intensive goods producing and extractive industries where production value is a better predictor of freight volume generation than employment.

Comparison of the 2005 industry sector employment data published in December of 2005 by the Washington State Employment Security Department reveal some differences with industry category employment data from the U.S. Bureau of Economic Analysis (BEA) used by Global Insight.¹ The U.S. BEA is the source for the historical state (and national) employment data used by Global Insight in our forecast models. The differences may be mostly due to the fact that 2005 was not over when the Employment Security Department published their data while Global Insight used the actual historical data as published by the U.S. BEA not released until 2006. It is also possible that there are other definitional differences that account for the variance between these two sets of data due to timing or sub-category coverage. With the exception of the 'Other Services' category, the differences are not large. The Washington State Employment Security Department data, as published in the *2005 Washington State Labor market and Economic Report* are compared to the US BEA series used by Global Insight in Table 1 below and on the following page.

¹ Though the Washington State Employment Security Department also publishes employment data by occupational classification,, as Global Insight did not forecast occupational code-classified state employment to use in the rail capacity study, no comparison against those Washington State projections is possible.

**Table 1: Summary Comparison of Global Insight
and Washington State Employment Security Department
Economic Sector Employment Data for 2005**

Major Industry Division	Employment 2005	
	Global Insight (U.S. BEA)	Employment Security Department
Total	2,779,383	2,694,148
Trade, Transportation and Utilities	531,950	502,333
Government (including public education)	526,733	498,770
Education and Health Services	329,817	299,573
Manufacturing	271,967	259,349
Professional and Business Services	317,600	292,711
Leisure and Hospitality	262,867	250,747
Construction	177,200	151,691
Financial Activities	154,467	148,123
Information	95,125	91,741
Natural Resources, Agriculture, Forestry, Fishing and Mining	89,227	85,275
Other Services	102,775	73,528

The long-term Washington State economic forecasting model used by Global Insight uses as an input a long-term macroeconomic trend scenario that dampens out the influences of the business cycle over time to achieve smoother growth, in the sense that actual output approaches potential output in the economy. This projection is best described as depicting the mean of all possible paths that the economy could follow in the absence of major disruptions. (Disruptions such as large oil price shocks, untoward swings in macroeconomic policy, or excessively rapid increases in demand from stimulative fiscal or monetary policies.) Long-term, work force size and character is influenced by projections of population demographics. The population projections in Global Insight's forecast are built on the U.S. Census Bureau's latest "interim" projections. The population projections are based on specific Census Bureau assumptions about immigration, fertility, and mortality rates. The aging of the population affects the availability of labor and consumption patterns, including such results as slower growth of the housing stock. Retirements of the baby-boomers also affect government outlays, including growth in federal entitlement program spending, despite higher social security taxes, that puts pressure on federal transfers to the Washington State and local governments and shows up as reductions in growth in other federal programs and in federal government employment.

Using the available data to compare only the beginning of the study forecast period, we have constructed a comparison of the published Washington State Employment Security Department employment forecast by industry and the Global Insight employment forecast for the same period. This summary comparison is in Table 2, below, as average annual percent growth over the 2007 to 2012 period. The organization and definition of industry sectors here are the same as used by the Employment Security Department in their published forecasts. These cover all

non-farm employment in Washington State. Total employment growth over this period is forecast by Global Insight to average 0.9% while the Employment Security Department forecast is for 1.3% growth over the same period. Looking at the sectors of the economy that result in this difference reveals that Global Insight's Washington State model forecasts more rapid growth during this period for the Information and Professional and Business Services sectors. For manufacturing, the contrast in employment forecasts is greatest with Global Insight projecting an average annual rate of decline over this period of 0.39% while the Employment Security Department forecast is for a gain of 0.2% average annual growth over this period. Global Insight's forecast of employment in construction and trade, transportation and utilities, leisure and hospitality and government sectors are all about half the average annual growth rate forecast by the Employment Security Department.

The reasons for the differences in outlook on a sector by sector basis are not possible to determine without knowing the assumptions made and the properties of the models used by the Washington State Employment Department that produce them. Global Insight's sectoral employment projections are based not only on employment time trends embedded in the historic employment series reported by the U.S. Bureau of Labor Statistics, but significantly are related to the projections for economic performance of each sector in terms of investment, demand growth from other sectors and consumers as well as the influences of competition between sectors of the economy for resources (e.g. investment capital and labor). Also influencing the Global Insight projections of goods producing and some services sectors are trade prices and supply competition from foreign producers, either affecting U.S. export markets or U.S. domestic markets supplied, at least in part, by imports.

**Table 2: Summary of Comparison of Global Insight
and Washington State Employment Security Department
Economic Sector Employment Forecasts**

Industry Sector	Average Annual Employment Growth Rate 2007 – 2012	
	Global Insight	Employment Security Department
Total	0.9%	1.3%
Construction	0.7%	1.2%
Manufacturing	-0.39%	0.2%
Trade, Transportation, Utilities	0.5%	1.1%
Information	2.6%	2.2%
Financial Activities	0.7%	0.8%
Professional and Business Services	2.5%	2.2%
Education and Health Services	1.2%	1.6%
Leisure and Hospitality	0.5%	1.1%
Government	0.7%	1.4%

Employment Base Year 2005 Data Source: US Bureau of Labor Statistics

Agriculture Sector Forecasts

Despite the current state of agricultural employment in Washington State showing another year-over-year decline,² what matters for the assessment of needs for transportation is the longer-term outlook for agriculture production, of which agriculture employment is but one factor. Over the long-term, many of the fruit and vegetable crops grown in Washington State face price competition from the increased globalization of trade, including reductions in barriers to agriculture products. While this can benefit Washington State growers in the cases where premium agricultural product exports can become more competitive, it also exposes growers to more international competition, especially as developing countries with low production costs and improving transportation infrastructure are able to sell into the U.S. market.

As an example of the influence on Washington State agriculture from trade globalization, Washington State asparagus production saw a significant decline over the last ten years due to the loss of Washington State market share to imports. In this case, producer countries such as Peru, following the opening of the U.S. market in accordance with the Andean Trade Preference Act, were able to deliver imported crops at a price and quality that made Washington State production less competitive, even within the U.S. This is but one example of the long-term impacts that the growing number of U.S. Free Trade Agreements are having on segments of U.S. and Washington State agriculture. There are other cases, such as in Washington State apple exports to India, where reductions in foreign trade barriers have helped Washington State exporters increase sales, but the longer-run agricultural production cost advantages of developing countries is still expected to generally favor foreign producers in competition with Washington State and other U.S. producers both in sales to foreign consumption markets and even inside the U.S.

Global Insight's long-term forecast for the real value of agriculture production in Washington State includes the value of farm crops, animals, fishing and forestry. Through 2010, Global Insight is forecasting growth at an average annual rate of 0.2% in the value of agricultural output in the state. Beyond 2010, a period for which there are no comparable Washington State Department of Employment Security projections, the real value of agriculture production in Washington State is forecast by Global Insight to decline modestly throughout the rest of the study forecast period to 2025. This reflects the combined effects of expected long-term reductions in forestry and agricultural output based on Washington State production costs that compare unfavorably to mostly foreign production costs. There are also the farm land valuation increases, especially in western Washington, that are a result of the influence of competing uses

² During the past 12 months, Washington State total agricultural employment declined 3.5%, from June 2005 to June 2006. The Department further reports that employment in food manufacturing has declined 0.5% over this same June 2005 to June 2006 period. Source: John Wines, Economic Analyst, Labor Market and Economic Analysis Branch, Washington State Employment Security Department, July 18, 2006 as posted on the Department's Internet site: http://www.workforceexplorer.com/admin/uploadedPublications/6868_JUNE06TOTALAG.pdf.

for land within the state, due to population increases and pressure from other industries as they continue to grow, despite constraints on land development.

For the agriculture sector, the Washington State Employment Security Department publishes separate forecasts of employment classified by occupational title rather than by industry. These are not directly comparable to Global Insight's sectoral forecasts, but should have some relationship to the overall employment in each sector. Like most forecasters, Global Insight does not forecast agricultural sector employment levels. For the industry sector that is described as agriculture, there are several occupational classifications that are relevant, including the Farming, Fishing and Forestry Workers, All Other category; the Logging Equipment Operators, and the Fallers occupational categories. Each of these occupational employment categories is forecast to decline over the period 2007-2012 by the Employment Security Department including an average annual growth rate of -0.1% for the Farming, Fishing and Forestry Workers, All Other category³.

Other Agriculture Forecasts

Publicly available data at the state level for agriculture sector indicators is limited to a few concepts for historical data. There are no official long-term agriculture forecasts published. There are four major national agencies producing U.S. industry sector level economic data: the Bureau of Economic Analysis (BEA), Bureau of Labor Statistics (BLS), Census, and the U.S. Department of Agriculture (USDA). All information below applies specifically to the aggregate NAICS two-digit industry sector category called the agriculture, forestry, fishing, and hunting industry sector (NAICS' sector code 11) and the three-digit disaggregates of this sector; Crop Production (NAICS code 111) and Animal Production (NAICS code 112).

- The BEA publicly provides Gross State Product (GSP) historical numbers for the agriculture, forestry, fishing, and hunting sector; but further disaggregation is a combined crop and animal production sector and forestry, fishing, and related activities sector. The BEA does not provide GSP forecasts or employment figures. The table below shows BEA's GSP historical numbers.

³ The Washington State Employment Security Department 2007-2012 forecast for the Logging Equipment Operators occupational category is for average annual growth of -2.0% and for Fallers is -2.1% over this period.

Table 3: Washington Gross State Product, billions⁴

Industry Sector	2000	2001	2002	2003	2004
Crop & Animal Production	2,559	2,266	2,492	3,090	3,626
Forestry, Fishing, Hunting	2,078	1,877	1,887	2,072	2,317
Total	4,637	4,143	4,379	5,162	5,944

- The Census Bureau provides state level employment data through its County Business Patterns database, however it does not provide any data for the Crop and Animal Production sub-sectors. The Census Bureau only provides industry sub-sector employment data for the Forestry, Fishing, and Hunting sub-sectors (113, 114, 115, respectively). Additionally, the last history year available currently is 2002.⁵
- The BLS does not provide state-specific employment data for industry sub-sectors for the agricultural sector. It aggregates all natural resource industries with the mining sector⁶.
- The USDA provides the most complete historical data for the agricultural sector. It does not publicly provide state-specific employment and output forecasts. For 2002, the last history year, USDA estimated the farm production industry sector employed 82,714 workers⁷.

Discussions with Sector Experts

Global Insight found the following from interviewing industry experts in the field of agriculture:

- The largest crop production industry in Washington state, apples, is responsible for approximately 25% of receipts. Similar to other tree fruit sectors, over the long-term, the apple industry will be under pressure from future competition from other country producers with access to low-cost labor, especially in South America and Asia. This also eventually includes competition for cherry producers, another staple tree fruit industry in Washington.

⁴ Bureau of Economic Analysis, <http://www.bea.gov/region/gsp/>.

⁵ Census Bureau, County Business Patterns; Web page: <http://www.census.gov/econ/census02/>.

⁶ Bureau of Labor Statistics, Web page: <http://www.bls.gov/sae/home.htm>.

⁷ United States Department of Agriculture, Web page: http://www.ers.usda.gov/Data/FarmandRelatedEmployment/ViewData.asp?GeoAreaPick=STAWA_Washington.

- Wheat production, responsible for about 10% of farm receipts, is likely to face a decline long-term as foreign producers capture market share at the expense of U.S. growers. The major foreign competitors in this sector, Australia, Argentina, and Russia, have lower land values and improving transportation infrastructure eventually giving them production cost advantages for wheat exports.
- Grape production is facing a glut as many states and foreign countries have increased their vineyard production over the last several years. This has been evident with the downward price pressure on world grape supplies. Additionally, South American wine producers have penetrated the U.S. market in an industry beleaguered already from low-cost, fair-quality imports from countries such as Australia.
- The arid conditions in eastern Washington provide a competitive disadvantage compared to mid-western producers for many crops. This, combined with high east-bound transportation costs, has led the Washington growers to export their produce overseas, primarily to Asia. Following the Asian economic collapse in 1997, exports dropped substantially seriously affecting the Washington agricultural economy. Apple tree acreage was especially hit as lower prices have pushed uneconomical land out of production. Export volumes have grown into China recently but Japanese demand has not returned to past growth levels.
- Although Washington farmers have creatively diversified acreage into a variety of crops, there is no new high volume, high revenue crop on the horizon that will substantially boost the overall long-term agricultural outlook.
- Ethanol is not a likely option, as the dry climate makes large-scale fiber/starch production uneconomical. This view was supported by a Battelle Memorial Institute study in the late 1980's examining the potential for ethanol. The conclusions of the study found that field production volumes were insufficient to support an ethanol conversion plant. Given changes in technology, markets, and pricing, the current environment may well be more conducive, but it is likely that the bottom line answer will be the same.

Conclusions

From the perspective of the Washington Transportation Commission, at issue is the significance of transportation costs to agricultural production compared with other factors. Intense international and domestic competition have resulted in slim operating margins for many Washington State agricultural producers, of which sensitivity to transportation pricing and service quality is only one factor. This sensitivity is highly variable, based on product characteristics, production costs, and market competition. In the case of high-volume, low-cost commodities such as grains, sensitivity to transportation cost is readily apparent. Very modest changes in transportation pricing can and do direct whether grain produced in the Upper Midwest is shipped out through Gulf Coast ports or the Pacific Northwest.

The overarching goal of any public initiatives should be to help maintain and improve the competitive position of the sector in a cost-effective manner. Direct involvement in

transportation is certainly one component, and one that perhaps can be more readily measured and managed than some others. A key goal of the rail capacity study is to develop policy packages that can achieve this objective.

A.E.A.

P.H.B.