NOVEMBER 2006

REGIONAL FREIGHT AND GOODS MOVEMENT ACTION PLAN

Draft Profile of the Regional Freight Transportation System

in the Portland-Vancouver Metropolitan Region

METRO

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The Regional Transportation Plan

Metro

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Draft

Profile of the Regional Freight Transportation System

in the Portland-Vancouver Metropolitan Region

November 2006

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Executive Summary

This paper provides background information on the Portland-Vancouver region's freight transportation system in order to provide context for the Metro Regional Freight and Goods Movement Action Plan (FGM Action Plan). The FGM Action Plan is an element of Metro's comprehensive Regional Transportation Plan (RTP), and is being completed in coordination with the 2035 RTP Update, which has an expected completion date of November 2007.

The FGM Action Plan will identify regional freight system needs – including transportation, economic and community needs – and will evaluate a series of potential solutions to meet goals identified by Metro, its local jurisdiction participants, and stakeholders. The plan is being developed under the guidance of the Freight and Goods Movement Task Force, composed of 34 regional stakeholders representing both the private and public sectors.

In this first background report of the FGM Plan, four key topics are discussed:

- Global economic trends and their opportunities and effects on freight movement, both nationally and regionally;
- An inventory and description of the regional multimodal freight transportation system and services;
- The public policy context that governs the public's investments in freight mobility systems; and
- A review of logistics practices utilized by shippers to ensure that the products shipped by suppliers to their facilities, and the finished products shipped to customers, are delivered according to desired delivery schedules.

These four topic areas drive the discussion of freight mobility and the considerations by public and private partners when evaluating system performance, congestion effects, access to markets, and how to incorporate system improvements into the community with adverse impacts. Interested stakeholders need to consider all of these components in order to provide the highest quality environment for current and future residents and businesses.

Organization of this Paper

This background paper is organized around the following four subject areas:

Section I. The Effect of Global Trends on Freight Movement – The demands on the regional freight and goods movement transportation system are growing in a dynamic manner that is influenced by market needs and opportunities throughout the world. As the Portland-Vancouver region is an international hub, its suppliers, manufacturers, customers and carriers are directly tied into both the domestic and international forces that are currently producing record levels of commodities, which are anticipated to double – in terms of tonnage – over the next twenty years. This upward trend will influence regional transportation and economic needs with respect to the efficient and effective performance of the transportation system and services.

Section II. Profiles of Freight Transportation Modes in the Portland-Vancouver Metropolitan Region – The regional freight transportation system is uniquely positioned to handle a wide diversity of freight given that it is served by several interstate highways, two Class 1 railroads, five short-line railroads and terminal switching railroads, trans-oceanic ship services, a river barge network, commercial airport, and a petroleum pipeline system. Shippers use all of these systems to maximize access to far off and local markets. With the variety of modes and carriers within most of the modes, regional shippers enjoy very competitive shipping cost structures. Demand on each of these systems is expected to grow, and while usage of modes other than public highways is very much in the public interest, the non-highway systems are controlled and operated by private organizations with unique business models and shipping characteristics.

Section III. Public Policy and Freight Mobility – The public policies guiding investment decision-making about freight mobility are relatively straightforward with regard to highways that carry relatively large volumes of trucks. That is, the region has established truck routes and designs streets on truck routes to safely accommodate truck traffic. State and federal laws are also tied to policies regarding truck equipment dimensions and weights, as well as various truck safety features and regulations. Many local jurisdictions have developed facilities and streets that accommodate trucks near industrial areas, as well as programs to control and/or restrict movements by trucks on local streets. While the bulk of public policy in this area is focused on highway modes, the state and regional policy also recognize the critical importance of non-highway modes to the economy and community.

Section IV. Logistics Profiles – It is essential to understand how shippers manage the inbound and outbound flows of goods before making recommendations about the transportation systems they rely on. While logistics practices have always been used to organize the movement of freight, today's shipping environment is far more highly customized with respect to the size, specialization, handling, inspection, and packaging of goods. Shippers often employ strategies to mitigate for unforeseen impediments in shipping schedules, and monitor the progress of shipments throughout their trips. Meeting customer delivery schedules is so critical because they are often tied directly to production processes, which are often integrally linked with other production processes. While each company uses a different set of logistics practices to meet their particular requirements, the four Logistics Profiles provided in this section are examples of the kinds of internal decision-making being made by shippers to meet the needs of their customers.

This background report sets the stage for the discussions regional stakeholders will be having about how to address the anticipated increase in freight activity throughout the regional transportation system. It is intended to provide particular focus on the relationship between freight movement and the opportunities and needs that will be evaluated throughout the Regional Transportation Plan process.

Section I: Effects of Global Trends on Freight Movement

A convergence of global and national trends is creating significant change in the movement of freight: increasing its importance to the national and regional economy; altering distribution and logistics industry practices; and effecting transportation infrastructure and the evolution of communities. A basic understanding of the forces shaping the future of freight movement, both globally and here in the Portland-Vancouver metropolitan region, is essential to the development of effective strategies to address its needs and impacts.

The distribution and logistics industry includes businesses involved in the shipping, storage, and delivery of freight and packages.

This section provides an overview of global and national trends and their impacts on the movement of freight. It also explores innovations in the distribution and logistics industry in response to the changes. These trends are essential considerations for the development of an effective plan of action for this region's freight and goods movement.

The Global Economy

The global economy is in the midst of change as profound in its effect on society as the Industrial Revolution. As mechanization led to large-scale production capabilities in the 19th century, 21st century innovations in trade policy, communications, and transportation have altered the sourcing, production, and marketing of products on a global scale.[1]

With the liberalization of policies that lower trade barriers between countries, more freight is moving across international borders than ever before. The use of trade policy to protect national industries is being replaced by those aimed at creating economic development opportunities beyond national borders.

Between 1970 and 1999, the share of U.S. gross domestic product attributed to trade in goods and services has grown from 11% to 27%.

Trade: From National to Global Markets, FHWA, 2000

A prime example of changing trade policy is the formation of multinational economic trading blocks. The North American Free Trade Agreement (NAFTA) between the United States, Canada, and Mexico exemplifies this trend. Fully executed in 1994, NAFTA reduced tariffs and quotas on goods traded between the three countries. Today Canada and Mexico comprise nearly one-third of U.S. international merchandise trade. In the future, NAFTA trade as well as trade with other Latin America countries will continue to create increased demand on north-south shipping lanes.

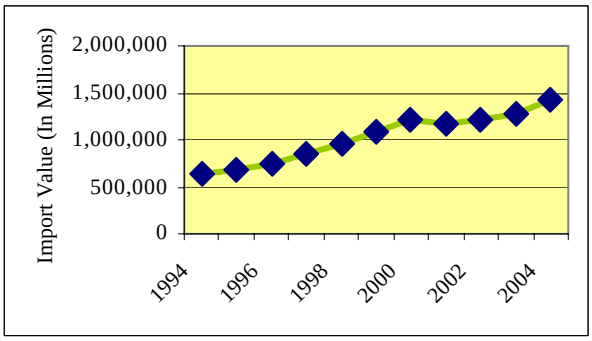
Beyond NAFTA, the U.S. has over 200 international trading partnerships, including a number of free-trade agreements with countries such as Australia, Chile, India, Israel, and Singapore. Additionally, the U.S. is negotiating free trade agreements with another half dozen nations. All told, free-trade agreement countries represented 42% of US trade exports in 2005.[2]
The Pacific Rim represents the greatest trade growth outside NAFTA countries. Half of the top ten U.S. trading partners, measured by value, are located in Asia; with Japan and China alone

[1] Martin E. Robins and Anne Strauss-Wieder, *Principles for a U.S. Public Freight Agenda in a Global Economy*, The Brookings Institution Series on Transportation Reform, January 2006, pg. 5.
[2] *The 2006 National Export Strategy Report,* Trade Promotion Coordinating Committee, Washington D.C., 2006.

accounting for over 18% of total U.S. trade.[3] The emerging economies of China and India represent some of the fastest growing markets for U.S. exports, with both countries growing at a rate over 20% between 2004 and 2005.[4]

Even more significant is the growth of imports to the U.S. Figure 1.1 shows the steady growth in import as measured by value (in 2000 dollars). In 2005, the U.S. import trade was valued at $1,671 billion dollars, 45% higher than the value of U.S. exports.[5] In general, the growth in international trade is putting pressure on U.S. gateways to accommodate ever-larger volumes of goods movement, particularly along the West Coast of the U.S.

Figure 1.1 – Growth in U.S. Imports (1994-2004)



Source: Foreign Trade Statistics, US Census Bureau
Import value measured in 2000 dollars

Information Technology

Information technology is a primary facilitator of the transition to a global economy. The rise of worldwide communication networks allow for the inexpensive and instantaneous transfer of knowledge around the globe. These networks allow complex supply chains to become better integrated and more efficient, and has supported innovations such as coordinated logistics. Using current communication tools, businesses can more easily disperse operations around the world to take advantage of low-cost or high-skilled labor markets as well as access to raw materials improving their competitive advantage in the global marketplace.

The advent of 21st century communication technology has spawned new businesses tools and models that impact the distribution of goods and services. The most notable advance in business models is *electronic business* (e-Business) and *electronic commerce* (e-Commerce).

E-Business refers to the use of electronic media such as the Internet, other computer networks, and wireless transmissions, to conduct a full array of business activities such as sales and marketing, customer service, and collaboration with partners. E-Commerce more specifically refers to the buying and selling of goods on the Internet. These e-business/commerce innovations are at the core of the highly efficient distribution and logistics industry practices. For example, carriers such as FedEx and UPS have invested heavily in information technologies to facilitate the movements of goods. A shipping company like DHL can now link more than 635,000 destinations in more than 230 countries.[6]

[3] Freight in America 2006, 46.
[4] *NAFTA Partners Lead Strong U.S. Export Growth*, International Trade Administration, International Trade Update Newsletter, July/August 2006.
[5] Foreign Trade Statistics, US Census Bureau, 2005
[6] *Trade: From National Markets to Global Markets*, FHWA Freight Management Working Papers, 2000, pg. 10.

E-Commerce refers to both consumers using the Internet to purchase goods and services online (business-to-consumer, or B2C), as well as businesses selling and communicating with other businesses through the Internet (business-to-business, or B2B). E-Commerce vastly improves accuracy in shipping and reduces administrative expenses. Customers can quickly and efficiently order goods that can be shipped directly by businesses. Customers and shippers are provided with real-time travel information about the location of packages through electronic container seals and software allowing transactions to be completed instantaneously.

The rise of business-to-consumer e-commerce has increased shipping demand and expanded the distribution and logistics industry. Consumers expect that goods can be shipped virtually anywhere in the world overnight. At the same time, distribution and logistics businesses have taken advantage of e-business solutions to realize greater efficiencies within their businesses, often through third-party services. The result is a growth in smaller and more frequent shipments, which increases demand on the transportation system.

The drive for efficiencies has triggered rapid advances in the application of information technology tools to organize and track freight shipments. An emerging trend is the use of radio frequency identification (RFID) tags to track pallets and equipment. RFID technology allows a scanner to read detailed information at a distance, greatly improving data accuracy and time savings. Organizations like Wal-Mart, Target, and the Department of Defense have RFID initiatives requiring suppliers to use the tags, effecting thousands of companies worldwide[7]. Real-time communication tools like global position devices, cell phones, and Internet are linking trade partners more efficiently than ever before.

Supply Chain

A key outcome of globalization is that goods travel greater distances. As the costs of technology and transportation have fallen, industries have been able to develop complex supply chains that seek out competitive advantages for different parts of the supply chain. Companies may outsource different business functions across several different countries to reduce costs and improve operations. Access to good transportation service has played a crucial role in allowing supply chains to become more complex - both longer and highly specialized.

*A **supply chain** is a coordinated network of organizations, people, activities, information and resources involved in moving a product or service from supplier to customer. It typically consist of manufacturers, service providers, distributors, sales channels (e.g. retail, ecommerce) and end consumers. Supply chain activities transform raw materials and components into finished products.*

For more than 20 years, companies have taken advantage of dependable and inexpensive transportation to reduce inventory and deliver goods *just-in-time*, in order to reduce warehousing costs while meeting highly efficient production schedules. Transportation modes have served as mobile storage to support this business practice.

More recently, the distribution and logistics industry has witnessed a shift away from a *push* to a *pull* business model for some sectors. In a traditional *push* model, goods are moved via larger shipments to distribution centers and replenished on fixed cycles. These goods are then *pushed* out to consumers based on demand. *Pull*-based models seek to shorten the time between manufacturing and point-of-sale. Customized goods are shipped in

[7] Tom Singer, *RFID & Logistics: Four Trends You Need to Know,* Manufacturing.Net, October 12, 2006.

smaller quantities directly to the customer. While inventory-based *push* models are not going to be replaced in the short term, the growth in e-commerce and direct-to-order commodities will facilitate the adoption of *pull*-based systems in the future. Like internet commerce, this business model's reliance on smaller, faster, and more frequent shipments contributes significantly to the growing volume of goods moving on the transportation system.

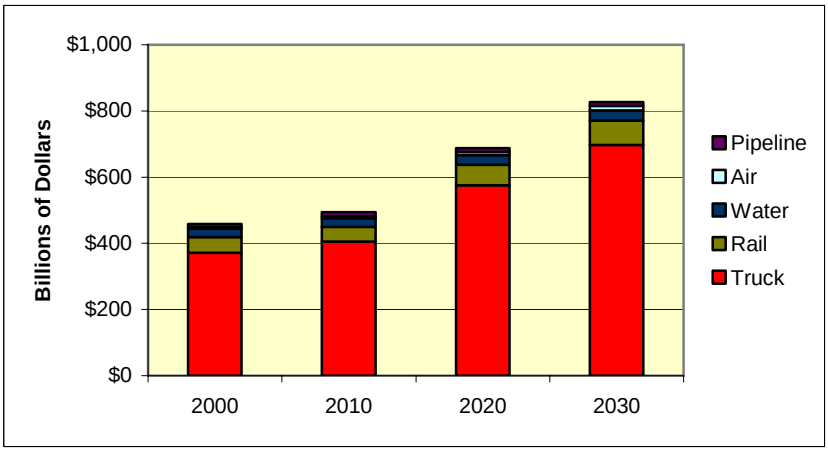
As supply chains have become more complex, they have also become more vulnerable to congestion, weather, and other events.[8] While distribution and logistics carriers have traditionally been organized around a single transportation mode, companies increasingly seek to optimize the balance between the use of marine, rail, highway, airport, and pipeline facilities. This practice, termed *coordinated logistics*, is intended to reduce cost and avoid disruption. Shippers use the transportation mode or combination of modes that can provide the highest level of service, most reliable transit time, and lowest cost for moving goods. Examples of these activities include the decision to truck goods long distances due to congestion or capacity issues on the rail system, or to use multiple ports rather than a single entry point for international shipping. Companies do not want to be dependent on a single means of shipping, and may even shift delivery routes while goods are in transit. To overcome potential impediments in the supply chain, companies often employ redundant shipping strategies to ensure their goods are delivered on time. The desire to minimize risk of delay in moving goods along a supply chain increases pressure on the intermodal transportation to work seamlessly as goods travel across miles and between modes.

The Growth in Freight

As a result of global trends previously described, international trade volumes are growing at an accelerating rate. According to the Bureau of Transportation Statistics and the Federal Highway Administration (FHWA), over 19 billion tons of freight, valued at $13 trillion, was carried over 4.4 trillion ton-miles in the United States in 2002.[9] On a typical day in the United States (2002), about 53 million tons of goods valued at about $36 billion moved nearly 12 billion ton-miles on the nation's multimodal transportation network. In terms of tons transported, domestic freight transportation for truck, rail, water, and air modes grew by 20 percent from 1993 to 2002 and is expected to increase by over 65 percent by 2020.[10] Within the Portland-Vancouver region, the 2002 Commodity Flow Survey forecasts a doubling of the demand for commodity tonnage shipments by 2030. In terms of value, commodities shipped to, from, through, and within the Portland-Vancouver region will increase from $457 billion dollars in 2000 to $824 billion dollars per year in 2030[11] (Figure 1.2).

[8] Martin E. Robins and Anne Strauss-Wieder, *Principles*, 7.
[9] Freight in America, 2006
[10] Freight in America, 2006
[11] *Commodity Flow Forecast Update and Lower Columbia River Cargo Forecast*, Port of Portland, June 30, 2002

Figure 1.2 – Forecasted Value of Commodity Shipments by Freight Mode for Portland-Vancouver Region



Source: Commodity Flow Forecast Update and Lower Columbia River Cargo Forecast, Port of Portland, June 30, 2002

While international shipments will continue to increase, U.S. domestic goods are also moving across longer distances. Nationally, nearly 60 percent of the value of freight shipments for all modes, worth $4.9 trillion, crossed state lines in interstate commerce.[12] As example, the 2002 Commodity Flow Forecast for the Portland/Vancouver region determined that a significant volume of goods movement is "pass through" traffic, not originating or destined for the region, but instead moving through on the roads, rails and waterways that connect the area to other regions. In terms of tonnage, this type of traffic is also forecast to double by 2030, with rail and truck movement forecasted to grow fastest.[13]

Constrained System Resources

The increased freight volumes are creating challenges for the nation's transportation infrastructure and for the distribution and logistics industry trying to efficiently move it.

Congestion

Across the nation, growth in international trade is straining the physical infrastructure intended to facilitate it. For marine terminals and airport infrastructure, the congestion and lack of physical space are exacerbated by the trade imbalances, particularly with Asia, where far more freight is moving into the U.S. than is moving out. For example, at the Ports of Los Angeles and Long Beach approximately three containers are imported for every one exported.[14]

Another factor in port congestion is the decline in facilities expansion. While tonnage at U.S. air and marine ports has increased by 13.8% between 1990 and 2000, physical capacity has only increased marginally. This is due to a combination of factors including the high cost of expansion in developed areas, lack of available undeveloped space, and concern about the community and environmental impacts of expansion.

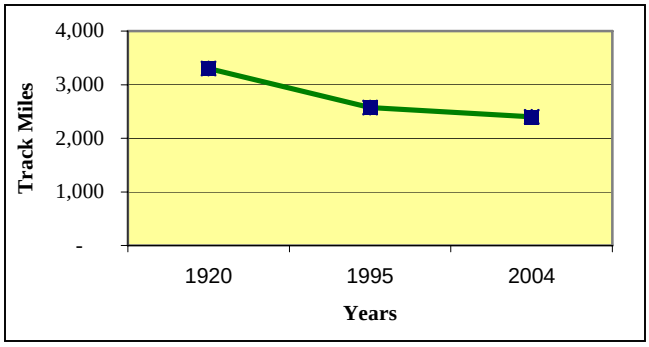
The increasing volumes particularly challenge the landside rail and road networks. Road network congestion poses a problem for all network users, but for businesses reliant on transportation, it has a number of adverse, and costly, effects. Congestion can increase costs through unmet

[12] Freight in America, 2006
[13] Ibid
[14] John Vande Vate, Frontline Solutions, March 2005

deliveries, added fuel costs, and driver wages. Companies have had to increase inventories, shift shipping to off-peak periods, or move distribution centers to better functioning locations. The 2005 *Cost of Congestion to the Portland Metropolitan Region Study* found that roadway congestion dampens the region's economic vitality, estimating that without adequate investments to transportation, the region's economy stands to lose $844 million annually by 2025.[15]

The impacts of congestion are also felt on the rail network. Since 1980, deregulation has led to a consolidation in the number of jobs and miles of rail line in the U.S. While overall productivity has increased, the rail system is facing challenges today and into the future. Despite a shrinking national rail network demand for rail service is at a near all-time high. The resulting increased demand on fewer rail miles forces lines to run at near capacity. Figure 1.3 shows the track decline in Oregon.

Figure 1.3 Oregon's Shrinking Rail Network



Source: Freight Rail and the Oregon Economy: Final Report, 2004

The Freight-Rail Bottom Line Report, commissioned by the American Association of State Highway and Transportation Officials (AASHTO), estimated that $175 to $195 billion of investment is needed over the next 20 years just to address the worst bottlenecks and maintain rail's current mode share.

The recent *Freight Rail and Oregon Economy: Final Report* found that rail congestion in the Portland Region, measured in terms of hours of delay, is almost half of Chicago's, despite the fact that Chicago handles almost six times more rail traffic.[16] Continued network congestion means rail companies turn away business, which shifts to comparable modes – most often truck.

Also, the high cost of capital investments in the rail industry makes it difficult for private companies to add new rail capacity that includes additional mainline, sidings, yard space, and equipment.

Labor

The distribution and logistics industry is also facing difficulty hiring and retaining employees. Difficult working conditions, high turnover, and an aging workforce are contributing to a shortage in the number of available train and truck drivers. The American Trucking Association predicts a shortage as high as 111,000 long-haul truck drivers by 2014.[17] The declining number of younger workers entering the trucking business exacerbates this number. According to the U.S. Bureau of Labor Statistics, the number of

A BB&T Capital Research report predicts that "the demand for drivers will be three times as high as the available supply for the next few years, constraining growth and raising trucking rates."

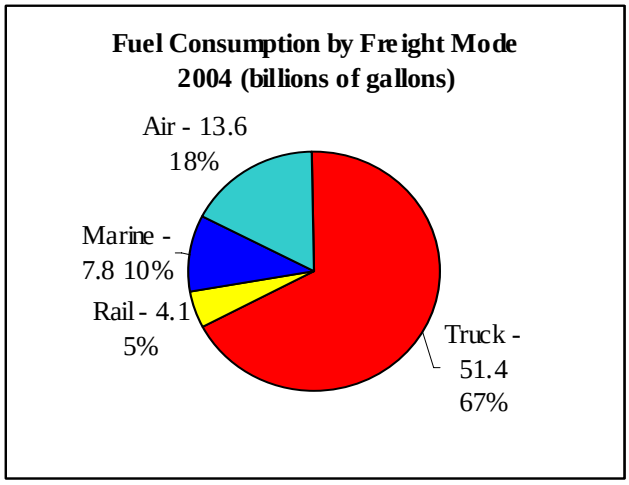
[15] *The Cost of Congestion to the Economy of the Portland Region*, Economic Development Research Group, 2005.
[16] Freight Rail and Oregon Economy: Final Report, 2004.
[17] *The U.S. Truck Driver Shortage: Analysis and Forecasts*. Global Insight 2005

working truck drivers aged 55 and older has risen 19 percent since 2000.[18] The rail industry began experiencing its labor shortage around 2002, as a result of railroad company mergers that reduced workers, as well as an unanticipated number of experienced railroad employees opting for early retirement, which left thousands of skilled jobs open. Other occupations in the freight industry are expected to have greater demand than labor supply including air cargo handlers and operators of moving machines, cranes, and tower.

Energy

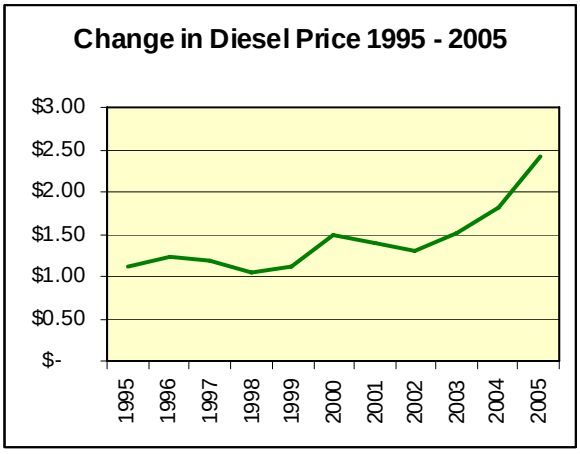
The rising and volatile fuel prices have a significant impact on freight transportation providers. Fuel is a primary business expense for companies that move freight and goods. In 2004, the combined freight modes (air, rail, truck and water) consumed 76.9 billion gallons of fuel (Figure 1.4).

Figure 1.4 – Fuel Consumption



Source: Bureau of Transportation Statistics & American Trucking Association

Figure 1.5 – Diesel Price Trends



Source: Energy Information Agency, U.S. Department of Energy, July 2006

[18] Robert Malone, "Help Wanted: Truck Drivers", Forbes.com, May 5, 2006

Fuel prices have increased at a steady pace over the past ten years (Figure 1.5). The financial impact of rising fuel prices is being felt across freight modes, albeit at different levels of impact. The logistics industry has generally responded to rising prices through a combination of fuel surcharges and fuel management strategies. Air cargo, rail, and trucking firms add fuel charges to their shipping rates, indexing the charge to the price of fuel and varying the surcharge on a weekly, bi-weekly, or monthly basis depending upon industry conditions. Fuel management strategies include using operating techniques such as reducing idling, improving aerodynamics on vehicles, driving training, and route optimization.

With the expectation of continuing energy volatility, businesses will be employing long-term strategies to increase energy efficiency. The most common approach is likely to be a better utilization of the physical capacity of equipment. This can be done through increasing shipments sizes to maximize use of equipment. There is also a trend to "right-sized" equipment to match market volume demand. The airline industry has used this approach in recent years to address their rising costs. Also likely are accelerated investments in information technologies that optimize the use of equipment.[19]

Industrial Land and Accessibility

A relatively recent development in transportation systems is the *freight hub* – facilities that provide international and/or domestic intermodal freight handling and services, typically involving transfer of freight between marine, air, rail, and truck modes and may include warehousing-distribution-consolidation facilities and services as part of a larger complex. Freight hubs are important to the national and regional economies as they provide the basic infrastructure for businesses to compete in a global economy as well as a source of employment.

Freight hub facilities are mostly found in older, more established parts of a metropolitan area, developing around historic marine terminals or rail yards, for example. This presents challenges for both expansion and efficient access.[20] Terminal facilities are land-intensive uses and the ability to expand with growth in freight volume is in competition with other uses for the same land, as well as concerns about environmental and community impacts. For example, waterfront property is highly desirable for both port terminal expansions and for residential and commercial development, creating competing economic development goals.[21]

With regard to efficient road and rail access, freight hubs intensify the volumes of cargo moving through a single location and are characterized by periodic surges of activities as equipment arrives to be loaded or unloaded. These bursts of activity can have spillover effects such as gate backups, increased truck activity on adjacent streets, and blocked at-grade rail crossings – creating congestion and delay. Another constraint on access is that older infrastructure adjacent to intermodal terminals may no longer adequately accommodate new, larger freight vehicles and equipment. The road geometry (curb radii), road dimensions (weight, height, and length), and pavement condition may impede the smooth transfer of loads.[22]

[19] Global Insight, *Portland/Vancouver International and Domestic Trade Capacity Analysis: Assessment of Trade and Economic Dynamics,* August 2006

[20] Transportation Research Board, Financing and Improving Land Access to U.S. Intermodal Cargo Hubs (NCHRP Report 497), 2003.

[21] Transportation Research Board, Integrating Freight Facilities and Operations with Community Goals (NCHRP Synthesis 320), 2003.

[22] Transportation Research Board, *Financing*, 35.

In the Portland region, a combination of policy and regulation define and protect key industrial/employment centers. Metro's Urban Growth Management Functional Plan defines *Regionally Significant Industrial Area*s in order to protect these employment areas near significant transportation facilities.[23] The City of Portland developed the concept of Industrial Sanctuaries within its Comprehensive Plan as a way to reserve and protect land for existing and future industrial development. Guild's Lake Industrial Sanctuary in Northwest Portland is one example of a sanctuary that limits non-industrial uses.

Community Issues

Increasing freight activity brings both economic opportunity and livability challenges to a community. The need to balance freight activity with community impacts generally arises when freight activity expands from a background support activity into a "noticeable presence."[24] Both regionally and nationally, there is growing interest in looking at how to better integrate freight operations with community goals, particularly for the areas of security, safety, and the environment.

Security

The events of September 11th, 2001 shook the nation and gave rise to the need for increased transportation system security in the wake of heighten concerns. Since this time, several major pieces of federal legislation that address transportation security have been passed.
The *Aviation and Transportation Security Act of 2001* created the Transportation Security Administration, established the Transportation Security Oversight Board, and contained enhanced security requirements for air travel.[25]

The *National Maritime Transportation Security Act of 2002* implements measures to protect ports and waterways from a terrorist attack. It requires area maritime security committees and security plans for facilities and vessels that may be involved in a transportation security incident. The act required the Transportation Security Administration to create a National Maritime Security Plan as well as Security Incident Response Plans.

The *Urban Area Security Initiative (UASI)* is a program of the Department of Homeland Security that provides funding to urban areas that are under potential threat from terrorism. UASI funding is allocated based on the presence of international borders, population and population density, the location of critical infrastructure, and other factors. In the Portland metropolitan region, a local group of interested parties, the Urban Area Working Group, meets to discuss emergency preparedness within the context of this program; it is organized by the state Department of Homeland Security.

Safety

Under development

Environment

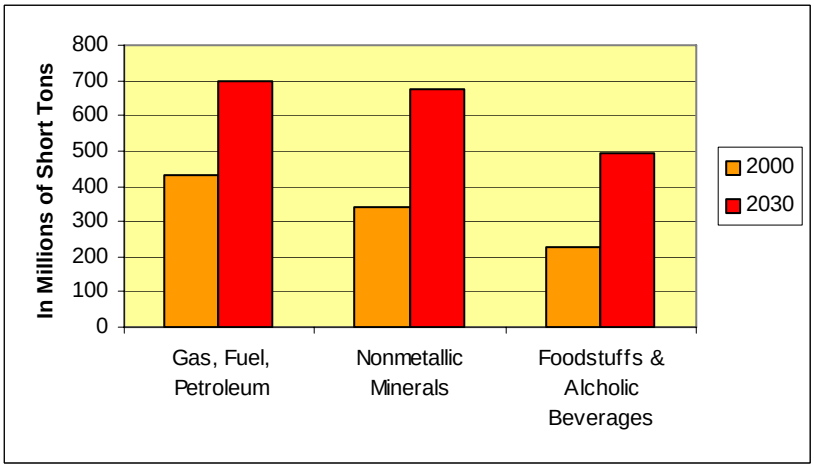
Under development

[23] Map located at: http://www.metro-region.org/library_docs/land_use/rsia_map_resolution_04_1040.pdf
[24] Transportation Research Board, Integrating Freight Facilities, 9.
[25] Metro, *Regional Safety and Security Profile*, November 2006.

Implications of Trends for the Portland/Vancouver Region

The Portland/Vancouver region, as an international gateway and domestic freight hub, is particularly influenced by the dynamic trends affecting distribution and logistics. As previously discussed, the region's latest commodity flow forecast projected an overall doubling of freight tonnage moved in the region by 2030. The region's forecasted population and job growth, estimated at an additional million residents and 600,000 jobs by 2030, and the associated boost in consumption of goods and services, largely drive the projected increased freight volume. In fact, the top three categories of commodities moved in the region, measured by tonnage, include products consumed by the region's population and businesses including petroleum products, materials used in construction, and foodstuffs and alcoholic beverages (Figure 1.6). These commodities are largely moved by truck, contributing to the overall projected increase in mode share for trucks from about 64% in 2000 to 73% by 2030.

Figure 1.6 – Growth Forecast for Top 3 Commodity Categories



Source: Commodity Flow Forecast Update and Lower Columbia River Cargo Forecast Update: Final Report 2002

Sparked by the growing freight activity, both public and private sector interests in the Portland-Vancouver region are taking a fresh look at the freight transportation system and its link to economic competitiveness. There is a renewed awareness of the importance of a seamless freight transportation system to the regional and state economy, as evidenced by several recent publications on the topic.

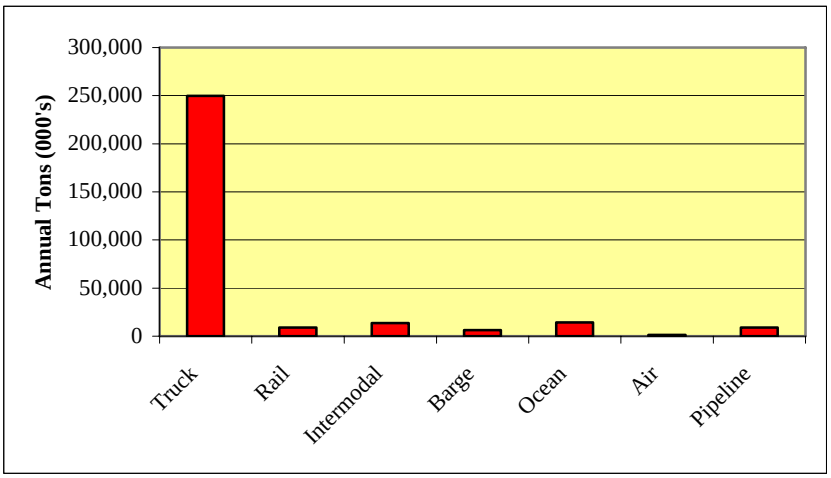
The *Cost of Congestion to the Economy of the Region Study (2005)* reported that the metropolitan region has a higher than average dependency on traded sector industries, particularly computer/electronic products, wholesale distribution services, metals, forestry/wood/paper products, and publishing; business sectors that serve broader regional, national, and international markets and bring outside dollars into the region's economy. These industries depend on a well-integrated and well-functioning international and domestic transportation system to stay competitive in a global economy. Similar to the national findings of growing congestion, the *Cost of Congestion Study* concluded that the region's current and planned transportation system was not adequate to meet the growing demand and will negatively impact regional competitiveness if not addressed.

The *Portland-Vancouver International and Domestic Trade Capacity Study (2006)* sought to identify the likely impacts of growth in West Coast trade activity on the Portland-Vancouver

region. The Portland/Vancouver region is one of four primary international trade gateways on the West Coast, the others being Southern California, the Bay Area, and Puget Sound. With the trend toward growth in NAFTA trade as well as in the Asian economies, like China and India, it is expected that demand for trade access into and out of the United States will grow, with significant effect on West Coast gateways.

The study confirmed previous forecasts of regional freight growth doubling in the next 20 – 25 years, but at an annual growth rate of about 2%, which is slower than the national rate. Domestic demand is the largest contributor to the growth, with the lion's share of tonnage moved by truck (Figure 1.7). This has implications for the region's road network.

Figure 1.7 – Change in Freight Tonnage by Mode (2000 – 2035)



Source: Global Insight 2006

The study assessed the overall ability of region's freight marine, rail, and air networks to support the expected demand, addressing both opportunities and challenges to meeting the forecast. General conclusions found:

- The Columbia River dredged to a depth of 43' will meet the expected mix of carrier vessels to the marine ports.
- Rail service in the region is challenged by infrastructure capacity constraints to track, sidings, and intermodal yards, as well as the Class I rail service provider's shifting focus to unit train and intermodal business. The role of shortline rail providers will become more critical for service to the region's businesses.
- Domestic air cargo service, provided by integrated carriers like UPS and Federal Express, will continue to make Portland International Airport an important regional hub but service expansion will need to address the nighttime operation impacts to the community. Direct international air cargo service for the movement of high value commodities is important for region's business sector.
- Industrial land, in the right location and readily developable, is important for retaining and attracting business in the region. Preparation of waterfront land is particularly important for maximizing growth opportunities, particularly auto imports.

- The road network connecting to marine, rail, and air cargo terminals is a critical link in the reliable movement of freight and protecting and enhancing access to these facilities is key to meeting forecasted demand.

The region's business community has also weighed in on the importance of freight mobility to the economy with the creation of the *Regional Business Plan* (2006). The plan lays out specific, action-oriented initiatives aimed at ensuring a competitive regional economy, identifying an initial four areas of focus including: K-20 education, freight mobility, land availability, and economic development/cluster competitiveness. With regard to freight mobility, the *Regional Business Plan* recommends the three action steps:

- Formation of a private sector Freight Mobility Coalition to advocate for transportation investments that improve business competitiveness.
- Transportation policies and projects that support business needs and economic development objectives.
- Funding for transportation investments that are needed and supported by regional businesses.

Assessment of Implications for Regional Freight Mobility

Global trends are having a profound effect on the movement of freight and significantly on the transportation systems that service mobility. As a gateway for trade, the Portland-Vancouver region will find both opportunity and challenge in an increasingly competitive global trade environment. Tackling the issues of increasing freight growth and economic opportunities will take a concerted effort by public and private sector interests to identify and prioritize actions. Table 1.1 lists the key trends and the policy implications they raise for the region.

Table 1.1 – Key Findings and Action Plan/Regional Transportation Plan Implications

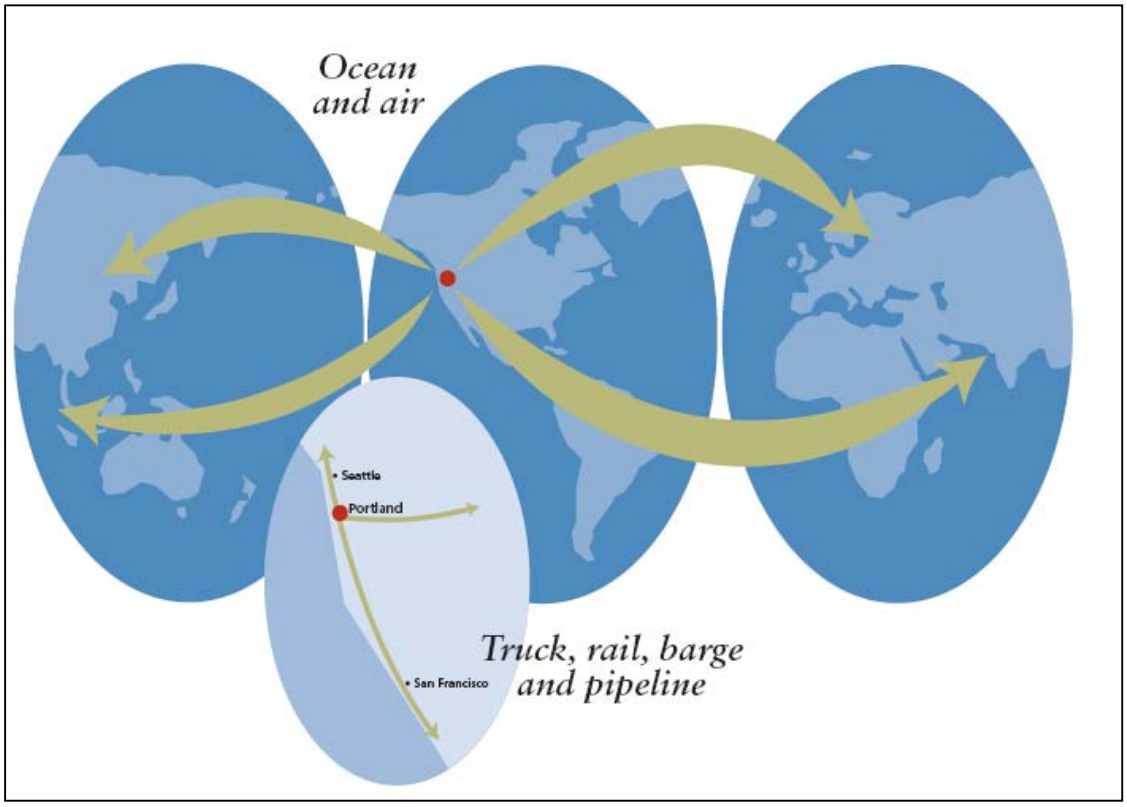
Key Findings	Action Plan (RTP) Implications
The domestic and international trade is increasing and is forecasted to continue this trend. The Portland-Vancouver region is a hub for international and domestic trade. Freight system improvements often result in economic benefits and are tied to economic development goals.	- Prioritize transportation investments that support the region's traded sector industry clusters. - Better coordination of transportation and economic development activities.
With growth of complexity in supply chain logistics and use of *just-in-time* business practices, reliability and cost are increasing important factors in decision making. Logistics management is relying on a mix of modes to move freight "door to door."	- Increasing importance of efficient connections between marine, air, and rail terminals and the landside networks (road, rail, and pipeline). - Consider rapidly changing dynamics of private sector decision-making (e.g. Siting, shipping, labor).
The overall freight system is facing constraints as a result of the growth in trade increasing the amount of freight tonnage moved.	- Management of the existing road capacity for movement of freight. Look at when and how to add highway capacity for the benefit of truck movement without attracting SOV use. - Look at whether freight trips through the area should be consider differently than freight trips with an origin and/or destination in the region. - In addition to highway constraints, identify public sector role in providing increased service/capacity for non-highway modes that directly support private industry.
Growth in freight movement has spillover effects that can adversely impact community livability.	- Expand focus of air quality assessment to address increasing diesel emissions. - Consider mitigation strategies for noise impacts (e.g. engine braking, train whistles, aircraft engines) - Reinforce existing activities around education, engineering, and enforcement for safety issues related to road and rail. - Look at commercial freight delivery to centers (e.g. parking/loading, street design)
Current transportation revenues not adequate to meet all of the transportation needs.	- Look at how to prioritize infrastructure needs based on the best return on public sector investment (i.e., jobs, tax revenues). - Opportunities for other funding mechanisms - Consider potential of public-private partnerships to fund regional transportation priorities for freight. - Determine the public sector role for investment in privately owned infrastructure.

Section II: Profiles of Freight Transportation Modes in the Portland-Vancouver Metropolitan Region

Introduction

Portland's geography has led to its location as a major freight hub for multiple freight transportation modes including marine, air, pipeline, rail, and truck. Shippers in the region can choose from a wide array of modes resulting in lower cost shipments, as well as seamless distribution to far-flung domestic and international markets. Figure 2.1 depicts the transportation networks that connect the Portland-Vancouver metropolitan region to domestic and international trade.

Figure 2.1 – International and Domestic Network Connections



As demonstrated in the following pages, each freight mode provides a distinct function it the movement of freight. They have different operating and cost characteristics that make them particularly suited to a certain market segments. While the different freight modes compete directly for business in certain instances, more often they are connected, as links in a chain, supplying door-to-door transportation of shipments.

Regional Growth in Freight Movement

The Portland metropolitan region has changed tremendously in the last 30 years. The region's population has grown from about 1.1 million residents in 1972 to over two million in 2005. The region's role as a freight gateway has also expanded. In 1972, the Port of Portland moved 46.8 tons of air cargo, 17,000 marine containers, and 2.5 million tons of grain. In 2005, it handled 275.7 tons of air cargo, 160,479 marine containers, and 3.8 million tons of grain.

The region's role as a gateway for international freight and a hub for domestic freight shipments is expected to continue its growth, in line with general economic and population growth. Table 2.1 shows both the projected growth in freight tonnage and the expected distribution of that grow across the different modes. Trucking is currently the dominant mode for moving freight and is projected to expand its market share in the next 30 years.

Table 2.1 - Portland Metropolitan Region Commodity Flows by Mode (millions of tons)

Mode	2000		2035		Growth
	Tons	%	Tons	%	2000-2035
Truck	197.2	67%	447.2	75%	127%
Rail*	32.9	11%	55.6	9%	69%
Water**	43.5	15%	63.9	11%	47%
Air	0.4	0.01%	1.7	0.02%	325%
Pipeline	22.2	7%	31.1	5%	40%
Total	296.3		599.3		102%

Source: Portland/Vancouver International and Domestic Trade Capacity Analysis, Port of Portland, 2006
**Combines Rail and Intermodal.*
***Combines ocean-going steamships and river barges*

That trucking is the primary mode of freight transport in the metropolitan region, now and into the future, is influenced to a certain extent by the regional shipment pattern – how much freight volume originates in the region and is shipped out (outbound); how much is being shipped into the region from other places (inbound); and how much volume has both an origin and destination within the region (internal). Table 2.2 allocates regional freight tonnage by origin/destination. The data in Table 2.2 does not include freight that traveled through the region. Freight movements that are internal to the region primarily use trucks to deliver goods from shipper to customer. Inbound and outbound shipments are more likely to utilize freight modes in addition to trucking, the choice influenced by the type and volume of freight, destination, special handling requirements, and customer specifications.

Table 2.2 - Freight Origins and Destinations in Years 2000 and 2035

Origin & Destination	Millions of Tons		Growth
	2000	2035	2000-2035
Inbound freight traffic	123	221	80%
Outbound freight traffic	99	208	110%
Internal freight traffic	73	170	133%
Total	296	599	102%

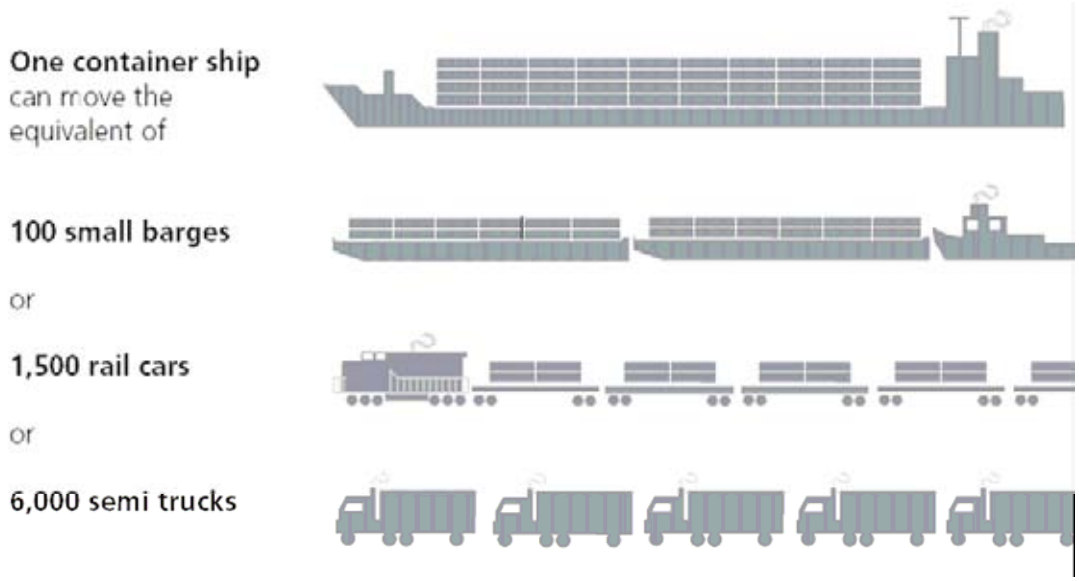
Source: Portland/Vancouver International and Domestic Trade Capacity Analysis, Port of Portland, 2006

General Comparison of Freight Modes

The capacity of each freight mode and the networks they use are one of the key determinants of usage by a shipper. As Figure 2 shows, one ocean-going ship can carry the equivalent of 1,500 rail cars and 6,000 trucks. For large shipments, steamships, barges and railroads are very efficient, in terms of cost, because of their capacity to handle mass quantities of bulky, heavy freight. For example, it would be less cost-effective to transport one container to Boise by rail than it would be by truck because railroads need to fill up trains before they can deliver goods at a low cost. Similarly, transporting grain from eastern Oregon and Washington by truck would be an expensive and inefficient choice over barges and railroads that can carry mass volumes of grain, and are better equipped to receive and distribute grain directly to and from silos and steamships. In many cases, customers will request a certain mode for shipping product because of warehouse's capabilities or the

need to distribute products to locations without access to certain modes, or the desire to combine different cargoes on a certain mode.

Figure 2.2 – Comparison of Shipment Capacity by Mode



Source: U.S. Army Corps of Engineers, Philadelphia District, http://www.nap.usace.army.mil/dredge/d1.htm

In addition to carrying capacity, each mode has specific performance parameters with respect to the distances traveled, overall rate of speed, energy consumption, and emissions outputs. As shown in Table 2.3, air cargo generally offers access to distant locations and a high level of service for the handling of perishable and/or fragile cargo, but it also has limited cargo capacity and very high energy costs (i.e., BTUs/ton-mile). River barges and railroads can carry a very large volume of cargo while consuming very little fuel with very few emisssions, but they are best suited for high-volume commodities moved long distances. Each of the characteristics below are critical considerations for producers, customers, and public policy agencies.

Table 2.3 - Comparative Characteristics of Freight Modes*

	Max Tonnage (gross tonnage weight)	Avg Trip Distance	Avg Long-Haul MPH	Ability to Handle Fragile Goods	BTUs/ Ton-Mile	Emissions/ Ton-Mile
Truck	50/truck	247	50-70	Good	3,337	3.25 gms
Rail	12,000/train	617	50-70	Fair	345	0.5 gms
Ship	10,000-65,000	511	22.5 knots	Fair	471	unavailable
Barge	14,500	511	12-13 knots	Fair	368	unavailable
Air	124	1,070	300-600	Best	28,000	unavailable
Pipeline	ma	na	3-4	na	na	na

** Sources and reference data for the above information provided in Appendix A.*

Distribution Hubs

The sophisticated logistics and transportation strategies for moving goods around the globe and the region rely on well-positioned distribution centers to manage automated and customized freight

flows. The goal of distribution centers is to concentrate short-term inventory in a few large facilities to execute "just-in-time" delivery. Unlike traditional warehouses that are primarily storage facilities adjacent to production plants, distribution centers consolidate and process the goods flowing through them. A typical distribution center incorporates loading bays, fast-moving conveyor systems, and electronic information technologies such as radio frequency identification technology (RFID) to organize goods and transactions between receiving docks and shipping docks and modes. Distribution centers are larger than warehouses and are principally located in suburban and ex-urban areas with good connections to highways and railroads. While airports and seaports also provide distribution centers (e.g., Oregon Transfer's new facility at the Port of Portland's Terminal 6), the cost of transporting from distant distribution centers far outweigh the higher cost of land, labor, and operations present in urban areas. Trucking is the primary mode moving freight to and from distribution centers.

In the Portland region, several companies trans-ship finished goods to distribution centers. Columbia Sportswear ships from the ports of Los Angeles/Long Beach, Seattle/Tacoma and Portland to its national distribution center in Kentucky. Georgia-Pacific ships paper product from around the world, including its Camas, WA plant, to its national distribution center in Waukesha, Wisconsin (as well as seven other distribution centers). Esco Corporation uses its national distribution centers in Mississippi and Kentucky to organize and deliver to its customers throughout the U.S. and Canada. In addition to national distribution centers, many companies are building regional distribution centers such as the Dollar Tree chain's facility in Ridgefield, WA, Lowe's facility in Lebanon, OR, and Target's regional center in Albany, OR.

Figure 2.3 shows the location of major freight traffic generators in the region including distribution centers.

Figure 2.3 – Major Freight Traffic Generators

Under development

Importance of Maintaining Reliable Freight Delivery Schedules

A unifying characteristic of all freight modes is that shipments meet a customer's delivery schedule. This simple requirement is critical to how companies maintain business relationships, keep production and other operations on track, and hold costs down. Many companies directly tie their shipping processes to their production output; e.g., some companies do not have enough on-site space to accommodate many days/weeks of finished product and thus need to have it shipped quickly to their customers. Similarly, some companies require raw materials for their production and if deliveries of those materials are late they may suspend production.

Motor Carrier

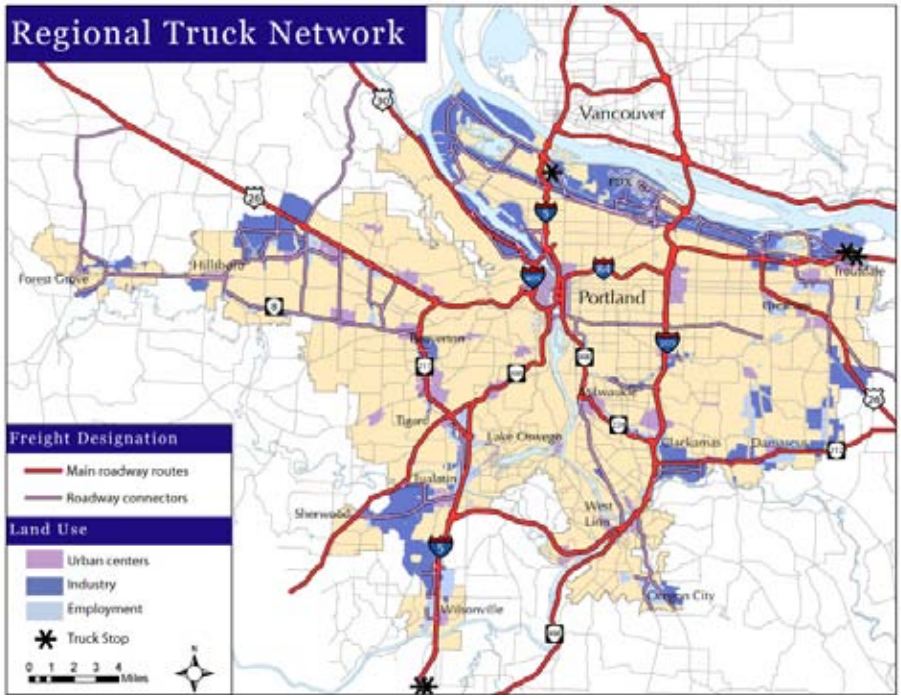
Trucks are the most common means of moving freight, both nationally and in the Portland-Vancouver metropolitan region. In 2006, over two-thirds of the total freight tonnage that flowed into, out of, within and through the region was moved by truck. The dominance of truck is even greater in the movement of goods internal to the region (i.e., with both an origin and a destination within the region). Trucks are not only the primary form of shipping for loads less than 80,000 lbs, but they are also the primary mode for trips under 500 miles. An equally important role played by trucks is in the local moves between freight terminals and between manufacturers and/or shippers and other modes (also known as “drayage”).

Trucks supply restaurants and retail outlets. They transport goods to and from offices, hospitals, cultural and government institutions, and residences. Because of the multitude of motor carriers in the region, truck deliveries can often be arranged quickly and their travel time has a high degree of predictability in comparison to other modes. Trucks have the added advantage of being able to accommodate fragile and perishable packages with limited damage. Finally, motor carriers often provide shippers with services beyond transport such as warehousing, logistics, inspection, certification, and other administrative services.

Truck Network

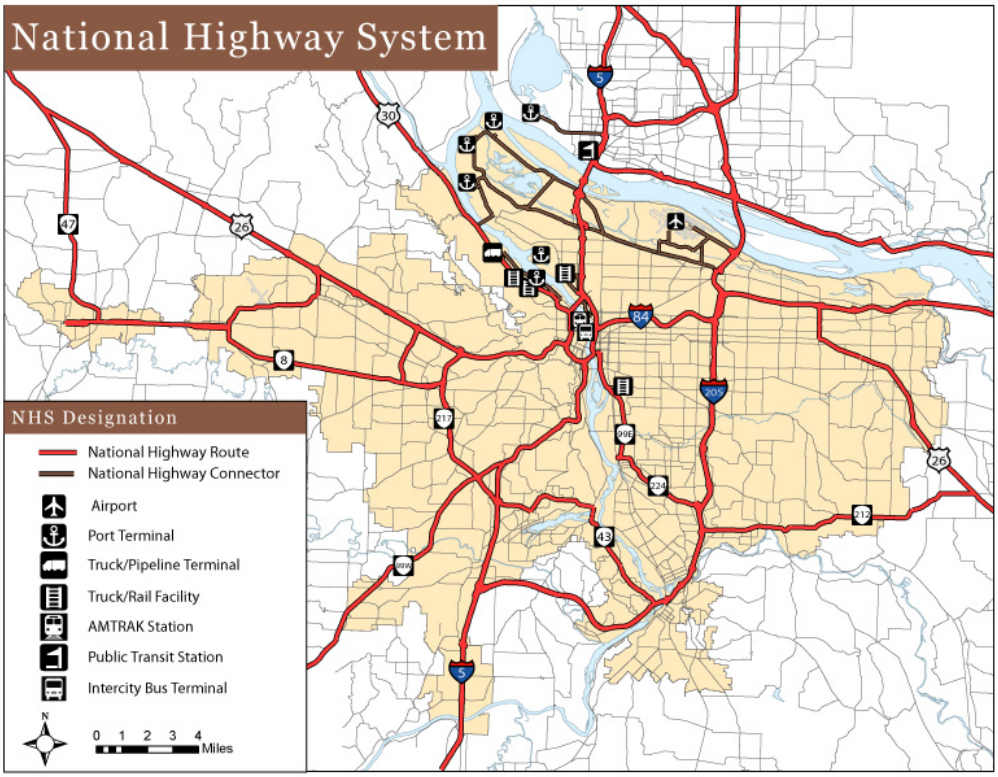
While trucks are generally permitted to travel on all roadways (in some cases, through-truck travel is prohibited and certain routes have weight and height restrictions), the region has designated a basic network of highways and arterials that connect regional freight activity centers to each other and to areas beyond the metropolitan region for the purposes of functional design and financing. Figure 2.3 depicts the currently designated regional truck network. Additionally, many local jurisdictions in the region have identified truck routes.

Figure 2.4 – Regional Truck Network



The federal government also designates a national truck network, identified as the National Highway System (NHS). The region's NHS network is shown in Figure 2.4. Officially designated in 1995, the system is a 161,000-mile interconnected network of roadways that link primary intermodal facilities including airports, international border crossings, marine ports, rail yards, passenger terminals, and major freight activity centers. The system is intended to identify the most critical connections in the nation in order to focus federal resources for improvements.

Figure 2.5 – National Highway System in Metropolitan Region



In addition to the basic truck network, there are routes identified for special types of truck movement. Over-sized (over 14' tall, 8'6" wide, or between 50-75' long trailers, depending on configuration) and over-weight (105,500 lbs in total weight) trucks are required to use over-dimensional truck routes for through travel – that is, roadways and associated structures that can accommodate over-dimension vehicles. These routes are identified in the permit provided by ODOT for the trip by the over-dimensional truck. In some instances, the vehicle dimensions are such that a pilot car and special signage is required (e.g., movement of a trailer home); in some cases, hours of travel may be restricted and some form of escort may be required (e.g., very large machinery and/or construction equipment)

Trucks carrying hazardous materials are limited to travel on a hazardous routes network. Vehicles carrying non-radioactive hazardous materials (such as spent fuel) are not required to purchase an Oregon permit, but they must comply with all federal rules and permits, and they must display a placard stating that they are carrying hazardous materials. Oregon also requires notification of the routes and schedule of travel of these loads. Commercial vehicles carrying radioactive material must not only comply with federal permits and regulations, but must obtain an Oregon permit to

travel on state roads, as well as display a placard that they are carrying radioactive material. Some regional roadways completely prohibit transportation of hazardous materials.
(Awaiting list from ODOT)...

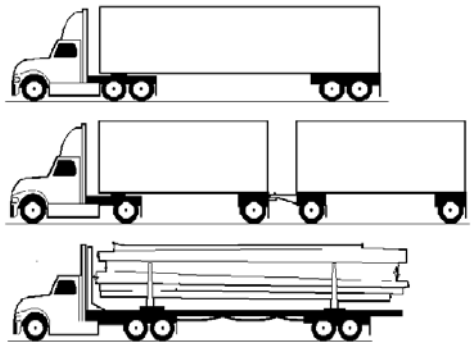
Types of Truck Service

The business of trucking includes many sectors, specialized to meet the needs of different customers and shipment types. At the simplest level, truck delivery is generally classified as either full truckload (TL) to and from a single source, or less-than-truckload (LTL) services that combine multiple packages for multiple customers to fill a truck. TL movements are primarily between shipper and ports/railroads, and directly to customer. LTL trips are nearly always between shippers and customers, and for local moves (except for express delivery truck). The equipment for TL shipments can include full liquid tanks, dry bulk cargoes, food, and beverages requiring refrigerated trailers, and containers. TL shipments often involve drayage activity, where trucks are used to move goods from ships, barges, railcars, or airplanes to an intermediate location (e.g., a warehouse) before final delivery to a customer.

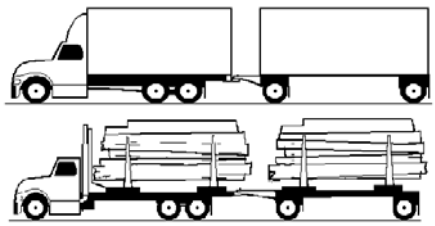
In addition to these basic types of truck delivery methods, the trucking industry is also segmented by types of service providers. *Common carriers* are trucking companies that provide interstate transportation services to the general public on a regular schedule at published rates. A *contract carrier* provides for-hire services by continuing contract to a limited number of customers. A *for-hire carrier* provides trucking services to the general public by fee but can meet specialized delivery needs. *Private carriers* are trucking fleets that are owned or leased by a business to meet their own logistic needs.

Types of Trucks

The trucking industry includes many different types of trucks, specialized to meet the particular needs of the freight being moved.

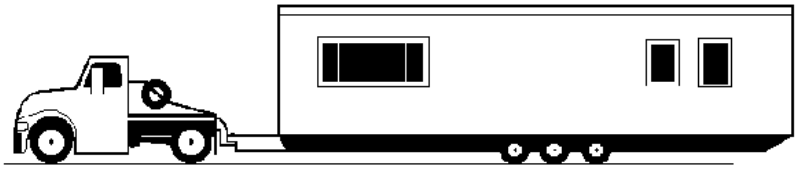


Tractor (TR) - a motor vehicle designed and used exclusively to pull trailers.



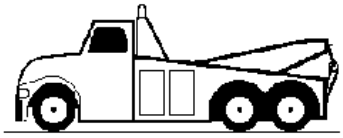
Truck/Trailer (TT) - a motor vehicle designed and used for carrying a load and for pulling trailers with loads.

Bus (BS) - a motor vehicle designed and used to carry more than ten passengers.



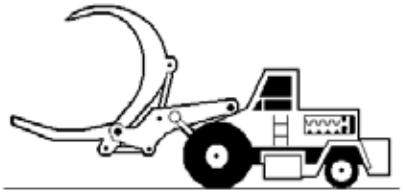
Mobile Home Toter (MT) - a motor vehicle designed and used EXCLUSIVELY to pull mobile homes on their own axles.

Dump Truck (DT) – a vehicle from which contents are unloaded by tilting the truck bed backward with the tailgate open.



Tow Truck (TW) - a vehicle designed and used, with a special towing license, to tow disabled vehicles.

Solo Truck (TK) - a motor vehicle designed and used to haul property, and NOT used to pull a trailer.



Fixed Load Vehicle (HF) - a vehicle with a gross weight and lightweight that is the same.

Vehicle Size

As many as 27 states (including Oregon, and neighboring states of Washington, Nevada, and Idaho) issue load permits for trucks with divisible loads over the federal maximum gross vehicle weight standard of 80,000 lb[1]. Like Oregon, Idaho, Washington and Nevada allow for maximum allowable trucks weights of 105,500 lbs. However, these neighboring states do not permit triple-

[1] Ibid.

trailer configurations (Oregon does) and they require a separate permit to operate up to 105,500 lbs. To the south, California does *not* permit trucks carrying more than 80,000 lbs (gross tonnage weight), except for over-dimensional loads, which require an elaborate set of permits and requirements. These differences from state to state compel carriers (and in some instances, shippers) to evaluate whether it's appropriate to transfer loads into different configurations at state borders, or to start and end trips that cross borders with equipment and loads that can be accommodated without special operational changes.

With respect to other truck equipment factors, Oregon and its four neighboring states share common standards for maximum height (14'), maximum width (8'6"), and maximum allowable length (105').

Regulations Governing Truck Movements

In addition to regulations identified on truck route networks, truck movements and services are governed by a host of national and state rules involving licensing (equipment and drivers), vehicle registration and taxes, hours of service regulations (a driver is not allowed to drive more than 11 hours in any 24-hour period), and a range of environmental rules including idling regulations and emissions standards, and truck loading areas.

Federal rules cover the licensing of truck drivers; the hours of service they are permitted to operate; the safety and inspection of equipment; means of securing cargo; truck emissions and energy consumption objectives; vehicle registration and tax payments; and a broad range of regulations for specific commodity movements (e.g., such as fuels).

Oregon's motor carrier rules reinforce many of the federal rules, and provide additional regulations about truck equipment include height, length, width and weights, use of traction devices, for over-dimensional loads, and transportation of specific commodities.

Finally, many cities and counties adopt regulations covering truck movements and parking at certain locations, such as signs that restrict through truck movement on local streets, or control on-street space for loading and parking activities.

Innovations in Truck Equipment

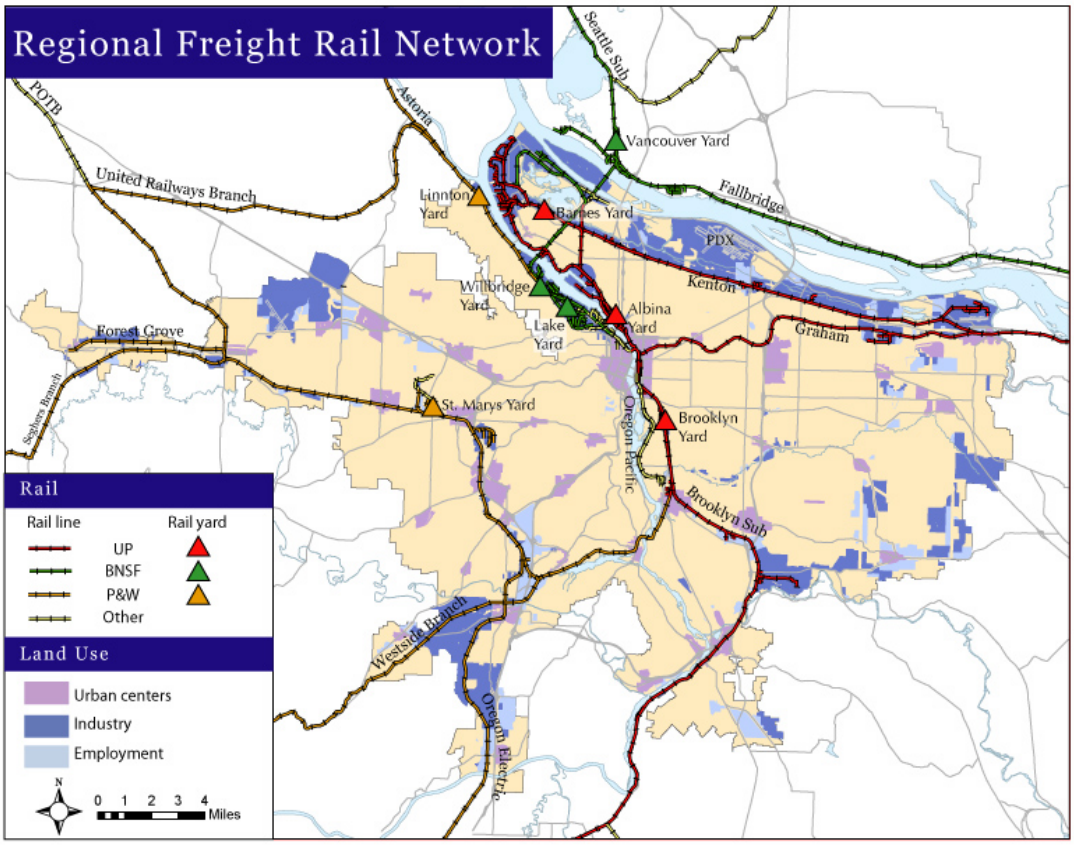
Truck performance has improved with improved acceleration and braking and reduced air and noise emissions levels (due in part to use of less diesel fuel; as well as plug-in power sources to maintain engine power without idling).
Motor carriers also make good use of electronic communications technologies allowing drivers and dispatchers to report on estimated arrival times, road conditions, and changes to schedules and pickup locations, etc.

Railroad

The Portland region is served by North America's largest and second largest railroads – Union Pacific Railroad (UP) and BNSF Railway Company (BNSF), respectively – as well as three short-line operators – Portland & Western Railroad (PNWR), Oregon Pacific Railroad (OPR) and the Port of Tillamook Bay Railroad (POTB). Two terminal switching carriers, Portland Terminal Railroad (PTRC) and Peninsula Terminal Company (PT), exist within the City of Portland. Figure 2.5 shows a map of the region's rail network.

UP and BNSF provide direct service throughout the U.S., including the nation's major rail terminals/ports at Chicago, Los Angeles/Long Beach, Oakland, Seattle/Tacoma, Dallas, Houston, and Kansas City, and intersect with rail service to Mexico and Canada. In addition, Amtrak's long-distance and *Amtrak Cascades* Vancouver, B.C.-Eugene, OR corridor services use UP and BNSF track. The short line railroads principally originate and terminate interstate shipments moving via UP and BNSF but a growing segment of their business is hauling local cargo between shippers and receivers within Oregon. Local switch engines move rail cars to assemble large trains within and between rail yards.

Figure 2.6 – Regional Freight Rail Network



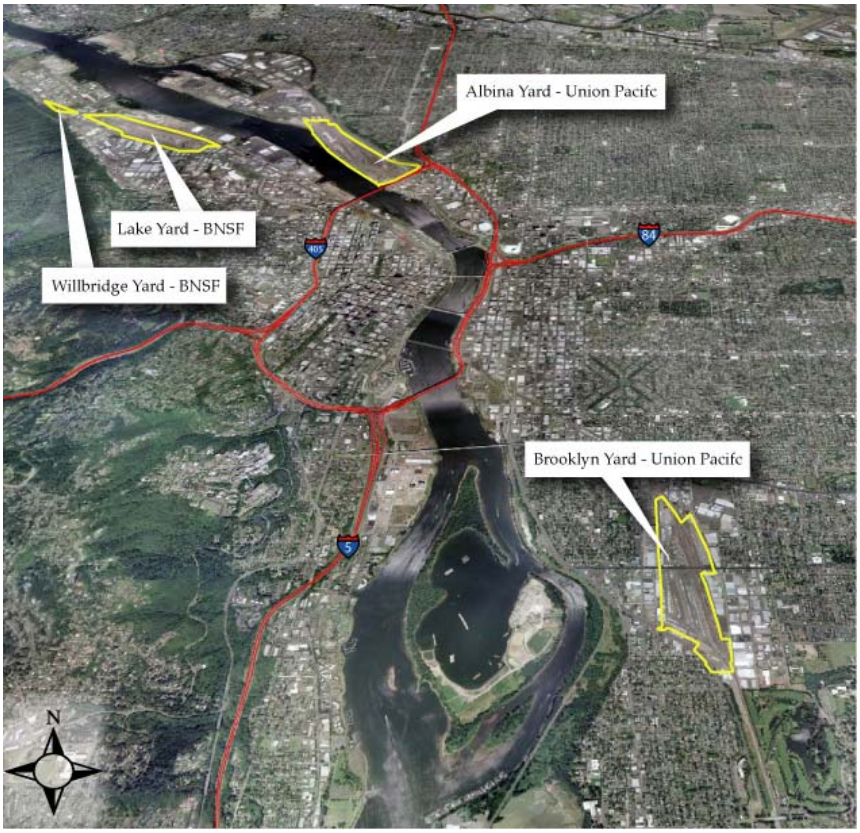
Rail terminals

Each railroad exchanges and organizes rail freight at their rail yards including UP's Brooklyn, Albina and Barnes yards, BNSF's Vancouver, Willbridge and Lake Yard facilities, and PNWR's St. Marys and Linnton yards. Figure 6 identifies the location of the rail yards in the region.

The Port of Portland's terminals 2, 4, 5, and 6 accommodate the largest concentration of rail traffic in the Portland region, followed by the Port of Vancouver's terminal 2. The ports are the destinations for the largest tonnages brought to and from the region by the UPRR and the BNSF, and are where railroads are loaded with commodities destined for locations throughout North America.

Figure 2.7 – Rail Yards in the Portland-Vancouver Region

Several rail terminals are located near marine facilities.



Both BNSF and Union Pacific have rail yards near downtown Portland.

Types of trains

The range of trains operating in the region includes 1.5-mile-long bulk commodity trains, mixed commodity manifest freight trains, unit trains of containers and trailers, and intercity passenger trains.

Track occupancy is governed by train dispatchers in the Midwest utilizing remote signals/communications to ensure safe and convenient operation in respect to each train's priority. For example, passenger trains are issued the highest priority in the system. Intermodal trains have priority over other freight trains because their movements are coordinated with other scheduled modes. Auto and merchandise trains generally receive the next highest priority when possible. Bulk commodity trains (such as coal, grain, potash, and trash) are run with varying priorities depending upon customers' needs. Local transfer and switching operations make multiple trips throughout the day between rail yards -- including movements across BNSF's Columbia River and Oregon Slough bridges between BNSF's Vancouver Yard and Portland area facilities – and generally have the lowest priority in terms of allotted time/capacity on the mainline. Another consumer of mainline capacity involves time needed for bridge openings for marine vessels passing through BNSF's three draw spans (as many as 20-30 times/month).

Table 2.4 – Daily Activity of Class 1 Trains in Region

Type of Service	Amtrak	BNSF	UP
Passenger	10		
Intermodal		7	16
Auto		2	2
Merchandise		13	14
Premium Merchandise			5
Grain (loaded)		5	2
Grain (empty)		3	2
Potash			4
Other Unit		4	

Source: I-5 Rail Capacity Study, HDR, Inc., 2001

Infrastructure

The Portland-Vancouver region has approximately 358 route miles of rail track.[2] As with highways and roads, the track and associated infrastructure govern speed limits and control movements throughout the system. These speed limits are influenced by horizontal and vertical track curvature, grade, yard operations, junctions with mainline and lead tracks, drawbridges, presence of at-grade railroad crossings, grade-separated structures, and other features and operations within the system. Though a rare occurrence, trains may occasionally be assembled with inadequate locomotive power to attain posted speed limits (e.g., local switcher trains moving car loads from one rail yard to another across the mainline.)

Drawbridges

The preponderance of regional freight crossing the Columbia, whether UP or BNSF, uses the BNSF's Columbia River/Oregon Slough two-track spans. A significant portion of BNSF's north/south freight crosses the Columbia River via BNSF's single-track drawbridge connecting BNSF's mainline on the north bank near Wishram, WA with jointly used (with UP) trackage along the Deschutes River to Bend and south. In Portland, the Willamette is crossed by BNSF's Willbridge span, and UP's Steel Bridge. Bridge tenders man these bridges around the clock and coordinate needs of marine (both commercial and recreational) and rail traffic for bridge occupation.

Commodities Carried by Rail

Railroads are best suited for high-volume and low-cost commodities, and in most cases, for commodities shipped long distances. In the Portland area, unit trains carrying coal, soda ash, grains, wood products and paper goods to the ports of Portland and Vancouver are a near daily experience. Intermodal goods in containers flow on both the UPRR and BNSF systems. Petroleum, metals, logs, finished wood products, paper goods, fertilizers, mail, solid waste, and automobiles are also regularly moved on both the Class I roads and the short-line railroads.

Innovations in Rail Equipment & Operations

Most technological advances have been focused on engine performance (increasing horsepower), track and signal upgrades, lengthening sidings and developing higher-capacity freight cars. Sophisticated radio communication systems now permit the engineer of a locomotive pulling a train to remotely control an additional locomotive pushing at the rear, a process the railroads call

[2] Metro (4-county region – Clackamas, Multnomah, Washington, & Clack Co. WA), 2006

Distributed Power Units (DPUs). Design of freight rolling stock now reflects the special needs of commodities, with specialized cars for containers and trailers, liquid and dry bulk commodities, and specially equipped box cars for products especially sensitive to in-transit shocks. A variety of rail users as well as port and regional transportation authorities are working to improve rail terminal efficiency, including use of third-party switching operators at some locations.

Regulations Associated with Railroad Systems and Services

Railroad systems and their infrastructure must meet design standards published and regulated by the Federal Railroad Administration. As with passenger rail equipment, freight trains operating in the region must meet a wide variety of safety and performance values. System signage, structures (including height and width clearances), design of track, placement and type of signal communications must meet minimum standards that are reviewed and enforced by both the State of Oregon (through ODOT's Rail Division) and the Federal Railroad Administration. Transportation of hazardous materials and/or waste by railroads is regulated by these agencies as well.

The areas where rail service regulations are most commonly known by the general public and regional agencies include crossing protection and design of at-grade railroad-roadway crossings, and noise from train whistles. At both public and private crossings, ODOT has the authority to require a certain type and amount of crossing protection (from gates to signals to signs to crossings, etc.), as well as to meet pavement design specifications. Moreover, ODOT has the authority to close and/or consolidate crossings. With respect to train noise, ODOT has the authority to identify "quiet zones" where trains are not required to blow their whistles for safety reasons because added safety protection may be present at a grade crossing.

River Barge

The Portland region is the primary destination for the busy barge traffic operating on the Columbia Snake River System. The inland marine system extends 365 miles eastward to Lewiston, ID on the Snake River, and 100 miles westward to the Pacific Ocean. The capacity for moving goods by barge was significantly increased with the construction of the Columbia and Snake River dams (8 in all), which established a series of slack water reservoirs and a navigable river environment.

Commodities Carried by Barge

Barges, which are pushed by towboats, can carry mixed cargo with as many as six barges attached. Barges connect with steamships, railroads and trucks, and carry a variety of commodities – primarily grains, but also paper and wood products, "pulses" (peas and lentils), fertilizers, and petroleum. Grains are moved in bulk cargoes, while paper/wood products and pulses are often containerized. Products shipped down river by barge are ultimately exported to Asia, South America, and Europe. Table 2.5 lists the type and quantity of commodities shipped by barge.

Table 2.5 - Commodities Moved by Barge

Commodity	Volume
Wheat and Barley	5.489M tons
Containers	16,262 TEU
Wood Products	1.018M tons
Petroleum	1.853M tons
Solid Waste	0.300M tons
Other	1.119M tons

Source: Waterborne Commerce of the United States, 2004, U.S. Army Corps of Engineers (wheat & barley, wood products, petroleum, other); Tidewater Barge Lines (solid waste); Port of Portland (containers)

Types of Barge Services

Barges are an extremely efficient means of moving cargo – a typical barge tow carries the equivalent of 140 rail cars, or 480 trucks. Barge transportation is the least expensive mode of shipping, with rates about one-third the cost of using a truck, and one-half that of rail[3].

There are four barge operators in the Portland region, operating 20 tugboats, 84 grain barges, 15 bin barges, 10 container barges, 6 double-hulled and 4 single-hulled petroleum barges. The barges used in the region have been specially designed for the Columbia Snake River System[4], which features a 14' draft, and eight locks measuring approximately 86' wide and over 660' long.

[3] *Breaching the Lower Snake River Dams: Transportation Impacts in Oregon*, prepared for the Port of Portland et al, by HDR Engineering, Inc., Executive Summary page 10, February 2000

[4] A grain barge on the Mississippi River system can be purchased for $200,000-$300,000, while a Columbia-Snake River grain barge can cost over $2,000,000.

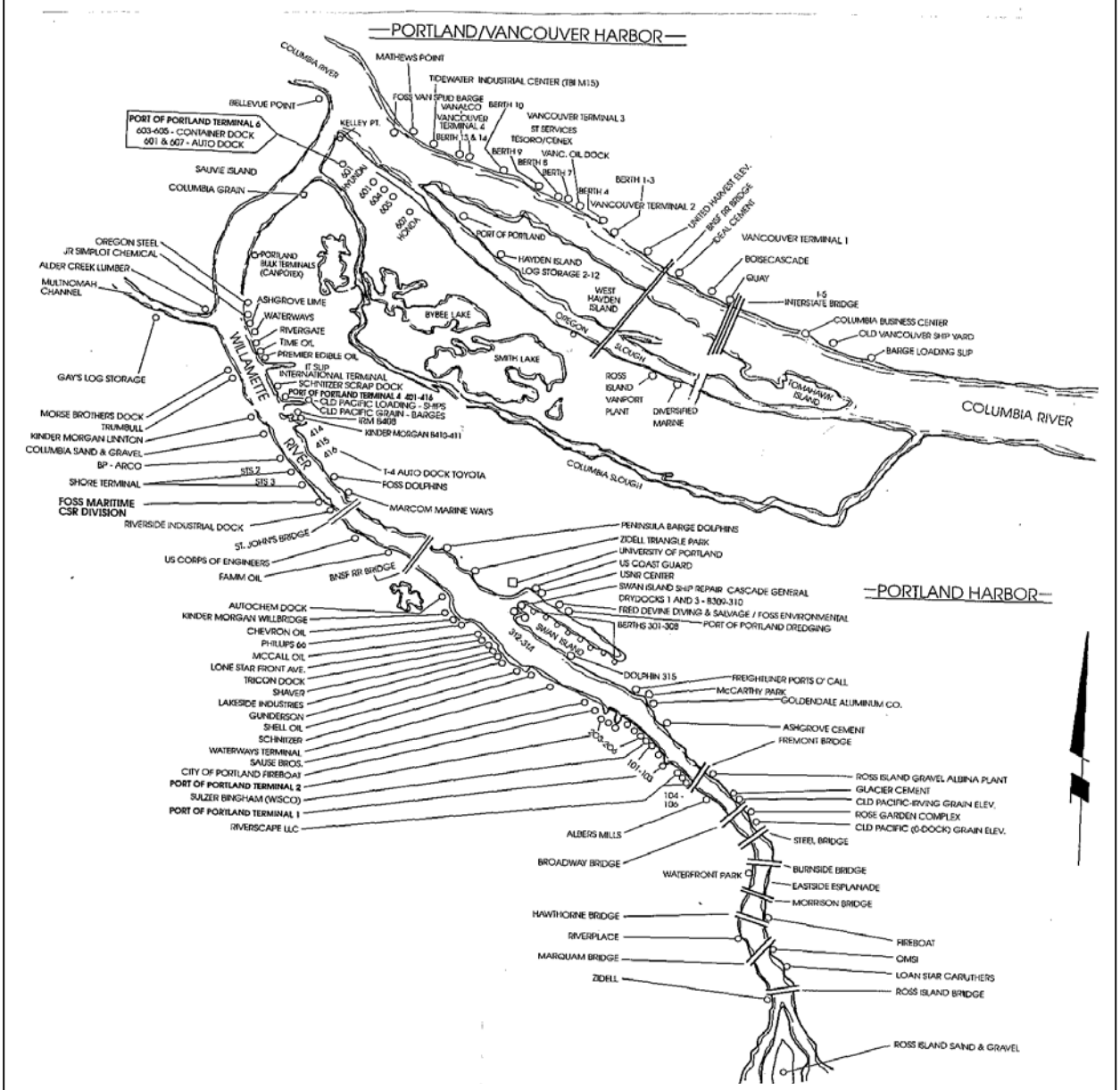
Barges used on the system are typically 42’ wide and 225’ long. They are often lashed together into tows, with typical barge tows measuring 84’ wide and 650’ long.

Barges cross under several highway and rail bridges in the Portland region, including several that are equipped with lift or swing spans to allow passage. Because each lift takes approximately 20 minutes from start to finish and can result in congestion on those bridges, Columbia River Towboater’s Association (CRTA) members agreed in 2000 to not request lifts during peak commuter hours on the I-5 Interstate Bridge.

Terminals

Figure 2.8 shows the location of the public and private dock facilities served by barge in the Portland-Vancouver Harbor area.

Figure 2.8 – Portland-Vancouver Harbor Barge Docks



Source: Foss Maritime Company, Portland, OR, 19__. Dock facilities may have changed since production of this map.

Deep Draft Marine Vessels

More than 1,000 ocean-going vessels call on the Portland Harbor each year. These vessels annually transport 18 to 20 million short tons of cargo to and from public and private facilities located in the Portland-Vancouver Harbor. Another to 8 to 10 million tons of inland barge cargo is also handled at these facilities. In total, $12 billion in foreign trade moves through Portland Harbor facilities each year.

With respect to public terminals, trans-oceanic ships carrying both containers, break-bulk, dry and liquid bulk, and automobile cargo visit the Port of Portland's terminal 2 4, 5 and 6, and at the Port of Vancouver's terminals 2, 3 and 4. In 2006, nine international container services are regularly visiting these terminals, including both Panamax ships carrying as many as 4,000 containers (or 65,000 toms), and Handymax ships with storage for between 10,000 and 50,000 tons of general cargo. The region trades with countries in Asia (China, Japan, South Korea, Taiwan, Indonesia, India, Turkey, and Israel); Central and South America (Mexico, Venezuela, Brazil and Guatemala); Europe (Netherlands, Germany, Italy, Spain, Romania, Belgium and Denmark); and Canada. Table 2.7 provides data on the vessel traffic to the public terminals along the Columbia and Willamette Rivers.

Table 2.6 – Public Terminal Vessel Traffic (2005)

Vessel Type (Commodities)	Port of Portland	Port of Vancouver
Containers	92	1
Autos	242	38
Dry Bulks	308	148
Breakbulk	36	122
Other	6	43
Total	*684*	*352*

Source: Jim Daly - Port of Portland, 9/25/2006; Katy Brooks- Port of Vancouver, 9/26/2006

Typically, marine cargo is loaded and unloaded over a period of two to five days in a regular rotation using cranes, fork-lifts, and other transfer equipment to load to and from docks. The time a vessel stays at a berth largely depends on the type of cargo being loaded or unloaded, and the size of the shipment. A panamax grain carrier receiving a 60,000-ton shipment may stay at berth for the better part of a week. By comparison, a typical automobile vessel can discharge its load in less than eight hours and is on berth for less than one day. A container vessel will be on berth typically one to two days.

Once loaded or discharged from vessel, cargo is moved to and from Portland Harbor marine terminals (including grain silos and soda ash storage facilities) by barge, truck, and rail. Portland enjoys the benefits of a thriving inland barge system that connects it with upriver ports in Oregon, Washington, and Idaho. The predominant cargos moving upstream are petroleum products and fertilizers; the predominant downstream cargos are grain, containers, and wood products.

Types of Vessels

The typical cargo ships visiting the region are known as Handymax ships, which are used to carry grains, minerals, lumber and wood products, automobiles, other bulk cargoes, and containers. Container ships regularly visit the Port of Portland and occasionally the Port of Vancouver, and include "Panamax" ships – so named because they are designed to be as large as possible and still be able to navigate through the Panama Canal. Typical Panamax ships hold approximately 4,000 twenty-foot equivalent units or TEUs, and require a minimum 43' draft.

So called Post-Panamax ships – a series of ever-growing ships which can hold between 6,000 and 14,000 TEUs, and require drafts of at least 46'-50' -- cannot navigate the Columbia River and Portland Harbor. These ships are generally used for Trans-Pacific and Asian-European trade. It is estimated that as much as 40 percent of the new cargo ships currently on order are of the Post-Panamax class.[5]

Panamax ship carrying containers through Panama Canal, courtesy Wikipedia, The Free Encyclopedia

Commodities Moved by Vessels

In addition to its enormous grain exports by sea, the region's marine ports are listed as the eighth largest U.S. port in terms of total export tonnage, and the 15th largest container port. The Port of Portland also ranks as the number one port gateway for automobiles on the West Coast, and handles the fourth highest volume of automobiles in the country. Table 2.8 lists the volume of cargo moved by commodity type.

Table 2.7 – Cargo Volumes by Commodity Type (2005)

Commodity Type	Port of Portland*	Port of Vancouver**
Containers (TEUs)	288,000	8,160
Intermodal (TEUs)	13,000	na***
Breakbulk (Metric Tons)	473,000	670,859
Automobiles (Units)	397,140	46,865
Bulk Grains (Metric Tons)	2,920,000	2,124,074
Bulk Minerals (Metric Tons)	3,825,000	678.774

*Source: * Provided by Jim Daly - Port of Portland, 9/25/2006*
*** Provided by Katy Brooks - Port of Vancouver, 9/26/2006*
**** Port of Vancouver does not report cargo as intermodal*

Marine Facilities

Port of Portland marine terminal facilities include:

- Terminal 6 (T-6) is the region's primary ocean container terminal on the Columbia River with rail, barge and steamship connections, and an integrated on-dock intermodal facility.
- Terminal 5 features the Columbia Grain, Inc. grain elevator, and a mineral bulk exporting facility (potash and other bulk commodities.
- Terminal 4 is a multi-purpose facility with seven ship berths handling grain, autos, forest products, steel, and dry and liquid bulks.
- Terminal 2 offers direct vessel to rail cargo movements, for general cargoes ranging from lumber and forest products to steel, machinery, and packaged goods.

[5] *Maritime Transportation Service Report to Congress: Trends and Competitive Pressures*, USDOT Maritime Transportation Service, Washington, DC, 2004, page III-2.

The Port of Vancouver marine terminals include:

- Terminal 4 accommodates the port's auto terminal (Subaru), lay berth facility, and sand and gravel cargo shipping, staging, and storage areas at three berths.
- Terminal 3 has two deep-water berths handle a wide-range of project and break-bulk commodities including wind turbines, trucks, pulp, lumber, plywood and steel, with corresponding storage/staging areas.
- Terminal 2 facilities accommodate five distinct types of cargo: project cargo; break-bulk; dry bulk (commodities such as copper concentrate and bentonite clay); liquid bulk (petroleum products); and, the United Grain Corporation's grain terminal. Direct transfer between railcar and vessel is offered, and track capable of handling 110-railcar unit trains meets each of the berths/storage facilities.

Figure 2.9 – Locations of Portland Region Marine Terminals

Aviation

While air cargo accounts for less than one percent of cargo tonnage moved in the region, the monetary value of that cargo is approximately $13,000/ton versus $1,300/ton for all of the region's cargo combined. Air cargo represents the fastest and most reliable means of shipping over long distances, as well as the mode with the highest cost, and generally moves shipments that are relatively small-sized, light in weight, and of high value. Air cargo is moved on both passenger (9% of total) and cargo aircraft, with the lion's share of domestic cargo moved by integrated carriers such as Fed Ex, UPS, DHL/Airborne. In 2005, air cargo movement involved over 34,000 separate flights and is expected to continue growing as evidenced in Table 2.9.

Table 2.8 - PDX Air Cargo Aircraft Operations (in 1,000's)

	2005	2010	2020
Jet/Air Carrier	12	14	20
Turboprop/Commuter	22	25	30
Total	34	39	50

Source: Portland International Airport Master Plan Low Growth Scenario (adopted after 9/11/01 terrorist attacks)

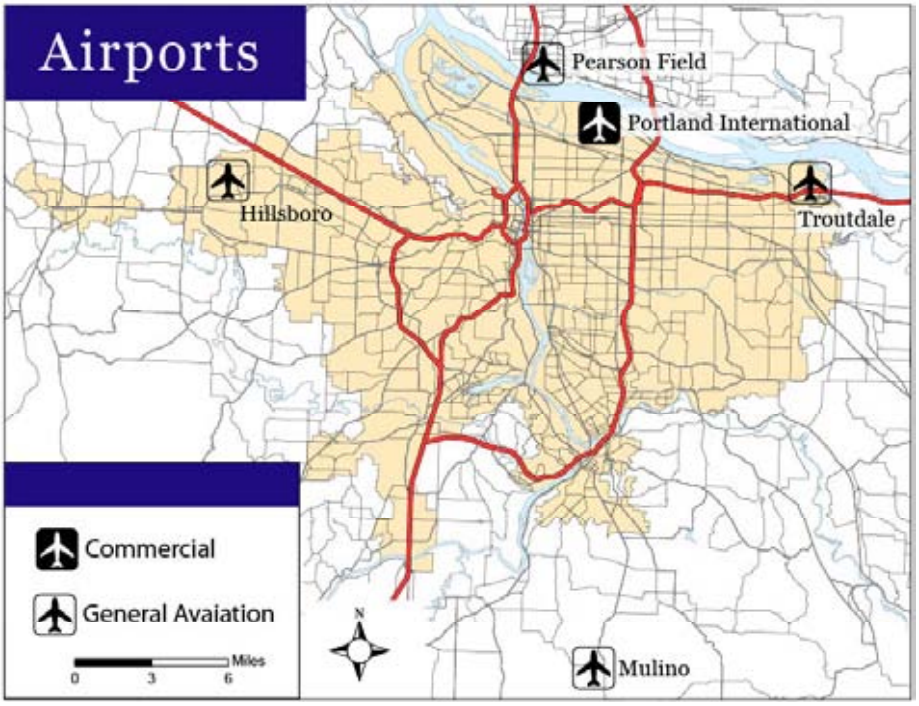
Air Facilities

Five airports, three of which are commercial facilities, serve the region (Figure 2.9). The Portland International Airport (PDX) handles 100% of international air cargo, and as much +90% of domestic air cargo. According to the Port of Portland Aviation Master Plan, PDX's two runways are expected to be operating at or near capacity before the year 2020. Another potential constraint to air cargo operations at PDX is noise levels of aircraft traveling during late night through early morning hours: the peak period for integrated air carriers. According to a recent report to the Port of Portland, "there are no problems anticipated regarding the airspace" [6] surrounding PDX.

There are currently 12 cargo facilities with a combined 661,000 sq. ft operating at PDX. In addition, PDX accommodates U.S. Customs and inspection activities at other facilities within the airfield property. Airfreight is also collected and distributed by freight-forwarders and customs brokers who are typically located at off -airport facilities.

[6] Portland/Vancouver International and Domestic Trade Capacity Analysis: Growth Opportunities and Challenges Assessment for Air Cargo Market (Draft), prepared for the Port of Portland by The Campbell-Hill Aviation Group, Inc., pages 9-10, August, 2006

Figure 2.10 – Locations of Portland Airports



Groundside Facilities at PDX

Since virtually all air cargo moves to and from a truck, the operations of the airport's gate, local roads, and regional highways are all critical components in the logistics of air cargo movement. Given the high dollar value and time-sensitivity factors associated with airfreight, efficient movement to and from groundside and airside is essential.

Access through PDX's air cargo gates is governed by security protocols that are evolving and changing just as they are at air passenger gates. Security clearances are mandatory for every truck driver moving goods into the gate areas.

A short haul transfer by truck is the way most air cargo moves between the airport and local warehouses and other facilities. Because air shipping operates under a very tight schedule, congestion on local roadways due to air passenger traffic and/or non-airport travel may impede the ability to meet flight schedules, potentially delaying shipments by a day or more.

Similarly, access between the airport and the local highway system, as well as the performance of the highway system near the airport, is a critical component of the air cargo shipment pattern, particularly for those carriers transporting cargo directly from a shipper to the airport.

Origins and Destinations.

The region's air cargo services provide the opportunity for shippers to reach the world's most far-flung markets. While direct airfreight service to Seoul, South Korea was suspended in May 2006, PDX provides direct air cargo movements to Japan, Germany, Canada, and Mexico. As shown in Table 2.10, 23,000 tons of international air cargo was moved to and from PDX in 2005.

Table 2.9 - Air Cargo Tonnage Carried in 2005

	Mail	Express Freight	General Freight	Total
Domestic	11,040	227,870*	26,050*	264,960
International	860*	na	na	23,040

Source: Portland/Vancouver International and Domestic Trade Capacity Analysis: Growth Opportunities and Challenges Assessment for Air Cargo Market (Draft), pages 6-8 August, 2006
** Estimated*

Air Cargo Handling and Transfer Equipment

Cargo planes typically load freight on pallets which are lifted into the belly of the aircraft (main level) which is fitted with rollers allowing for up to 30 pallets (i.e., on a Boeing 747 -400 plane, the mainstay of the integrated carrier fleet) measuring anywhere between 8' and 10' wide and 10' tall. A level below the main level, from which freight is loaded from the side of the aircraft, can carry as many as 14 specialty containers called "air stables" which measure about 64 inches. Some planes also load from the nose of the aircraft, which can be used for irregularly shaped cargo.

Cargo-hold area in the belly of a plane.

Loading cargo through the nose of a 747-400

Larger aircraft known as "Super Transporters" such as the Airbus "Beluga" are equipped with very large doors and cargo space that stretches the entire length and width of the plane. Often used for military purposes, these planes can carry as much as 47 tons of freight.

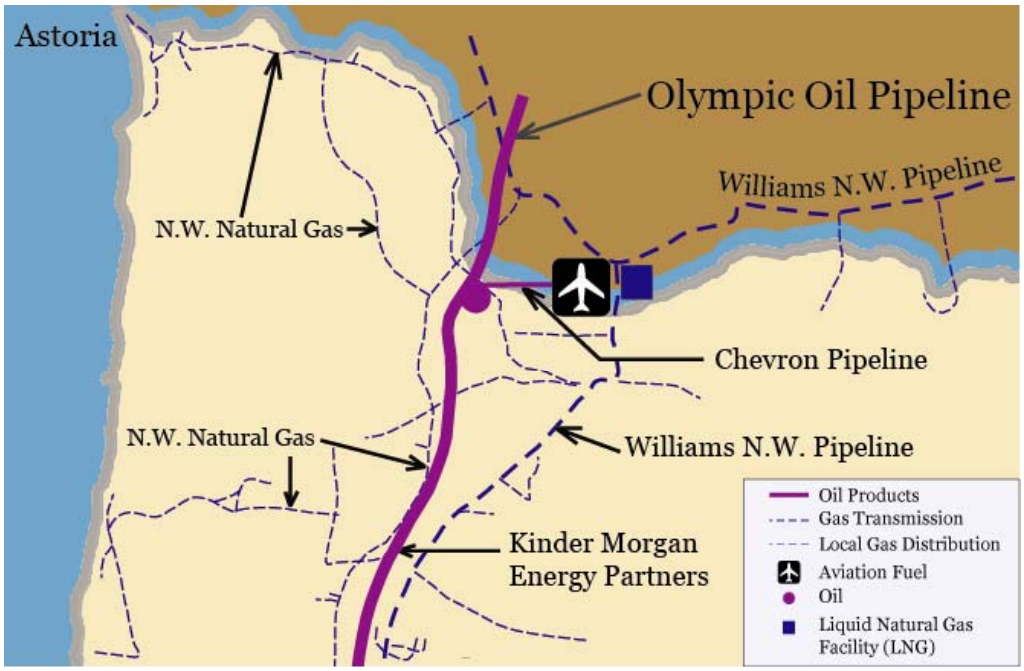
Pipeline

Petroleum products (gasoline, diesel fuel, and aviation jet fuel) make their way to Portland via the underground Olympic Pipeline (jointly owned by BP and Shell) between four refineries in the north Puget Sound to a distribution center in Renton, WA, to tank terminals in the NW Industrial District (also known as the Portland "tank farm"). From the "tank farm," petroleum product is distributed through local transmission pipes, including jet fuel to the Portland International Airport, and gasoline directly to industries and distribution centers.

Commodities Moved

While barges and trucks move some petroleum product into Oregon, the 400-mile long Olympic Pipeline is Oregon's principal source (65%) of petroleum transport, accounting for 2.1 billion gallons annually. According to the Pipeline and Hazardous Materials Safety Administration[7], if the pipeline was not available, "it would take a constant line of tanker trucks (about 750 per day), loading up and moving out every two minutes, 24 hours a day, seven days a week, to move the volume of even a modest pipeline. The railroad-equivalent of this single pipeline would be a train of 75 2,000-barrel tank rail cars everyday." Figure 2.10 illustrates the types and general routing of the region's pipeline network.

Figure 2.11 – Pipelines in the Portland-Vancouver Region



Terminal Facilities

The Olympic pipeline terminates in the City of Portland's Linnton –Willbridge area, along Highway 30. The area is home to the region's petroleum terminals owned by Kinder-Morgan and the BP West Coast Products and is the primary entry point and wholesale distribution hub for most of the region's processed petroleum products. From here, gasoline, diesel, and jet fuel is

7 http://www.phmsa.dot.gov/index.html

distributed to end-users by truck, rail, or pipeline. Barges transport petroleum products to eastern Oregon and beyond. Due to the its agglomeration of terminals and transport modes, and its significance to the regional and state economy, the area has been informally dubbed the "Linnton Energy Cluster."[8]

Underground Networks

Except for valve stations, the entire pipeline system is located underground (approximate depth averages between 7 and 10 feet; regulatory minimum of 3 feet, terrain permitting), including a tunnel under the Columbia and Willamette rivers**.**

Pipeline Dimensions

The dimension of the mainline pipeline between the Puget Sound refineries and the Renton center is a combination of 16" and 20" diameter pipe. Between Renton and Portland the pipeline is 14" in diameter. In addition, there are three lateral lines off the mainline ranging from 6" - 14" in diameter.

Local Distribution

Given the slow velocity of pipeline transmission (about the same as walking speed), delivery schedules must be planned 30 to 45 days in advance.

[8] *The Energy Cluster in Linnton,* Olympic Pipeline Company, BP West Coast Products LLC, Kinder-Morgan Energy Partners LP, June 27, 2005.

Section III: Public Policy and Freight Mobility

Introduction

This section provides an overview of the current policy and regulatory landscape governing the multimodal freight system at the different levels of government. Table 4.1 captures the complex and multifaceted role of public sector involvement in the movement of freight and goods in the Portland-Vancouver region.

Table 3.1 – Role of Public Sector Agencies in the Region's Freight Transportation System

Level	Agency	Infrastructure Development, Operations & Maintenance					Regulatory & Oversight					System Planning					Financing				
		R	T	A	O	W	R	T	A	O	W	R	T	A	O	W	R	T	A	O	W
Federal	US Treasury/US Customs						X	X	X	X	X										
	Federal Highway Admin (FHWA)	X	X					X					X				X	X			
	Federal Aviation Admin (FAA)			X					X					X					X		
	Maritime Admin (MARAD)											X	X		X						
	Federal Railroad Admin (FRA)	X					X					X					X				
	Motor Carrier Safety Administration							X													
	Economic Development Administration		X			X												X			X
	Transportation Security Admin (TSA)						X	X	X	X											
	Army Corps of Engineers				X					X					X					X	
	Surface Transportation Board						X														
	Environmental Protection Agency (EPA)						X	X	X	X	X										
State	Oregon Department of Transportation (ODOT)	X	X				X	X				X	X				X	X			
	Oregon Department of Aviation			X					X					X					X		
	Department of Environmental Quality (DEQ)						X	X	X	X	X										
	Oregon Economic & Community Development Dept (OECDD)																	X		X	
Local	Metro							X			X	X	X	X	X	X	X	X	X	X	X
	Port of Portland	X	X	X	X	X	X	X	X	X		X	x	X	X	X	X	X	X	X	X
	County governments		X				X	X			X	X	X	X	X	X		X			X
	Local governments		X				X	X			X	X	X	X	X	X		X			X

R - Railroads
T - Trucking
A - Air Cargo
O - Ocean/Waterborne Cargo
W - Warehousing

Federal

ISTEA to SAFETEA

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) was a landmark piece of federal transportation legislation, altering how all levels of government plan for and invest in the multimodal transportation system. ISTEA initiated a policy directive to develop a national intermodal transportation system that is economically efficient, environmentally sound, and move people and goods in an energy efficient manner. It recognized that with the interstate highway system largely complete, it was time to shift to managing and maintaining the system. As a result of ISTEA, state, regional, and local governments gained greater control and flexibility for transportation investment decisions in their jurisdictions. ISTEA amended state and metropolitan planning agency (MPO) requirements for better linkages: to non-traditional stakeholders, such as the freight industry; between the different transportation modes; and to transportation impacts on communities and the environment. Intermodal freight movement was identified as one of the 15 sound planning factors for MPO planning processes.

Since its adoption, subsequent transportation legislation has passed that continues and builds on the ISTEA paradigm shift. The Transportation Equity Act for the 21st Century (TEA 21) enacted

in 1998, was a $198 billion investment package continuing the ISTEA legacy of multimodal investment including freight system improvements, environmental protection, and safety improvements. The most recent reauthorization legislation, the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), was signed into law in August of 2005. Table 4.2 provides an overview of freight provisions within SAFETEA-LU.

Table 3.2 – Freight Provisions within SAFETEA-LU

Section	Name	Description	Allocation
Section 1301	Projects of National and Regional Significance	Projects of national and regional significance. Legislation requires that these projects be multi modal. Includes freight railroad projects.	$1.779 billion over 5 years
Section 1302	National Corridor Infrastructure Improvement Program	For projects in corridors of national significance to promote economic growth and international or interregional trade, such as connecting highway segments, serving freight volumes, reducing congestion, and serving high-value cargo.	$1.948 billion over 5 years for 33 designated projects
Section 1303	Coordinated Border Infrastructure Program	Program funds to border states to make operational improvements, construct and support transportation infrastructure, coordinate international planning operations in the border regions.	$833 million over 5 years
Section 1305	Truck Parking Facilities	Pilot program to address shortage of long-term parking. Includes construction of new facilities, modifying existing facilities, ITS.	$25 million over 4 years
Section 1306	Freight Intermodal Distribution Pilot Grant Program	Projects are to reduce congestion into/out of ports and establish/expand intermodal facilities and inland freight distribution centers.	$30 million over 5 years for 6 designated projects
Section 5204	(h) Training and Education: Freight Planning and Capacity Building Program	Initiative to support enhancements to freight planning to better target investment and strengthen decision-making capacity of state and local agencies.	$3.5 million over 4 years
Section 5209	National Cooperative Freight Transportation Research Program	National research program to be established in partnership with the National Academy of Sciences.	$15 million over 4 years
Section 1601	Transportation Infrastructure Finance and Innovation Act	Program project eligibility expanded to include public freight rail facilities or private (freight rail) facilities providing public benefit to highway users; intermodal freight transfer facilities; and access to facilities.	$610 million over 5 years. Minimum project size reduced to $50 million, ITS project minimum reduced to $15 million
Section 11-1143	Private Activity Bonds	Amended IRS statues to add Tax-exempt financing of privately owned or operated highway projects and rail-truck transfer facilities. Added a new qualifying entity: "qualified highway or surface freight transfer facility."	National Limit of $15 billion
Section 9002	Capital Grants for Rail Line Relocation Projects	Projects for local rail line relocation and improvement. Projects to result in improved vehicle traffic flow, improve quality of life and economic development	$1.4 billion of 4 years
Section 9003	Rehabilitation and Improvement Financing	Loans or loan guarantees for projects to enhance rail service and capacity.	$35 billion load authority

National Highway System

The U.S. National Highway System (NHS) comprises approximately 160,000 miles of roadway, including the Interstate Highways system and other roads, which are important to the nation's economy, defense, and mobility. Congress adopted the highway routes in the National Highway System as part of the National Highway System Designation Act of 1995. The NHS was developed by the United States Department of Transportation (DOT) in cooperation with the states, local officials, and metropolitan planning organizations (MPOs). Oregon's National Highway System routes total 470 miles of urban roads and 3,264 miles of rural roads. These roads provide access to air cargo terminals, deep draft ports, shallow draft cargo handling ports, and numerous other types of intermodal facilities.

Congress also designated major intermodal connectors as part of the National Highway System. In the Portland region, these include:

- The Port of Portland's Terminals 1,2,4,5, and 6
- Port of Vancouver, Washington
- Swan Island Ship Yard
- Portland International Airport
- NW Industrial Area Pipeline Terminal
- BNSF Lake Yard and Willbridge Yards
- Union Pacific Albina and Brooklyn Yards
- Portland Greyhound Bus Terminal
- Portland Amtrak Union Station
- City of Vancouver, Washington 7th Street Transit Center

A map of the National Highway System is provided in Section II, map 2.5.

Beginning with the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), several corridors on the National Highway System have been designated in Federal transportation legislation as high priority corridors. Specific funding in ISTEA, TEA-21, and SAFETEA-LU has been set aside for these corridors. Interstate 5 along the entire west coast is designated a high-priority corridor.

National Network

In 1982, the federal government enacted the Surface Transportation Assistance Act (STAA). The act requires states to allow larger vehicles (trucks) on a national network of roadways comprised of the Interstate Highway System and the non-Interstate Federal Aid Primary System. The STAA specifies the legal limit for height, width, length, and weight of trucks using the National Network roadways. The current federal gross vehicle weight limit is 80,000 lbs. The maximum federal width is 102 inches. Vehicles exceeding these limits require over-dimensional permits subject to Oregon Department of Transportation regulations.

The act also directs states and local jurisdictions to provide reasonable access for STAA legal-sized vehicles on their networks. State and local jurisdictions may not enact or enforce laws that deny reasonable access between the National Network and points of loading or unloading for legal-sized truck tractor-trailer and semi-trailer combinations, household goods carriers, or

passenger motor carriers. In addition, STAA legal vehicles must be given access within one mile of a National Network route using the most practicable and reasonable route available except for specific safety issues on individual routes.

In the Portland region, the National Network consists of the following routes:

- I-5, I-405, I-84, I-205
- US 26: I-405 to US 101
- US 30: I-405 (Portland) to US 101 (Astoria)
- OR 99E: I-84 (Portland) to OR 224 (Milwaukie)

National Initiatives

In April of 2006 the US Department of Transportation drafted a "Framework for a National Freight Policy." The framework has seven main objectives:

- Improve the operations of the existing freight transportation system.
- Add physical capacity to the freight transportation system in places where investment makes economic sense.
- Use pricing to better align all costs and benefits between users and owners of the freight system and to encourage deployment of productivity-enhancing technologies.
- Reduce or remove statutory, regulatory, and institutional barriers to improved freight transportation performance.
- Proactively identify and address emerging transportation needs.
- Maximize the safety and security of the freight transportation system.
- Mitigate and better manage the environmental, health, energy, and community impacts of freight transportation.

In May 2006, then US DOT Secretary Mineta announced the "National Strategy to Reduce Congestion on America's Transportation Network," which provides the framework for government officials and the private sector to take the steps to reduce congestion. The Department has a six-point plan for addressing congestion relief:

- Relieve urban congestion.
- Unleash private sector investment resources.
- Promote operational and technological improvements.
- Establish a "Corridors of the Future" competition.
- Target major freight bottlenecks and expand freight policy outreach.
- Accelerate major aviation capacity projects and provide a future funding framework.

State

Oregon's statewide planning goals, adopted in 1974, established state policies in 19 different areas, including Goal 12: Transportation (OAR 660-015-0000(12)), which states "To provide and encourage a safe, convenient and economic transportation system." The goal requires

transportation plans that consider all modes of transportation, including mass transit, air, water, pipeline, rail, highway, bicycle and pedestrian.

Like all statewide planning goals, this goal is achieved through local comprehensive planning. State law requires each city and county to adopt a comprehensive plan and the zoning and land-division ordinances needed to put the plan into effect. The local comprehensive plans must be consistent with the Statewide Planning Goals. Plans are reviewed for consistency by the state's Land Conservation and Development Commission (LCDC).

Transportation Planning Rule

The Land Conservation and Development Commission adopted the Transportation Planning Rule (TPR) (OAR 660-012) in 1991 to implement Statewide Planning Goal 12. The rule requires the state, the four metropolitan areas (Medford, Eugene, Salem and Portland), and all other cities and counties to adopt Transportation System Plans (TSPs). Each TSP is required to determine transportation needs and plans for roadway, transit, bicycle, pedestrian, air, rail, water, and pipeline facilities. TSPs in larger jurisdictions also are required to address transportation system management, demand management, parking, and finance. The TPR requires the development of modal system plans, including those for road, rail, and aviation systems.

Among other things, the TPR:

- requires the Oregon Department of Transportation (ODOT) to prepare a State Transportation System Plan (TSP) and identify a system of transportation facilities and services adequate to meet identified state transportation needs;
- directs counties and metropolitan organizations to prepare regional transportation system plans that are consistent with the state TSP;
- requires counties and cities to prepare local transportation system plans that are consistent with the regional plans.

Section 1(d) of the TPR, refers specifically to the efficient and safe movement of freight:
"Facilitate the safe, efficient and economic flow of freight and other goods and services within regions and throughout the state through a variety of modes including road, air, rail and marine transportation."

The TPR defines the elements required in a Transportation System Plan (OAR 660-012-0020). Section 2(b) defines the road elements required. Section 2(e) defines the air, rail, water, and pipeline elements:
"(e) An air, rail, water and pipeline transportation plan which identifies where public use airports, mainline and branchline railroads and railroad facilities, port facilities, and major regional pipelines and terminals are located or planned within the planning area. For airports, the planning area shall include all areas within airport imaginary surfaces and other areas covered by state or federal regulations"

Oregon State Transportation System Plan

Section 15 of the Transportation Planning Rule (OAR 660-012-0015) calls on the Oregon Department of Transportation to prepare, adopt, and amend the state Transportation System Plan.

The state TSP consists of the Oregon Transportation Plan and modal and topic plans (including the Aviation System Plan, the Bicycle/Pedestrian Plan, various Corridor Plans, the Oregon

Highway Plan, the Public Transportation Plan, the Rail Plan, the Transportation Safety Action Plan, and the Willamette Valley Transportation Strategy).

The following is a summary of major elements of the state TSP that impact freight.

Oregon Transportation Plan

The Oregon Transportation Plan (OTP), adopted in September 2006, is the state's guide for transportation policy and long-range, comprehensive planning for the multimodal transportation system. Developed by the Oregon Department of Transportation, the plan builds on the polices drafted in the 1992 plan and emphasizes maintaining the assets in place, optimizing the existing system performance through technology and better system integration, creating sustainable funding and investing in strategic capacity enhancements.

Goal 1 (Mobility and Accessibility) calls for several strategies in the development of an integrated multimodal system:
Strategy 1.1.1
Plan and develop a multimodal transportation system that increases the efficient movement of people and goods for commerce and production of goods and services that is coordinated with regional and local plans. Require regional and local transportation plans to address existing and future:

- Centers of economic activity;
- Routes and modes connecting passenger facilities and freight facilities;
- Intermodal facilities and industrial land; and
- Major intercity and intra-city transportation corridors and supporting transportation networks.

Strategy 1.1.2
Promote the growth of intercity bus, truck, rail, air, pipeline and marine services to link all areas of the state with national and international transportation facilities and services. Increase the frequency of intercity services to provide travel options.

Strategy 1.1.3
Identify transportation needs that extend beyond state borders to increase multimodal passenger and freight connections to state systems and to enhance interstate access to major destinations within and beyond Oregon. Cooperate with neighboring states to improve interstate travel.

Goal 3, Economic Vitality, calls for an integrated and efficient freight system:

"It is the policy of the State of Oregon to promote an integrated, efficient and reliable freight system involving air, barges, pipelines, rail, ships and trucks to provide Oregon a competitive advantage by moving goods faster and more reliably to regional, national and international markets"

The policy includes the following strategies:

- Develop coordinated state, regional, and local transportation plans and master plans that address current and future freight needs, issues, and economic strategies. Co-locate economic activities and appropriate transportation facilities with convenient and reliable access to freight transportation options.

- Work with local governments, ports, state agencies and landowners to protect industrial land near key transportation corridors and facilities.
- Encourage innovative technology, management and information sharing that will facilitate goods movement and economic strategies.
- Encourage communication among shippers, transportation providers, government agencies and jurisdictions to address freight transportation issues, challenges and opportunities across modes.
- Improve system efficiency and reduce conflicts by developing grade separations at rail and highway or roadway crossings whenever appropriate, by improving transportation networks and by enhancing connections with intermodal facilities.
- Systematically address barriers to efficient truck movements on roads and highways, including intermodal connectors, while balancing the needs and safe access of all modes.
- Give priority to freight mobility projects that are located on identified freight routes of statewide or regional significance, remove identified barriers to the safe, reliable and efficient movements of goods, and facilitate public and private investment that creates or sustains jobs.
- Encourage public/private partnerships to make strategic investments to respond to current and forecasted needs of rail shippers and transportation providers and to provide multimodal transportation options for industry.
- Cooperate and coordinate with state and federal agencies, other states, shippers and transportation providers to maintain and enhance current and forecasted air freight and passenger movements by supporting strategic, market-supported investments in air cargo terminals, airport facilities and equipment and links with surface transportation systems.
- Work with port districts, state and federal agencies, shippers and transportation providers to support strategic investments in marine transportation facilities to respond to current and forecasted needs.
- Support and facilitate expansion and development of capacity in pipelines to meet market demand and supply and enhance links with other modes.

Oregon Highway Plan

The Oregon Highway Plan (OHP), adopted in 1999, focuses specifically on Oregon's state highway system. The plan emphasizes efficient system management, partnerships with regional and local agencies, connecting land use and transportation, access management, connectivity between modes, and environmental and scenic resources.

The plan designates the State Highway Freight System in Policy 1C, which is intended to facilitate interstate, intrastate, and regional movements of trucks. This freight system, made up of the Interstate Highways and certain Statewide Highways on the National Highway System, includes routes that carry significant tonnage of freight by truck and serve as the primary interstate and intrastate highway freight connection to ports, intermodal terminals, and urban areas. The policy states:

"It is the policy of the State of Oregon to balance the need for movement of goods with other uses of the highway system, and to recognize the importance of maintaining efficient through movement on major truck freight routes"

The policy calls for four actions including:

- Apply performance standards appropriate to the movement of freight on freight routes.
- Prepare a statewide freight study to address the role of trucks and other freight modes in Oregon's economy, freight mobility and accessibility issues, current, near-term and long-term needs, and other topics.
- The development of corridor plans, which treat designated freight routes as Expressways where the routes are outside of urban growth boundaries and unincorporated communities. Continue to treat freight routes as Expressways within urban growth boundaries where existing facilities are limited access or where corridor or transportation system plans indicate limited access; and Recognize and balance freight needs with needs for local circulation, safety and access in Special Transportation Areas.
- Consider the importance of timeliness in freight movements in developing and implementing plans and projects on freight routes.

Policy 4A: Efficiency of Freight Movement pertains directly to freight movement:

It is the policy of the State of Oregon to maintain and improve the efficiency of freight movement on the state highway system and access to intermodal connections. The State shall seek to balance the needs of long distance and through freight movements with local transportation needs on highway facilities in both urban areas and rural communities.

The policy identifies seven implementing actions, including:

- Identify roadway obstacles and barriers to efficient truck movements on state highways. These include bridges with load limits and geometric constraints that prohibit the travel of legal size vehicles. Set up a process through the Statewide Transportation Improvement Program to systematically improve the highway segments that hinder or prevent freight movements.
- Encourage uniform commercial vehicle regulations at the regional and national levels where the safety and efficiency of Oregon's transportation system will benefit. These might include regulation regarding vehicle design.
- Support further development, standardization, and/or compatibility of Intelligent Transportation System Commercial Vehicle Operation technology in the western United States.
- Maintain and improve roadway facilities serving intermodal freight facilities that are part of Oregon’s Intermodal Management System, and support development of new intermodal roadway facilities where they are part of a local or regional transportation system plan.
- Support the establishment of stable funding or financing sources for transportation systems that will benefit the efficiency of freight movement on the highway system. These transportation systems include non-highway freight modes and intermodal connectors.
- Work with the private sector (e.g., carriers, shippers), local governments, metropolitan planning organizations, port authorities and others to improve planning coordination between public investments in highways and other investments in the freight movement infrastructure.

- Support the maintenance and improvement of non-highway infrastructure that provides alternative freight-moving capacity in critical corridors where doing so will maintain or improve the overall performance of the highway system.

In the Portland region, the State Highway Freight System includes:

- I-5, I-405, I-84, I-205
- US 26: I-405 to US 101
- US 30: I-405 (Portland) to US 101 (Astoria)
- OR 18/OR 99W: I-5 (Tigard) to US 101 (Lincoln City)
- OR 99E: I-84 (Portland) to OR 224 (Milwaukie)
- OR 217: US 26 (Beaverton) to I-5 (Tigard)
- OR 224/OR 212: OR 99E (Milwaukie) to US 26

Special Transportation Areas

The Oregon Highway Plan allows for ODOT to work with local jurisdictions in the creation of Special Transportation Areas (STAs). The plan defines an STA as a designated compact district located on a state highway within an urban growth boundary in which the need for appropriate local access outweighs the considerations of highway mobility except on designated Freight Highways. While traffic moves through an STA and automobiles may play an important role in accessing an STA, convenience of movement within an STA is focused upon pedestrian, bicycle and transit modes. In these areas freight needs are balanced with local accessibility needs. Speeds typically do not exceed 25 miles per hour.

Examples of Special Transportation Areas in the Portland region include State Street along Highway 43 in downtown Lake Oswego, Hall Boulevard east of Scholls Ferry Road in Washington Square Town Center, Tualatin-Valley Highway between 20th and 10th in Cornelius, and McLoughlin Boulevard between Scott Street and Blue Bird Street in Milwaukie.

Overdimensional Routes

Policy action 4A.2 of the Oregon Highway Plan states *"Encourage uniform commercial vehicle regulations at the regional and national levels where the safety and efficiency of Oregon's transportation system will benefit."* Oregon and its four neighboring states share common standards for maximum height (14'), maximum width (8'6"), and maximum allowable length (105'). Vehicles over those dimensions require a Special Transportation Permit.

The Oregon Motor Carrier Transportation Division oversees regulations concerning over-dimension operations. ORS Chapter 818 defines the allowable vehicle limits on roadways. The division also provides information on bridges in the state with weight restrictions.

Oregon Rail Plan

The Oregon Rail Plan, developed by ODOT in 2001, contains policies and plans concerning freight rail in the state. Included in the vision is the call to:

"…work with carriers, shippers and other groups to maintain and improve access to the national rail freight system, maintain a competitive environment for rail customers, strengthen the retention of local rail service, and assure a level playing field for all modes"

In 1994, the Oregon Transportation Commission adopted four policies relating to rail freight service:

Policy 1: Increase economic opportunities for the State by having a viable and competitive rail system.

- Stabilize and improve Oregon's access to the national rail system by maintaining a competitive environment for rail customers, assuring a level playing field for each mode, and assisting in removing capacity restraints.
- Promote intermodal centers where freight may be interchanged between rail and other modes by identifying suitable locations with adequate potential volumes and, if necessary, funding rail improvements and providing adequate highway access.
- Identify opportunities for improved rail service to Oregon's deep water ports, which will promote foreign trade by funding support facilities to reduce congestion and increase efficiency.

Policy 2: Strengthen the retention of local rail service where feasible.

- Where necessary, seek alternative ownership and/or operation of rail facilities in order to preserve service.
- Encourage increased use of rail service by promoting rail service opportunities, providing a wide range of intermodal facilities, and assisting localities and rail users to understand railroad economics, revenue needs of individual lines, and land use requirements.
- Utilize federal or state funds for rail service continuation assistance where appropriate. Preference should be given to those lines that upon analysis have a positive benefit over cost ratio and will not require public assistance for ongoing operations.

Policy 3: Protect abandoned rights-of-way for alternative or future use.

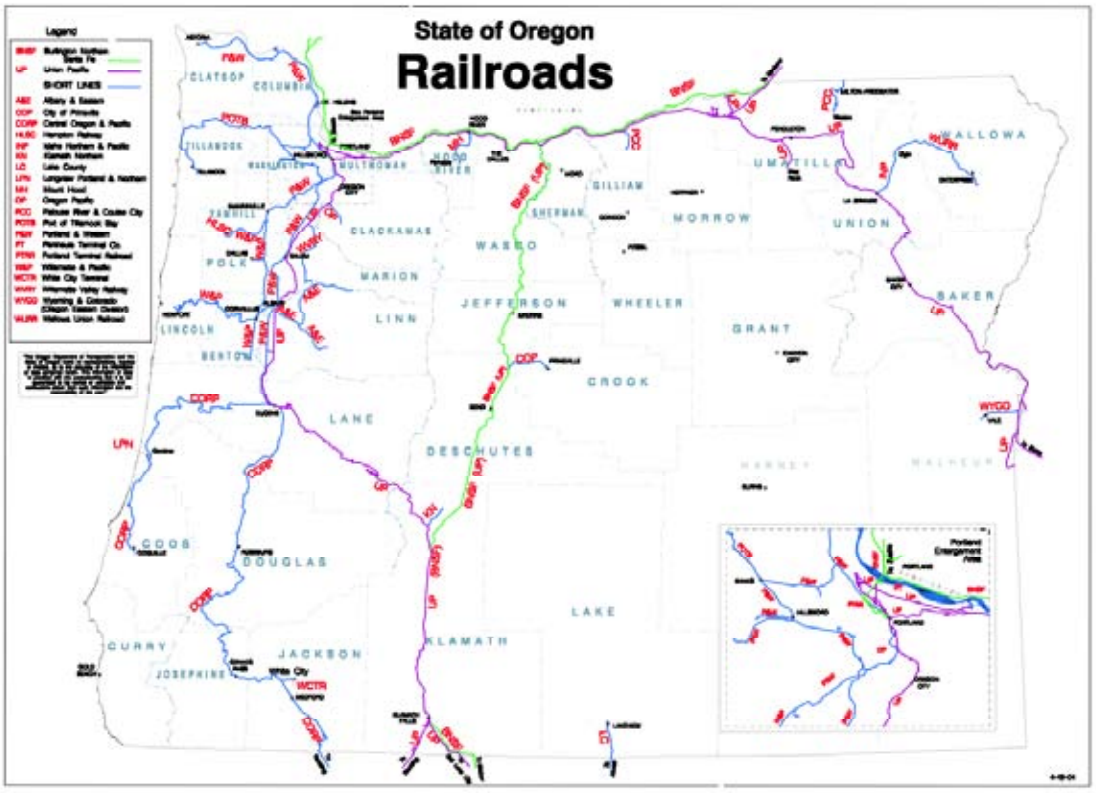
- Ensure that political jurisdictions and private groups are familiar with how to preserve and convert abandoned rail rights-of-way for Public Use and Interim Trail Use, as allowed under federal law.
- Use federal, state, and local funds to preserve rail rights-of-way for future transportation purposes.

Policy 4: Integrate rail freight considerations into the State's land use planning process.

- Recognize the social, economic, and environmental importance of rail freight service.
- Encourage land use zoning and ordinances that enhance and protect existing rail freight service.

- Work with communities to minimize conflicts between railroad operations and other urban activities.
- Assist in removing constraints to improved railroad operating efficiency within urbanized areas. Work with communities to consolidate or close existing grade crossings and prevent the establishment of unjustifiable new grade crossings.
- Encourage local jurisdictions to identify alternative uses for low-density branch line rights-of-way.

Figure 3.1 - Oregon Railroad System Map



Oregon Aviation Plan

Oregon Aviation Plan was adopted in 2000 by the Oregon Department of Aviation. The plan defines policies and investment strategies for Oregon's public-use aviation system for the next 20 years.

Policy 4, Economic Development, calls for supporting economic development by providing access to regional, state, national, and international markets. Policy 5, Intermodal Accessibility, calls for access to the air transport system and its connections. The policy states:

"Provide Oregon with an airport system that is integrated with surface transportation modes, and allows for a choice of modes for the movement of people and goods."

The policy has four primary actions:

- Work with airport owners and the FAA to identify airport ground access issues.

- Develop a comprehensive approach to airport ground access as part of local and regional transportation system plans, of corridor planning, and of modal planning.
- Provide information to airport owners on highway and other surface mode planning and programming efforts affecting airports.
- Encourage and support the integration of airports into local corridor and regional planning.

The Oregon Aviation Plan classifies the region's airports into five functional categories, as shown in Table 3.3:

Table 3.3 – Oregon Airport Functional Categories

Category	Significant Function	Designation Criteria
1 Commercial Service Airports	Accommodate scheduled major/national or regional/commuter commercial air carrier service.	Scheduled commercial service.
2 Business or High Activity General Aviation Airports	Accommodate corporate aviation activity, including business jets, helicopters, and other general aviation activities.	30,000 or more annual operations, of which a minimum of 500 are business related (turbine) aircraft.
3 Regional General Aviation Airports	Accommodate a wide range of general aviation users for large service areas in outlying parts of Oregon. Many also accommodate seasonal regional fire response activities with large aircraft.	Generally less than 30,000 operations. Geographically significant location with multiple communities in the service area. Nearest Category 1 airport is more than 90 minutes average travel time by road.
4 Community General Aviation Airports	Accommodate general aviation users and local business activities.	2,500 or more annual operations or more than ten based aircraft.
5 Low Activity General Aviation Airports	Accommodate limited general aviation use in smaller communities and remote areas of Oregon. Provide emergency and recreational use function.	Less than 2,500 annual operations and ten or fewer based aircraft.

For the Portland region, the Aviation Plan designates airports as follows:

- Portland International: Category 1
- Hillsboro: Category 2
- Troutdale: Category 2
- Mulino: Category 4

Oregon Freight Advisory Committee

The Oregon Freight Advisory Committee (OFAC) was first established in August 1998 to provide increased visibility for freight mobility and its vital role in the state's trade and transportation dependent economic sectors, such as forest products, agriculture, high-tech manufacturing, the commercial and retail trades, maritime commerce and the transportation equipment industry. In 2001, the Oregon Legislature formalized the committee through the passage of House Bill 3364, which called for the ODOT Director to appoint members of a Freight

Advisory Committee to advise the Director and the Oregon Transportation Commission (OTC) on issues, policies and program that impact multimodal freight mobility in Oregon.
The mission of the Freight Advisory Committee is to advise the Oregon Department of Transportation, Oregon Transportation Commission, and Oregon Legislature on priorities, issues and funding needs that impact multi-modal freight mobility and to advocate the importance of a sound freight transportation system to the economic vitality of the State of Oregon and the Pacific Northwest.

Regional

Metro 2040 Growth Concept

In 1995, Metro adopted the 2040 Growth Concept to define how the region should grow and develop over a 50-year planning horizon. The primary tenets of the concept include:

- Efficient use of land
- Protection of farmland and natural areas
- Balanced transportation system
- Healthy economy
- Diversity in housing options

The concept provides a strategy for guiding the region's growth into mixed-use centers and corridors with higher densities of development supported by a balanced transportation system. The concept identifies industrial areas as a primary component and acknowledges the importance of maintaining these areas as sanctuaries for long-term industrial activities.

The Regional Framework Plan, adopted in 1997, is the implementing plan for the 2040 Growth Concept. It provides the specific policies and guidelines that the local governments under Metro's jurisdiction incorporate in their local policies and strategies to implement 2040.

Regional Transportation Plan

The Regional Transportation Plan (RTP), adopted by Metro in 2000 and updated in 2004, is the Portland region's policy and investment guide for the multimodal transportation system. The Regional Transportation Plan is the transportation component of the 2040 Growth Concept and Regional Framework Plan. Policy 15 involves the Regional Freight System:

Policy 15.0. Regional Freight System
Provide efficient, cost-effective and safe movement of freight in and through the region.

a. Objective: Provide high-quality access between freight transportation corridors and the region's freight intermodal facilities and industrial sanctuaries.

b. Objective: Maintain a reasonable and reliable travel time for moving freight through the region in freight transportation corridors that enhances the region's economic competitive advantage.

• Freight operation (such as weigh-in-motion, automated truck counts, enhanced signal timing on freight connectors).

• Where appropriate, consider improvements that are dedicated to freight travel only.

c. Objective: Consider the movement of freight when conducting multi-modal transportation studies.

d. Objective: Work with the private sector, local jurisdictions, ODOT and other public agencies to:

• develop the regional Intermodal Management System (IMS) and Congestion Management System (CMS)

• monitor the efficiency of freight movements on the regional transportation network

• identify existing and future freight mobility problems and opportunities

• reduce inefficiencies or conflicts on the freight network

• maximize use of ship, rail, air and truck for a multi-modal freight system

• address safety concerns related to freight.

e. Objective: Coordinate public policies to reduce or eliminate conflicts between current and future land uses, transportation uses and freight mobility needs, including those relating to:

• land use changes/encroachments on industrial lands; and

• transportation and/or land use actions or policies that reduce accessibility to terminal facilities or reduce the efficiency of the freight system.

f. Objective: Ensure that jurisdictions develop local strategies that provide adequate freight loading and parking strategies in the central city, regional centers, town centers and main streets.

g. Objective: Develop improved measures of freight movement as defined in the 2040 Growth Concept.

h. Objective: Correct existing safety deficiencies on the freight network relating to:

• roadway geometry and traffic controls;

• bridges and overpasses;

• at-grade railroad crossings;

• truck infiltration in neighborhoods; and

• congestion on interchanges and hill climbs.

Policy 15.1. Regional Freight System Investments

Protect and enhance public and private investments in the freight network.

a. Objective: Improve opportunities for partnerships between the private freight transportation industry and public agencies to improve and maintain the region's integrated multi-modal freight network:

• work with the private transportation industry, Oregon Economic Development Department, Portland Development Commission, Port of Portland and others to identify and realize investment opportunities that enhance freight mobility and support the state and regional economy

b. Objective: Analyze market demand and linkages in estimating and expanding the life of public investments in the freight network.

c. Objective: Encourage efforts to provide flexible public funding for freight mobility investments.

The Regional Transportation Plan defines the Regional Freight System, which include the following categories:

- **Main roadway route**. Main roadway routes connect major activity centers in the region to other areas in Oregon or other states throughout the U.S., Mexico and Canada.
- **Road connectors**. A road that connects freight facilities or freight generation areas to the main roadway route.
- **Main railroad line.** Class I rail lines (e.g., Union Pacific and Burlington Northern/Sante Fe).
- **Branch railroad lines**. Non-Class I rail lines, including shortline or branch lines.
- **Marine facility.** A facility where freight is transferred between water-based and land-based modes.
- **Reload facility.** A facility that serves as the primary gateway for freight entering and leaving the region by truck.
- **Air cargo facility.** A facility that has direct access to an airport runway and transfers commodities between airplanes and land-based modes.
- **Distribution facility.** A facility where freight is reloaded from one land-based mode to another for further distribution.
- **Truck terminal.** A facility that serves as a primary gateway for commodities entering/leaving the region by truck. A truck terminal operates only truck to truck transfers of commodities.
- **Intermodal facility.** An intermodal facility is a transportation element that accommodates and interconnects different modes of transportation and serves the statewide, interstate and international movement of people and goods.
- **Intermodal railyard.** An intermodal railyard is a railyard that facilitates the transfer of containers or trailers between truck and rail.

Port of Portland

The Port of Portland is the port district responsible for overseeing Portland International Airport, general aviation, and marine activities in the Portland region. The Port owns seven marine terminals, seven business parks, and four airports.

The Port developed the Marine Terminals Master Plan 2020. The plan has three primary goals:

- Optimize Port marine facilities through the identification and prioritization of improvements required to maintain, redevelop, and build-out existing marine Terminals 2, 4, 5 and 6;
- Create a 10-year Capital Improvement Plan using a 20-year planning horizon; and
- Develop a road map for investment decisions by the Port, its stakeholders and customers.

The Portland International Airport Master Plan was developed in 2000. The plan includes a facility plan with forecasts for passengers, cargo, and operations and facility development to meet projected growth. It also includes sections on environmental planning, citizen involvement, capacity preservation, and strategies to maintain viability.

The Port of Portland initiated an update to the Hillsboro Airport's Master Plan and Compatibility Study Update in June 2003. The goal of the master plan is to ensure that Hillsboro Airport meets future demand for aviation services while also being sensitive to local community issues. The Troutdale Airport Master Plan update was completed in 2004. Among other findings, the report

determined that the airport facilities are generally well-suited their for current and future role, and that the airport has adequate aviation capacity and land supply for the next 20 years. The Port of Portland is currently in the process of updating the 1993 Mulino Airport Layout Plan.

Port of Vancouver

The Port of Vancouver is a multi-purpose port authority located in Vancouver, Washington. The port is comprised of three districts encompassing an area of 111 square miles with a population of almost 300,000. The Port is governed by three elected Commissioners who are responsible for setting the overall policy and goals for Port operations and development.

County and City Transportation System Plans

As required by the state Transportation Planning Rule, local jurisdictions include freight policies and network maps within their Transportation System Plans. The City of Portland adopted the Portland Freight Master Plan in 2006.

Section IV - Logistics Profiles

Shipping and receiving goods between producers and customers often involves multiple transfers of those goods between different modes and distribution centers. During transit, those goods may be consolidated with other shipments, re-packaged, inspected, re-loaded, require special handling and other delivery requirements, all while maintaining inventory control and monitoring of their transport progress. Moreover, each mode and terminal has different operating practices and time windows, and in combination with the above represent the new standard for moving goods through domestic and international global supply chains. Expediting and organizing these processes is known as "logistics."

This paper examines the logistics systems of the following four major Portland area shippers: Albertsons Grocery Chain, Intel, Nike, and Stimson Lumber. These organizations are representative of some of the largest traded sectors in metropolitan area, including food products, apparel, hi-technology and timber products. Each of these shippers use multiple modes to move goods, including trans-oceanic ship, airplane, rail, and truck between regional, U.S., Canadian and Mexican destinations, and in the case of Nike and Intel, throughout the world.

In addition, these organizations were selected for interview because they were surveyed about their logistics practices in 2003[1]. The previous interviews – which included surveys of 19 other metropolitan area companies – identified logistics practices and how the regional transportation network influenced them. The interviews also included their opinions about some of the strengths and weaknesses in the area's freight transportation network. These companies were interviewed again because the nature of domestic and international freight movement is so dynamic that some of the conclusions made in 2003 were believed to have changed. As shown in these four "Logistics Stories", there have been comprehensive changes in not only the methods companies use to move freight, but where they are storing and moving their goods. Moreover, their opinions for how the regional freight transportation works has changed in the three years since they were last interviewed.

[1] *Industry Supply Chain Profile*", prepared by Cambridge Systematics, Inc. for the Port of Portland, July 11, 2003

Logistics Story I: Albertsons, Inc

17505 NE San Rafael, Portland, OR 97230-5923

Each week the national Albertsons grocery chain receives 525 truckload and 25 containers at its Portland distribution center, and ships 525 truckloads to 130 stores throughout Oregon, Washington and northern Idaho. Except for two containers/month shipped to Portland during peak season periods, all overseas imports are received at their Meridian, ID distribution center via the port of Long Beach. The majority of their goods are delivered to and from Portland by their own fleet (96% outbound deliveries and 33% inbound deliveries), with inbound deliveries dominated by LTL carriers bringing in brand name products from local manufacturers or distribution centers. All goods received at and shipped from the Portland Distribution Center arrive and depart by truck.

Inbound shipments of groceries are sourced from all over the U.S., with some sundries products shipped from overseas. The most pressing performance criteria for inter-plant shipments using third party carriers include on-time delivery, equipment availability, price and adequate insurance. In addition to the outbound deliveries directly to stores, Albertsons moves products between their distribution centers, sometimes using LTL services.

They identified several transportation network and operations issues that affect their logistics plans. Congestion on I-5, particularly in the Puget Sound, I-205 in the region, and the two regional Columbia River crossings (i.e., lack of another crossing) are at the heart of their operational problems. In addition, some city ordinance curfews restrict deliveries to certain portions of the day.

Recent Changes in Logistics Practices and Networks

In January 2006 Supervalu Stores purchased the Albertsons food chain and major changes in the logistics governing the Portland Distribution Center are expected. For example, Albertsons used 19 distribution centers throughout the U.S. (Portland was the second or third largest) and they were headquartered in Boise, ID. Supervalu Stores is headquartered in Eden Prairie, MN and uses many more distribution centers in many more locations for its logistics. While interviews were not held with the Supervalu Stores logistics staff, it is likely that there will be some consideration of changes to the current Portland Distribution Center's operations.

Strengths and Weaknesses of the Portland Region's Distribution Network

Albertsons reiterated many of the comments they made in 2003 about the region's transportation systems and networks. They continue to believe that the region provides good rail rates, that ODOT provides a high level of road maintenance, that the weigh-in-motion program saves time, the higher truck weights save money, and there are no tolls in the region. Weaknesses include road congestion, and the lengthy rail transit time in the area. They believe another crossing of the Columbia River is needed, and that more highway lanes are needed throughout the region.

Logistics Story II: Intel, Inc

HF2-08, 5200 NE Elam Young Pkwy, Hillsboro, OR 97124-6497

Ranked 53rd on the Fortune 100, Intel is an international manufacturer of wafers and finished computer chips (processors), employing 82,000 people worldwide, including 17,000 at its seven campuses in Washington County. It is the company's largest and most complex site in the world[2]. According to a 2003 study, Intel has generated $9 billion in economic impact within Oregon[3], considered the largest economic impact of any single employer in the state[4]. Its 2005 revenues were $38.8 billion.

Intel receives raw materials and equipment from all points of the globe via air, ocean, truck, and small package services. Raw materials are shipped by ocean carrier with more than 20 FEUs/month year-round (the number of air and truck trips was not provided but were indicated to be "sizable"). Construction equipment is also a heavy source of freight because Intel is continuously changing its infrastructure to accommodate their technological advances. There are a variety of critical performance criteria for their inbound shipments including handling (i.e., damage) and security capability, service, price, on-time delivery, and interface with Intel's inventory systems.

Intel manages its logistics and transportation operations, and uses DGF[5] for marine, DGF and EGL for air, EGL for long-haul truck, and Fed Ex, DGF and UPS for small package service. They use warehouse space provided by third party logistics providers, including United Van Lines in Portland and BAX at their Ronler Acres and Aloha facilities. BAX and EGL deliver raw materials, computer systems, equipment, and mail between the Washington County facilities multiple times each day.

Challenges for inbound cargo include: 1) traffic congestion on US 26 which results in 1.5 hours travel time between Hillsboro facilities and PDX Airport; 2) lack of choice and consistency in international airline services; and, Customs being closed over weekends. The lack of international service has resulted in Intel using San Francisco as their gateway for Oregon inbound shipments, and trucking those goods to the Washington County facilities.

Outbound shipments share many of the characteristics as inbound (e.g., destinations are international and domestic, involve same products, and are impacted by similar air service and highway congestion issues), with the major exception being that most shipments travel by intermodal to the East Coast and Europe.

Recent Changes in Logistics Practices and Networks

Three fabrication facilities that were under construction in 2003 are now in full operation, and traffic congestion on roadways used to and from local facilities, interstate highways, and air and marine facilities have grown worse as development has increased. Production and market demand have increased since 2003, and construction of additional facilities will probably occur within the next five years, further straining the logistics strategies that are in use. Intel is still concerned

[2] Intel, Inc. Web Site – Intel in Your Community, Oregon, 2006, http://www.intel.com/community/oregon/index.htm

[3] *Economic Impact of Intel's Oregon Operat*ions, ECONorthwest, Inc., 2003, ftp://download.intel.com/community/oregon/downloads/ECONorthwest.pdf

[4] Ibid.

[5] DGF acquired Excel and DHL in the past few years.

about the lack of international airline service in the region, and drays most of its outbound cargo through Sea-Tac Airport (i.e., about twice as much as cargo shipped through PDX Airport)

Strengths and Weaknesses of the Portland Region's Distribution Network

Intel repeated many of the comments they made in 2003 about the advantages of Portland's freight transportation network (i.e., there are some direct-call ocean carriers, and carriers are flexible), and the weaknesses of the regional network (i.e., lack of alternate routes and signal synchronization). They believe the most important transportation operations changes that could be made in the region are focused on increasing air service.

Logistics Story III: Nike, Inc

One Bowerman Drive, Beaverton, OR 97005-6453

Founded in 1964, Nike is perhaps Oregon's best known regional headquartered brand, and is the only Oregon-based company in the Fortune 500. The company employs 26,000 people worldwide, including 14,000 in the U.S., and 7,000 at its Beaverton campus. In addition to the Nike brand, the company owns and operates six other sportswear and sports equipment subsidiaries, and over 200 retail outlets, which generated revenues of $15 billion in 2006. Nike operates eight (8) U.S. distribution centers: Wilsonville, OR, Tigard, OR, Memphis, TN, Greenland, NH, and the California cities of Foothill Ranch, Ontario, Fontana, and Costa Mesa.

While most of Nike's manufacturing and assembly occurs in Asia, Latin America and Europe, its' Beaverton and Tigard facilities still manufacture airbags and golf clubs, respectively. Nike's footwear line – which produced entirely overseas – travel by ship (62,000 TEUs using four ocean carriers) to the ports of Los Angeles/Long Beach (54%), Seattle (25%), various east coast ports (9%), Portland (7%), and Oakland, CA (5%). Air shipments (10 million kilos allocated over three air lines) travel primarily through Los Angeles and Chicago. From marine ports and airports, goods are generally shipped by rail to distribution centers, including 950 containers/year to the Wilsonville facility. Nike also contracts with integrated motor carrier services such as Federal Express and UPS, and long-haul motor carriers including C.H. Robinson, Schneider Trucking and Gordon Trucking.

Recent Changes in Logistics Practices and Networks

Nike will be closing its Wilsonville distribution center in 2008 (moving those operations to Memphis, TN), and cease using the Port of Portland that same year for footwear products "unless Portland gets a first call vessel for their containers." They intend to transfer Port of Portland footwear shipments to the ports of Seattle/Tacoma and will be selling the Wilsonville facility. The Tigard facility will continue to manufacture golf clubs, but Nike promotions have moved from Tigard to Memphis, TN, and footwear samples moved from the Portland region to Chicago because "Chicago is an international air freight gateway; with Portland Nike always needed to add two days from other international gateways like Los Angeles.[6]"

With respect to logistics challenges, Nike remains concerned with infrastructure congestion issues especially in the Southern California area and along the rail routes to Memphis and other Mid-West destinations. Nike's cargo is time sensitive so they utilize a number of West Coast and several East Coast ports in order to create as many service options as possible. Nike is looking ahead to the 2008 International Longshore and Warehouse Union (ILWU) negotiations in hopes the parties reach a favorable agreement; and thereby, avoid a strike or work stoppage such as the 11-day work stoppage that occurred in 2002.

Strengths and Weaknesses of the Portland Region's Distribution Network

Nike reiterated several points it made in its 2003 interview, namely the Portland area is free of the congestion issues facing other West Coast ports, and customs services here work very well. The loss of Korean Airlines for air freighter service was a disappointment. The rail network between Portland and Seattle has created delays for container shipments to Wilsonville and with the lack of certainty on transit time, more containers are being drayed by truck from Seattle-Tacoma by

[6] Comments by John Isbell, Director of Corporate Delivery Logistics for Nike in interview with Sorin Garber (Sorin Garber Consulting Group) on October 19, 2006

truck to Wilsonville. The Free Trade Zone at T-6 is a positive attribute for Portland. From Nike's perspective, the major weakness for the Port of Portland is that there are no ocean carriers that Nike uses that have first direct calls to Portland. From a longer-term perspective, the Columbia River channel depth and the resulting inability to accommodate post-Panamax ships may create other issues for the Port.

As a general comment, Nike believes Oregon has a good transportation system. When asked about other states they operate in, Nike pointed to the State of Washington as being a good model for how the public sector can effectively invest in infrastructure: "generally they're (the State of Washington) pro-active and tend to get things done."

Logistics Story IV: Stimson Lumber Company

520 SW Yamhill Ste 700, Portland, OR 97204-1330

Based in Portland, OR, and with over 400,000 acres of company-owned timber-land in Idaho, Montana, Oregon and Washington, Stimson Lumber Company is one of the oldest, continuously operating forest products companies in the United States. Stimson Lumber sells forest products and manufactured wood products throughout the U.S., as well as to customers in Australia, Japan, China and other Asian destinations, from ten manufacturing facilities including Forest Grove, St. Helens, Clatskanie, and Tillamook.

Stimson Lumber's supply chain extends from its timber harvest lands to their ten plants and mills, before being shipped by rail and truck to private and public reload centers, customer distribution centers (e.g., Lowes and Home Depot), and marine, rail and truck terminals. International shipping is completed solely by ship (four ocean carriers) from the ports of Portland, Seattle and Coos Bay (85% containerships, 15% bulk ships). Rail (shortline operators to the Union Pacific Railroad-UPRR and Burlington Northern & Santa Fe Railway-BNSF) is used to ship throughout the west and other U.S. destinations (6,000 rail cars annually), as well as truck (5,000 truck loads).

Recent Changes in Logistics Practices and Networks

Since the 2003 interview, Stimson has sold its Chehalis, WA gluelam beam plant and transferred stud manufacturing from a plant in Priest River, ID to its Hauser, ID facility. Overall production has remained steady, but production has increased at its Forest Grove facility by 33%, and decreased by 60% from its Tillamook operation. Shipping overseas has dropped by 50 containers (40' equivalents) per year, or 25%. In addition, the railroads they use have encouraged them to use 65' center-beam rail cars (i.e., moving away from the standard 50' box car), which carries more product, but is not always the most cost-effective equipment for their shipments. Finally, they see that their predominant use of 65' "maxi-trailer" trucks is becoming out-moded in the industry; a trend which they believe will increase their shipping costs by truck.

Strengths and Weaknesses of the Portland Region's Distribution Network

Stimson's goals are to move from truck to rail as much as possible, however, use of rail has presented two major challenges. First, the "paper barrier" issues that exist between the short line operators they use and the restrictions placed on them by the Class 1 carriers (e.g., UPRR and BNSF do not permit unrestricted access to other railroads, terminals customers, etc., from the shortline operations -- such as the Portland & Western Railroad -- they work with) forces them to use trucks more often than they'd like. In addition, some of the capacity and operating characteristics of the shortline carrier's infrastructure restricts movements and speeds. While Stimson does not expect much relief from the "paper barrier" restrictions, they are encouraged by efforts by the State of Oregon through its *ConnectOregon* program which granted funds to upgrade Portland & Western Railroad track along the Segher's Branch to be able to handle 286,000 lb loads and result in an increase in speed from 10mph to 25mph to and from its Forest Grove mill.

As a short-haul operation, Stimson is very much challenged by growing congestion on Portland region freeways. For example, they can only reliably complete two trips to Vancouver/day where they were able to make three trips to Vancouver/day in 2003.

Appendices

Appendix A – Comparative Characteristics of Modes References

Reference Sources for Information provided in table: *Comparative Characteristics of Freight Modes.*

Comparative Characteristics of Freight Modes

	Max Tonnage (gross tonnage weight)	*Avg Miles /Trip*	*Avg Long-Haul MPH*	*Ability to Handle Fragile Goods (g)*	*BTUs/ Ton-Mile*	*Emissions/ Ton-Mile*
Truck	50/truck (a)	247 (f)	50-70 (g)	Good	3,337 (k)	3.25 gms (n)
Rail	12,000/train (b)	617 (f)	50-70 (g)	Fair	345 (k)	0.5 gms (n)
Ship	10,000-65,000 (c)	511 (f)	22.5 knots (h)	Fair	471 (k)	unavailable
Barge	14,500 (d)	511 (f)	12-13 knots (i)	Fair	368 (l)	unavailable
Air	124 (e)	1,070 (f)	300-600 (g)	Excellent	28,000 (m)	unavailable
Pipeline	na	na	3-4 (j)	na	na	na

Notes:

(a) Oregon permits truck gross tonnage weights up to 105,500 lbs; excluding over-dimensional loads.

(b) Typical unit freight trains in the Pacific Northwest range in size from 100 to 110 rail cars, with capacity of 112-tons/rail car.

(c) *Wikipedia, The Free Encyclopedia*, http://en.wikipedia.org/wiki/Panamax and http://en.wikipedia.org/wiki/Handymax, and confirmed by Jim Daly, Port of Portland, September 2006

(d) *Alternate Transportation Mode Comparison*, US Army Corps of Engineers; Columbia/Snake River barges have maximum capacity of 3,500 tons, and four can be towed together.

(e) *Boeing Commercial Airplanes: 747 Freighter Family Background*, http://www.boeing.com/commercial/747family/pf/pf_400f_back.html

(f) *TRANSEARCH and USDOT Freight Analysis Framework Project* (unpublished data), Reebie Associates, 2002 – See Figure 3. http://climate.dot.gov/workshop1002/caldwell.pdf#search=%22Length%20of%20average%20air%20cargo%20trips%22

(g) Professional judgment

(h) *The Time Factor in Liner Shipping Services*, Theo Nottebaum, Table 6, 2001, http://www.palgrave-journals.com/mel/journal/v8/n1/fig_tab/9100148t6.html

(i) *Utilizing Inland Waterway, Coastal and Open Ocean Barging of Containerized Agricultural Products to Overcome Existing Service*, U.S. Dept of Agriculture, 8/2005. *http://www.ams.usda.gov/tmd/FSMIP/FY2004/OR0431.pdf#search=%22travel%20speed%20of%20fully%20loaded%20Columbia%20River%20barges%22*

(j) Minutes of Portland Freight Committee meeting (9/1/2005) of Presentation by BP, http://www.portlandonline.com/shared/cfm/image.cfm?id=95575

(k) *Transportation Energy Data Book: Edition 24* Oak Ridge National Laboratory, (Oak Ridge, TN: 2004,

http://www.ops.fhwa.dot.gov/freight/freight_analysis/nat_freight_stats/docs/05factsfigures/table5_10.htm

(l) Impacts of a Snake River Drawdown on Energy and Emission Based on Regional Economic Co-efficients, Trent Ball and Ken Casavant, Washington State University-Department of Agricultural Economics, Aug 2001 http://ntl.bts.gov/DOCS/TNW2001-06.html

(m) *Energy Use in Freight Transportation*, Alice Rivlin, Congressional Budget Office, 1982 http://www.cbo.gov/showdoc.cfm?index=5330&sequence=0

(n) *Railroads: Building a Cleaner Environment*, American Association of Railroads, July 2004

Appendix B - Glossary[1]

Average Annual Daily Truck Traffic (AADTT) - The total annual volume of truck traffic on a highway segment, divided by the number of days in the year.

Backhaul - The process of a transportation vehicle (typically a truck) returning from the original destination point to the point of origin. A backhaul can be with a full or partially loaded trailer.

Barge - The cargo-carrying vehicle that inland water carriers primarily use. Basic barges have open tops, but there are covered barges for both dry and liquid cargoes.

Belly Cargo - Airfreight carried in the belly of passenger aircraft.

Bill of Lading - A transportation document that is the contract of carriage containing the terms and condition between shipper and carrier.

Bottleneck - A section of a highway or rail network that experiences operational problems such as congestion. Bottlenecks may result from factors such as reduced roadway width or steep freeway grades that can slow trucks.

Boxcar - An enclosed railcar, typically 40 or more feet long, used for packaged freight and some bulk commodities.

Breakbulk Cargo - Cargo of non-uniform sizes, often transported on pallets, sacks, drums, or bags. These cargoes require labor-intensive loading and unloading processes. Examples of breakbulk cargo include coffee beans, logs, or pulp.

Broker - A person whose business it is to prepare shipping and customs documents for international shipments. Brokers often have offices at major freight gateways, including border crossings, seaports, and airports.

Bulk Cargo - Cargo that is unbound as loaded; it is without count in a loose unpackaged form. Examples of bulk cargo include coal, grain, and petroleum products.

Cabotage - A national law that requires coastal and intercoastal traffic to be carried in its own nationally registered, and sometimes built and crewed ships.

Capacity - The physical facilities, personnel, and process available to meet the product of service needs of the customers. Capacity generally refers to the maximum output or producing ability of a machine, a person, a process, a factory, a product, or a service.

Cargo Ramp - A dedicated load/unload facility for cargo aircraft.

Carload - Quantity of freight (in tons) required to fill a railcar; amount normally required to qualify for a carload rate.

Carrier - A firm that transports goods or people via land, sea, or air.

Centralized Dispatching - The organization of the dispatching function into one central location. This structure often involves the use of data collection devices for communication between the centralized dispatching function, which usually reports to the production control department and the shop manufacturing departments.

Chassis - A trailer-type device with wheels constructed to accommodate containers, which are lifted on and off.

Claim - Charges made against a carrier for loss, damage, delay, or overcharge.

Class I Carrier - A classification of regulated carriers based upon annual operating revenues- motor carrier of property greater than or equal to $5 million; railroads: greater than or equal to $50 million: motor carriers of passengers; greater than or equal to $3 million.

[1] Federal Highway Administration – Freight Professional Development Program, Office of Operations, http://ops.fhwa.dot.gov/freight/fpd/glossary/

Class II Carrier - A classification of regulated carriers based upon annual operating revenues- motor carrier of property $1- $5 million; railroads: $10-$50 million: motor carriers of passengers; less than or equal to $3 million.

Class III Carrier - A classification of regulated carriers based upon annual operating revenues- motor carrier of property less than or equal to $1 million; railroads: greater than or equal to $10 million.

Classification Yard - A railroad terminal area where railcars are grouped together to form train units.

Coastal Shipping - Also known as short-sea or coastwise shipping, describes marine shipping operations between ports along a single coast or involving a short sea crossing.

Contract Carrier - A carrier that does not serve the general public, but provides transportation for hire for one or a limited number of shippers under a specific contract.

Commodity - An Item that is traded in commerce. The term usually implies an undifferentiated product competing primarily on price and availability.

Consignee - The receiver of a freight shipment, usually the buyer.

Consignor - The sender of a freight shipment, usually the seller.

Container - A "box"' typically ten to forty feet long, which is used primarily for ocean freight shipment. For travel to and from ports, containers are loaded onto truck chassis' or on railroad flatcars.

Container on Flatcar (COFC) - Containers resting on railway flatcars without a chassis underneath.

Containerization - A shipment method in which commodities are placed in containers, and after initial loading, the commodities per se are not re-handled in shipment until they are unloaded at destination.

Containerized Cargo - Cargo that is transported in containers that can be transferred easily from one transportation mode to another.

Contract Carrier - Carrier engaged in interstate transportation of persons/property by motor vehicle on a for-hire basis, but under continuing contract with one or a limited number of customers to meet specific needs.

Cubage - Cubic volume of space being used or available for shipping or storage.

Deadhead - The return of an empty transportation container back to a transportation facility. Commonly used description of an empty backhaul.

Detention Fee - The carrier charges and fees applied when rail freight cars, ship, and carriers are retained beyond a specified loading or unloading time.

Demurrage - The carrier charges and fees applied when rail freight cars and ships are retained beyond a specific loading or unloading time.

Direct to store - Process of shipping direct from a manufacturer’s plant or distribution center to the customer’s retail store, thus bypassing the customer’s distribution center.

Dispatcher - An individual tasked to assign available transportation loads to available carriers.

Distribution Center (DC) - The warehouse facility which holds inventory from manufacturing pending distribution to the appropriate stores.

Dock - A space used or receiving merchandise at a freight terminal.

Double-stack - Railcar movement of containers stacked two high.

Drayage - Transporting of rail or ocean freight by truck to an intermediate or final destination; typically a charge for pickup/delivery of goods moving short distances (e.g., from marine terminal to warehouse).

Drop - A situation in which an equipment operator deposits a trailer or boxcar at a facility at which it is to be loaded or unloaded.

Durable Goods - Generally, any goods whose continuous serviceability is likely to exceed three years.

Exempt Carrier - A for-hire carrier that is free from economic regulation. Trucks hauling certain commodities are exempt from Interstate Commerce Commission economic regulation. By far the largest portion of exempt carrier transports agricultural commodities or seafood.

Flatbed - A trailer without sides used for hauling machinery or other bulky items.

For-hire Carrier - Carrier that provides transportation service to the public on a fee basis.

Freight All Kinds (FAK) - Goods classified FAK are usually charged higher rates than those marked with a specific classification and are frequently in a container that includes various classes of cargo.

Freight Forwarder - A person whose business is to act as an agent on behalf of a shipper. A freight forwarder frequently consolidates shipments from several shippers and coordinates booking reservations.

Free Trade Zone (FTZ) - An area or zone set aside at or near a port or airport, under the control of the U.S. Customs Service, for holding goods duty-free pending customs clearance.

Fuel-Taxed Waterway System - Eleven thousand miles of the U.S. waterway system designated by the Water Resources Development Act of 1986. Commercial users of this system pay a per gallon fuel tax which is deposited in the Inland Waterways Trust Fund and used to fund inland navigation projects each year.

Four P's - Set of marketing tools to direct the business offering to the customer. The four P's are product, price, place, and promotion.

Gross Vehicle Weight (GVW) - The combined total weight of a vehicle and its freight.

Hazardous Material - A substance or material which the Department of Transportation has determined to be capable of posing a risk to health, safety, and property when stored or transported in commerce.

Hours of Service - Ruling that stipulates the amount of time a driver is allotted to work.

Hub - A common connection point for devices in a network. Referenced for a transportation network as in "hub and spoke" which is common in the airline and trucking industry.

In-bond Shipment - A shipment status in which goods are permitted to enter a country and temporarily stored for transport to a final destination where the duty will be paid.

Inbound Logistics - The movement of materials from shippers and vendors into production processes or storage facilities.

Interline Freight - Freight moving from point of origin to destination over the lines of two or more transportation lines.

Intermodal terminal - A location where links between different transportation modes and networks connect. Using more than one mode of transportation in moving persons and goods. For example, a shipment moved over 1000 miles could travel by truck for one portion of the trip, and then transfer to rail at a designated terminal.

Inventory - The number of units and/or value of the stock of good a company holds.

Just-in-Time (JIT) - Cargo or components that must be at a destination at the exact time needed. The container or vehicle is the movable warehouse.

Lead-time - The total time that elapses between an order's placement and it receipt. It includes the time required for order transmittal, order processing, order preparation, and transit.

Less-Than-Containerload/Less-Than-Truckload (LCL/LTL) - A container or trailer loaded with cargo from more than one shipper; loads that do not by themselves meet the container load or truckload requirements.

Level of Service (LOS) - A qualitative assessment of a road's operating conditions. For local government comprehensive planning purposes, level of service means an indicator of the extent or degree of service provided by, or proposed to be provided by, a facility based on and related to the operational characteristics of the facility. Level of service indicates the capacity per unit of demand for each public facility.

Lift-on/Lift-off (lo/lo) Cargo - Containerized cargo that must be lifted on and off vessels and other vehicles using handling equipment.

Line Haul - The movement of freight over the road/rail from origin terminal to destination terminal, usually over long distances.

Liquid Bulk Cargo - A type of bulk cargo that consists of liquid items, such as petroleum, water, or liquid natural gas.

Live Load - As situation in which the equipment operation stays with the trailer or boxcar while being loaded or unloaded.

Lock - A channel where the water rises and falls to allow boats to travel a dammed river.

Logbook - A daily record of the hours an interstate driver spends driving, off duty, sleeping in the berth, or on duty not driving.

Logistics - All activities involved in the management of product movement; delivering the right product from the right origin to the right destination, with the right quality and quantity, at the right schedule and price.

Lumpers - Individuals that assist a motor carrier owner operator in the unloading of property; quite commonly used in the food industry.

Neo-bulk Cargo - Shipments consisting entirely of units of a single commodity, such as cars, lumber, or scrap metal.

Node - A fixed point in a firm's logistics system where goods come to rest; includes plants, warehouses, supply sources, and markets.

OS&D - Over, short and damaged. Report is issued at warehouse when goods are damaged; claim is usually filed with the carrier.

On-dock Rail - Direct shipside rail service. Includes the ability to load and unload containers/breakbulk directly from rail car to vessel.

Outbound Logistics - The process related to the movement and storage of products from the end of the production line to the end user.

Operating Ratio - A measure of operation efficiency defined as: (Operating Expenses/Operation Revenues) x 100.

Owner-operator - Trucking operation in which the owner of the truck is also the driver.

Placard - A label that identifies a hazardous material shipment and the hazards present.

Piggyback - A rail/truck service. A shipper loads a highway trailer, and a carrier drives it to a rail terminal and loads it on a flatcar; the railroad moves the trailer-on-flatcar combination to the destination terminal, where the carrier offloads the trailer and delivers it to the consignee.

Pool/Drop Trailers - Trailer that are staged at a facilities for preloading purposes.

Point of Sale (POS) - The time and place at which a sale occurs, such as a cash register in a retail operation, or the order confirmation screen in an on-line session. Supply chain partners are interested in capturing data at the POS because it is a true record of the sale rather than being derived from other information such as inventory movement.

Port Authority - State or local government that owns, operates, or otherwise provides wharf, dock, and other terminal investments at ports.

Private Carrier - A carrier that provides transportation service to the firm that owns or leases the vehicles and does not charge a fee.

Private Warehouse - A company owned warehouse.

Prepaid - A freight term, which indicates that charges are to be paid by the shipper. Prepaid shipping charges may be added to the customer invoice, or the cost may be bundled into the pricing of the product.

Proof of Delivery - Information supplied by the carrier containing the name of the person who signed for the shipment, the time and date of delivery, and other shipment delivery related information.

Pull Logistics System - "Just in time" logistics system driven by customer demand and enabled by telecommunications and information systems rather than by manufacturing process and inventory stockpiling.

Purchase Order (PO) - The purchaser's authorization used to formalize a purchase transaction with a supplier. The physical form or electronic transaction a buyer uses when placing an order for merchandise.

Push Logistics System - Inventory-based logistics system characterized by regularly scheduled flows of products and high inventory levels.

Rail Siding - A very short branch off a main railway line with only one point leading onto it. Sidings are used to allow faster trains to pass slower ones or to conduct maintenance.

Reefer Trailer - A refrigerated trailer commonly used for perishable goods.

Regional Railroad - Railroad defined as line-haul railroad operating at least 350 miles of track and/or earns revenue between $40 million and $266.7 million.

Reliability - Refers to the degree of certainty and predictability in travel times on the transportation system. Reliable transportation systems offer some assurance of attaining a given destination within a reasonable range of an expected time. An unreliable transportation system is subject to unexpected delays, increasing costs for system users.

Reverse Logistics - A specialized segment of logistics focusing on the movement and management of products and resources after the sale and after delivery to the customer. Includes product returns and repair for credit.

Receiving - The function encompassing the physical receipt of material, the inspection of the shipment for conformance with the purchase order (quantity and damage), the identification, and delivery to destination, and the preparation of receiving reports.

Return to Vendor (RTV) - Material that has been rejected by the customer or buyer's inspection department and is awaiting shipment back to supplier for repair or replacement.

Radio Frequency (RFID) - A form of wireless communication that lets users relay information via electronic energy waves from a terminal to a base station, which is linked in turn to a host computer. The terminals can be placed at a fixed station, mounted on a forklift truck, or carried in the worker's hand. The base station contains a transmitter and receiver for communication with the terminals. When combined with a bar-code system for identifying inventory items, a radio

frequency system can relay data instantly, thus updating inventory records in so-called "real time".

Roll-on/Roll-off (ro/ro) Cargo - Wheeled cargo, such as automobiles, or cargo carried on chassis that can be rolled on or off vehicles without using cargo handling equipment.

Seasonality - Repetitive pattern of demand from year to year (or other repeating time interval) with some periods considerably higher than others. Seasonality explains the fluctuation in demand for various recreational products, which are used during different seasons.

Shipper - Party that tenders goods for transportation.

Shipping Manifest - A document that lists the pieces in a shipment.

Short Line Railroad - Freight railroads, which are, not Class I or Regional Railroads that operate less than 350 miles of track and earn less than $40 million.

Short-sea Shipping - Also known as coastal or coastwise shipping, describes marine shipping operations between ports along a single coast or involving a short sea crossing.

Sleeper Team - Two drivers who operated a truck equipped with a sleeper berth; while one driver sleeps in the berth to accumulate mandatory off-duty time, the other driver operates the vehicle.

Stock Keeping Unit (SKU) - A category of unit with unique combination of form, fit and function.

Stock Outs - Merchandise that is requested by a customer but is temporarily unavailable. Also referred to as (OOS).

Stop Off Charge - Charge associated with a load that has more than one drop off point. Typically, the first stop of a multi-stop load is free, and then the charge applies to the subsequent stops.

Strategic Highway Network (STRAHNET) - A network of highways which are important to the United States' strategic defense policy and which provide defense access, continuity, and emergency capabilities for defense purposes.

Strategic Rail Corridor Network (STRACNET) – Interconnected/continuous 38,000 mile rail line network serving over 170 defense installations.

GloSwitching and Terminal Railroad - Railroad that provides pick-up and delivery services to line-haul carriers.

Supply Chain - Starting with unprocessed raw materials and ending with final customer using the finished goods.

TEU - Twenty-foot equivalent unit, a standard size intermodal container.

Third-party Logistics (3PL) Provider – Logistics specialist who may provide a variety of transportation, warehousing, and logistics-related services to buyers or sellers. These tasks were previously performed in-house by the customer.

Throughput - Total amount of freight imported or exported through a seaport measured in tons or TEUs.

Ton-mile - A measure of output for freight transportation; reflects weight of shipment and the distance it is hauled; a multiplication of tons hauled by the distance traveled.

Trailer on Flatcar (TOFC) - Transport of trailers with their loads on specially designed rail cars.

Transit time - Total time that elapses between a shipment's delivery and pickup.

Transloading - Transferring bulk shipments from the vehicle/container of one mode to that of another at a terminal interchange point.

Truckload (TL) - Quantity of freight required to fill a truck, or at a minimum, the amount required to qualify for a truckload rate.

Twenty-foot Equivalent Unit (TEU) - The 8-foot by 8-foot by 20-foot intermodal container is used as a basic measure in many statistics and is the standard measure used for containerized cargo.

Unit Train - A train of a specified number of railcars handling a single commodity type which remain as a unit for a designated destination or until a change in routing is made.

Vehicle Miles of Travel (VMT) - A unit to measure vehicle travel made by a private vehicle, such as an automobile, van, pickup truck, or motorcycle.

Warehouse - Storage place for products. Principal warehouse activities include receipt of product, storage, shipment, and order picking.

Appendix C - Acronyms

AAPA	American Association of Port Authorities
AASHTO	American Association of State Highway and Transportation Officials
ACE	Automated Commercial Environment
ATA	American Trucking Association
BTS	Bureau of Transportation Statistics
CBP	Customs Border Protection
CDL	Commercial Drivers License
CFS	Commodity Flow Survey
CMAQ	Congestion Mitigation Air Quality Act
CMV	Commercial motor Vehicle
CTPAT	Customs Trade Partnership Against Terrorism
CVISN	Commercial Vehicle Information Systems and Networks (CVISN), a national program administered by the Federal Motor Carrier Safety Administration designed to improve motor carrier safety and to enhance the efficiency of administrative processes for industry and government.
CVO	Commercial Vehicle Operations
DOD	Department of Defense
FAST	Free and Secure Trade
FHWA	Federal Highway Administration
FMCSA	Federal Motor Carrier Safety Administration
FPD	Freight Professional Development
FRA	Federal Railroad Administration
GIS	Geo Information Systems
GPS	Global Positioning System
HERS	Highway Economic Requirements Systems
HPMS	Highway Performance Monitoring System
ITE	Institute of Transportation Engineers
ITS	Intelligent Transportation System
MPG	Miles Per Gallon
MUTCD	Manual on Uniform Traffic Control Devices
NAFTA	North American Free Trade Agreement
NHS	Nation Highway System
NVOCC	Non- Vessel Operating Common Carriers
P&D	Pick up and delivery.
POD	Proof of Delivery
POE	Port of Entry
SED	Shipper's Export Declaration
SCAC	Standard Carrier Alpha Code
SCAC	Standard Carrier Alpha Code
SCAC	Standard Carrier Alpha Code
SLSC/SLDC	Shipper Load, Shipper Count/Shipper Load, Driver Count
STCC	Standard Transportation Commodity Classification
SCAC	Standard Carrier Alpha Code
SLSC/SLDC	Shipper Load, Shipper Count/Shipper Load, Driver Count
STCC	Standard Transportation Commodity Classification
TRANCAD	Transportation Computer Assisted Design

UFC	Uniform Freight Classification

New Look
The Regional Transportation Plan

2035 Regional Transportation Plan Update

Background Paper:

A Profile of Regional Travel Options and Parking Management Systems

Prepared by:

METRO
PEOPLE PLACES • OPEN SPACES

DISCUSSION DRAFT
November 27, 2006

Metro
People places • open spaces

Clean air and clean water do not stop at city limits or county lines. Neither does the need for jobs, a thriving economy and good transportation choices for people and businesses in our region. Voters have asked Metro to help with the challenges that cross those lines and affect the 25 cities and three counties in the Portland metropolitan area.

A regional approach simply makes sense when it comes to protecting open space, caring for parks, planning for the best use of land, managing garbage disposal and increasing recycling. Metro oversees world-class facilities such as the Oregon Zoo, which contributes to conservation and education, and the Oregon Convention Center, which benefits the region's economy.

Your Metro representatives

Metro Council President – David Bragdon
Metro Councilors – Rod Park, District 1; Brian Newman, District 2; Carl Hosticka, deputy council president, District 3; Susan McLain, District 4; Rex Burkholder, District 5; Robert Liberty, District 6.
Auditor – Alexis Dow, CPA

Metro's web site: www.metro-region.org

2035 Regional Transportation Plan Update

A Profile of Regional Travel Options and Parking Management Systems

TABLE OF CONTENTS

I. Introduction

This paper is one of a series of papers that provide background research and analysis to guide Regional Transportation Plan (RTP) update policy discussions. The papers describe trends and research affecting the regional transportation system, current regional transportation planning policies and regulatory requirements, a profile of the existing transportation system and policy implications to be addressed in the RTP to respond to identified policy gaps and key findings of the background research. Collectively, the background papers will inform future policy discussions by Metro Policy Advisory Committee (MPAC), Joint Policy Advisory Committee on Transportation (JPACT) and the Metro Council and lead to an updated RTP.

This paper provides a profile of the regional travel options and parking management systems in the Portland metropolitan region. The trends shaping future travel needs and performance of the current transportation system are essential considerations for the development of effective goals and strategies to address regional travel options and parking management systems needs in the Portland metropolitan region. The paper concludes with a list of key findings and policy recommendations to be considered during the RTP update process.

II. Background

The Regional Travel Options (RTO) Program implements regional transportation demand management (TDM) policy and strategy to reduce reliance on the automobile and promote alternatives to driving for all trips. Managing demand for parking is also critical to successfully reducing reliance on the automobile. TDM and parking policy benefits are:

- **Maximizing regional transportation investments** in auto, transit, rideshare, pedestrian, bicycle and telecommute infrastructure by introducing residents to effective ways of using each system (e.g., new LRT corridor).
- **Promoting balanced use** of the existing system (e.g., increasing awareness and use of non-SOV options)
- **Reducing auto trips** (e.g., trip-chaining)
- **Limiting the need to build** new infrastructure (especially important during times of global increases in cost for raw materials and energy resources).
- **Lowering maintenance** cost per capita.
- **Reducing the use of land for parking** through policies, pricing and designing parking that gives preference to using transportation options (e.g., carpool, biking).
- **Reviving community health** by overcoming barriers for parents, children, seniors and other community segments that have recently reduced their physical mobility (i.e., biking and walking).

TDM and parking management supports, and has many connections to all outcomes (2040 Growth Concept fundamentals).

Foremost, regional TDM and parking management policy seeks to restore and protect a **healthy environment** for current and future residents. Current motor vehicle transportation systems burn non-renewable fossil fuels that negatively impact air quality. They are the largest single source of air pollution in the Portland area. Roads and parking lots are impervious to rain, which collects roadway pollutants that runoff the street affecting water quality. Community health is affected by excessive noise resulting in

stress, air pollutants that result in health conditions, and street design when it presents a barrier to both physical activity for young and aging populations. TDM and parking management advances the region toward sustainable transportation and toward zero or restorative impacts on the natural environment.

TDM provides the "how-to" of balancing the public's demands on transportation systems. TDM balances regional **transportation choices** using operations, financial incentives, messaging, promoting, informing and creating tools to aid the public in making the best use of transportation infrastructure. TDM also facilitates reductions in trips per capita through trip-chaining (combining errands), telework and alternative work schedules. Parking management, and connecting the price of parking to its users, influences the public's choice of how to use it and mode choice.

A **healthy economy** grows from a balanced transportation system that maximizes use of infrastructure for citizens and business. Citizens benefit from learning less expensive ways to get around and local suppliers of goods and services to meet their needs (e.g., through individualized marketing coupon books featuring local businesses). Businesses benefit from slower increases in congestion and ability for their workforce to arrive at work reliably by a variety of means. The RTO system can respond quickly during economic fluctuations, such as change in the supply and price of fuel, which is an asset to maintaining resiliency of the local economy. Parking management results in less expense across the economy, since parking costs are passed from development to residents, businesses and shoppers.[1]

TDM supports quality travel options for every income and age range, complementing **equity** of transportation investments. Stakeholders are invited from all over the region to convene an open decision-making process, resulting in a balance of regional and local programs.

TDM explains the benefits and removes barriers to transportation options such as biking, walking and carpooling. Implementing TDM is a significant component of creating **vibrant communities** by overcoming perceptions that keep individuals from using transit, sharing rides or feeling safe in urban areas. Assets to TDM are well-planned transportation infrastructure and land use that supports a mix of businesses, residential development and re-generative development in centers. TDM operations, financial incentives, messaging, promotions, information and tools help new and existing residents improve their access to the community. The community is more resilient to fluctuations in energy availability and better prepared to deal with emergencies, like a flu epidemic.

Finally, TDM is a major tool to implement regional **fiscal stewardship** of both public and private resources. Managing demand for existing infrastructure maximizes the benefit of past and present regional investments. Investments in corridors more frequently include TDM as an alternative, or partial alternative, to building new infrastructure. Rising capital and operations costs, because of global demand for materials and energy, will mean a greater emphasis on non-capital alternatives.

III. Trends and Recent Research

This section identifies new trends and research since the last Regional Transportation Plan.

Expanding Scope of Transportation Demand Management Strategies

The scope of TDM has expanded beyond work-related trips to include trips generated by households, trips related to schools, and all other trip purposes. New strategies were piloted, researched and implemented such as individualized marketing. Parking is seen as a greater cost both in materials and land.

[1] The High Cost of Free Parking, Donald C. Shoup, 2005, p.2

2005 Metro Modal Targets Project

The July 2005 "Evaluation of Potential Measures for Achieving Modal Targets" highlighted a number of effective means to achieve increases in the share of trips made using non-single-occupant vehicle modes.

> *The most effective strategies included parking pricing, transportation-efficient development and area-wide application of peak-period or mileage-based strategies.*[2]

A literature review on TDM strategies and their impact on mode share is summarized into a table of the report (reprinted on the next three pages). Chapter 3 of the report then describes strategies and tools for further or future implementation. The study points out that it is difficult to compare (let alone rank) strategies by modal share impact because of difficulty isolating changes. Even when "…quantitative information was available on changes in ridership or VMT related to a given strategy…such changes could not directly be converted to mode share with any degree of confidence."[3]

Table 2. Summary of Literature Review Research

Strategy	Quantitative Evidence (SOV)	U.S. Studies	Oregon Studies	Relative Ease of Implementation	Applicability (PDX Region)	Regional Applicability				Modal Share Impact
						Central City, Regional and Town Centers	Targeted Areas	Transit/Mixed-use Corridors	Other Urban Areas	
Land Use										
Connectivity	○	●	●	◒	●	✓	✓	✓	✓	1% - 2% VMT
Transportation-Efficient Development	●	●	●	◒	●	✓		✓		15% - 24% SOV [12]
Parking										
Parking Pricing	●	●	●	●	●	✓	✓	✓	✓	2.5% - 5% SOV [12] 20% SOV [1] 5% - 35% SOV [1]
Parking Supply and Management	●	●	●	◒	◒	✓		✓		28% RDI [1]; 40% - 50% PKD
Timed Parking	●	●	○	●	●		✓			
Fare Free Area										
Fareless Area	●	●	●	◒	◒	✓				2% - 3% SOV
Transit										
Bus Service Improvements	◒	●	●	●	●	✓	✓	✓	✓	4% - 30% RDI
Demand Responsive / ADA Service	○	●	○	◒	●	✓	✓	✓	✓	40% wheelchair RDI
High Capacity Transit Service	◒	●	◒	◒	●	✓		✓		20% - 72% of new riders shifted mode from auto; 92% RDI over previous bus route

[2] Evaluation of Potential Measures for Achieving Modal Targets, July 2005, http://www.metro-region.org/article.cfm?ArticleID=12130

[3] Evaluation of Potential Measures for Achieving Modal Targets, July 2005, p.30,34 http://www.metro-region.org/article.cfm?ArticleID=12130

Strategy	Quantitative Evidence (SOV)	U.S. Studies	Oregon Studies	Relative Ease of Implementation	Applicability (PDX Region)	Regional Applicability				Modal Share Impact
						Central City, Regional and Town Centers	Targeted Areas	Transit/Mixed-use Corridors	Other Urban Areas	
HOV Lane	◒	●	○	◒	◒			✓		Reduce vehicle trips 4% - 30%
Park-and-Ride/ Carpool Lots	●	●	●	◒	●				✓	40% - 60% SOV [2]
Pricing and Fares	●	○	●	◒	○					18% SOV; 12% - 59% mode shift from auto
Site Design / Accessibility	●	●	○	◒	●	✓	✓	✓	✓	2% to 4.75% SOV [12]
Transportation Management and Employer-Based Strategies										
Alternate Work Schedule and Telecommute	◒	●	○	●	●	✓	✓	✓	✓	Auto commute reduced 7% - 10% [9]
Carshare	◒	●	●	◒	●	✓				47% VMT [10]
Guaranteed Ride Home	○	●	○	◒	●				✓	N/A
Rideshare	○	●	○	◒	●	✓	✓	✓	✓	Represents 2% - 7% of commute trips
Shuttle Service	--	--	--	--	--				✓	N/A
Marketing and Promotion	◒	●	●	●	●	✓	✓	✓	✓	21% RDI
Bicycle and Pedestrian										
Bikeway Improvements	◒	○	●	●	●	✓	✓	✓	✓	1 – 4% SOV; 100 – 150% Bike RDI [13]
Elimination of Auto Access	--	--	--	--	--	✓				N/A
Encouragement, Promotional and Individualized Marketing Programs	●	●	●	●	●	✓	✓	✓	✓	6% SOV; 12% VMT
End-of-Trip Facilities	●	●	●	◒	●	✓	✓	✓	✓	77% SOV [4]
Free Bike and "Smart Bike" Programs	○	○	●	◒	◒		✓			N/A
Pedestrian Improvements [7]	--	--	--	--	--	✓	✓	✓	✓	N/A
Safe Routes to School	●	●	○	●	●	✓	✓	✓	✓	13% SOV [11]
Traffic Calming	○	○	○	◒	◒	✓	✓	✓	✓	5% - 54% Ped/Bike RDI
Pricing										
Congestion Pricing	●	●	●	●	◒	✓	✓	✓	✓	15% – 30% transit RDI; 1% - 3% SOV; 28% - 30% transit shift [3]
Vehicle Miles Traveled Tax	○	○	○	○	○	✓	✓	✓	✓	13% VMT [5]
Vehicle Miles Traveled Insurance	○	●	○	◒	◒	--	--	--	--	13% VMT [6]

Strategy	Quantitative Evidence (SOV)	U.S. Studies	Oregon Studies	Relative Ease of Implementation	Applicability (PDX Region)	Regional Applicability				Modal Share Impact
						Central City, Regional and Town Centers	Targeted Areas	Transit/Mixed-use Corridors	Other Urban Areas	

Evidence of Mode Share Impact
-- = No evidence
● = Direct evidence of impact on SOV use or mode share
◒ = Anecdotal relationship, including quantitative evidence of change in VMT
○ = Indirect relationship based on anecdotal evidence

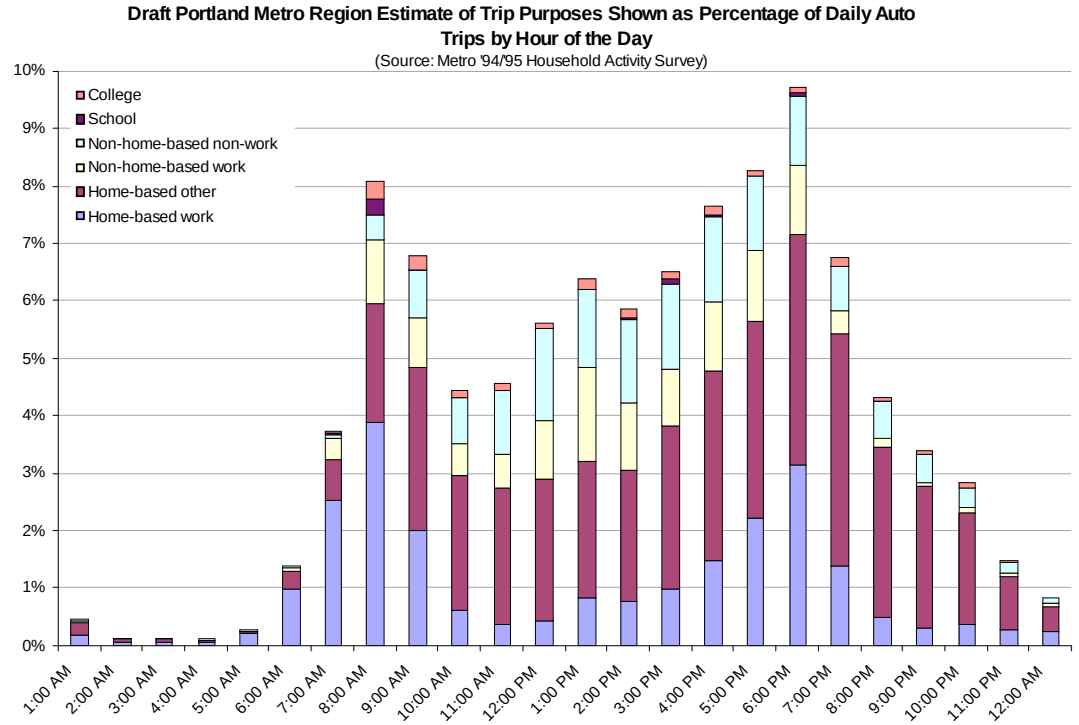
Examples and Data Availability
● = Yes
○ = No

Implementation and Applicability
● = High (easy to implement or very applicable)
◒ = Moderate
○ = Low (difficult to implement or relatively un-applicable)

Modal Share Impact
SOV = Single occupancy vehicle trips
VMT – Vehicle miles traveled
RDI = Ridership increase
PKD = Parking demand

Source: 2005 Metro Modal Targets Report

While past TDM policy and strategies were written to include all trips, program implementation had focused on peak period travel and emphasized the commute. Metro TRMS data show that 48% of peak-hour auto traffic are trips related to the commute between home and work (see 8:00 AM in chart below). Congestion can also occur at any time of day when weather, cultural or accident events occur. TDM implementation needed to expand beyond the employer-based program to work with other trip purposes, not only for off-peak air quality concerns but for peak-hour congestion as well.



Individualized Marketing

Two new programs were implemented to address all household vehicle trips:

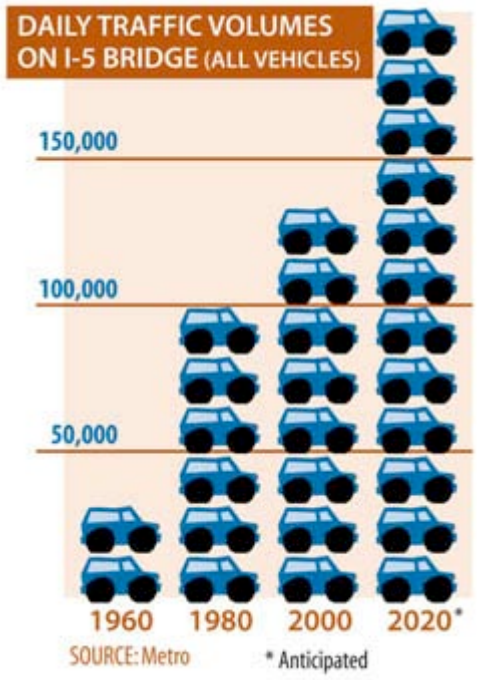
- **Drive Less/Save More**, a marketing campaign, blends commercial-style marketing concepts with methods for behavior change (a model that successfully encouraged recycling, reduced household toxics and reduced smoking). Drive Less/Save More encourages auto trip reduction for all trip purposes.
- Individualized marketing, such as **TravelSmart™**, selects an urban area, uses a survey to create market segments, and then provides receptive households with enough information and one-on-one expert advice to make new choices about the ways they get around. Evaluation of this program in Portland has shown more use of non-SOV modes, more local trips and fewer total trips per person.

TravelSmart

TDM was found to have a net benefit during a corridor project. The City of Portland completed a large scale TravelSmart™ individualized marketing project in north and northeast Portland, simultaneous with the opening of TriMet Yellow Line MAX light-rail service. TravelSmart™ had never been implemented in an area with a large capital project opening at the same time. In addition, TriMet executed a marketing plan centered on safety and the opening of the new MAX line. In order to contrast the results, the TravelSmart™ project used control groups throughout the neighborhood, surveyed them, but did not offer the individualized marketing package. People in the control group took transit trips 24% more than before the new capital service, while people who received the individualized marketing took 44% more trips.[4]

Portland/Vancouver I-5 Transportation and Trade Partnership and the Columbia River Crossing Study

The **Portland/Vancouver I-5 Transportation and Trade Partnership** and the **Columbia River Crossing** task force identified strategies to deal with increasing traffic volumes crossing the state line between Oregon and Washington, over the Columbia River (see figure). In addition to congestion, one of the two bridges is nearly 100 years old. Now, and certainly more so with any project, traffic mitigation is needed to handle additional person trips without increasing the number of vehicle trips. While some strategies include new bridges with additional right-of-way for traffic and light-rail, other strategies include expanded coordination of transportation system management and transportation demand management solutions.[5] In addition to regular and express bus service, vanpools help relieve some congestion across the Columbia River. The Clark County and the City of Vancouver recently approved funding for more vanpools.



[4] Interstate TravelSmart Large-Scale Project, City of Portland, http://www.portlandonline.com/transportation/index.cfm?c=36370

[5] "Preliminary Alternatives Package" Columbia River Crossing, updated 11/6/06, p.6 http://www.columbiarivercrossing.org/materials/projectDocuments/AlternativePackages.pdf

Travel Behavior Barriers and Benefits Research

Travel Behavior Barriers and Benefits Research was done "…to understand the real and perceived barriers and benefits to changing travel behavior for all types of trips."[6] A general marketing approach underscored "direct contact with people at the community level to promote behavioral change."[7] Supporting campaigns, such as mass marketing and associated branding were seen as working to reinforce and support the direct contact approach. In addition to the general marketing approach, nine strategies were recommended:

1. Employer/Employee Outreach
2. Neighborhood Outreach
3. Neighborhood Interventions
4. Rideshare Parties
5. Street Teams
6. Fairs and Festivals
7. Special Day Promotions
8. Partnerships
9. Special Event Shuttles

The RTO Subcommittee stated that a challenge to removing barriers to increasing biking and walking trips is the lack of public safety messages in the media that promote safe driving. The Subcommittee said inconsistent road design between county and city roads, with varying safety standards, is a challenge. In addition, road design should emphasize local trips rather than through-trips. Bike facilities need to be matched with exactly where they are needed for mobility, rather than placed where convenient on back streets. The Subcommittee also acknowledged that culturally, people are increasingly sensitive to time.

Regional efforts have related the demand on the transportation system to home and car ownership. Location efficient mortgages and carsharing help reduce auto ownership, reduce vehicle miles traveled, and **balance costs** for households.

Location efficient mortgages (LEMs)

Location efficient mortgages (LEMs) have highlighted the impact of transportation choices on household budgets. "Location Efficient Mortgages are being tested in Seattle, Chicago, and Los Angeles. In Chicago, the lowered transportation costs create savings estimated to range between $350-$650 per month due to the availability of services and alternative transportation. No policy currently exists that explicitly supports LEMs in Oregon."[8] Although there is no policy for LEMs, a few employers, one housing agency and one lending agency have supported the idea. Employers include Emanuel Hospital and Pacific University; the housing agency is the Housing Authority (working with Swan Island TMA); and, the lending agency was Fannie Mae (program was rolled into energy efficiency mortgages).

[6] Travel Behavior Barriers and Benefits Research, December 2004, http://www.metro-region.org/library_docs/trans/travel_barriers_ppr_report-121604.pdf
[7] Travel Behavior Barriers and Benefits Research, December 2004, http://www.metro-region.org/library_docs/trans/travel_barriers_ppr_report-121604.pdf
[8] Oregon Transportation Plan Update: Sustainable Transportation and Sustainable Development http://www.oregon.gov/ODOT/TD/TP/docs/otpSustain/SustainTransDev.pdf

Carsharing

Private car ownership enables auto trips and parking needs; however, cars are used for only a fraction of the day and are otherwise left parked. **Carsharing** acknowledges this underutilization of capital. Carsharing changes the equation by creating a short-term car rental service. Typically, for-profit companies supply a fleet of vehicles, disburse them throughout neighborhoods, set up a reservation system and market a fee scale that allows for short-term uses. Participants in car sharing are more likely to reduce the number of cars they own and the number of trips they make by car. Mobility is increased for those without a car, yet new, generated auto trips are well below the number of auto trips reduced by carsharing participants who own cars.[9] Both the public and business community use carsharing. Businesses supplement or replace their company car fleet with carsharing vehicles, saving on maintenance and parking costs. Each car place by Flexcar in Portland is estimated to reduce vehicle ownership by 3.5 cars.[10]

Software developed by Flexcar can work to manage other fleets of vehicles that sit idle much of the day.[11] For example, a van used for a commuter vanpool may sit idle during an eight-hour workday. A nearby retirement home could reserve that van during hours left un-reserved.

Paratransit

Travel options are increasingly important among the aging population of the region as they make transportation decisions in their senior and retirement years. **Paratransit** is a public transportation service required by the Americans with Disabilities Act for people who are not able to ride regular public transit. Paratransit is more expensive and use of it is on the rise. **RideWise** offers travel training for senior citizens and people with disabilities to help build their confidence to ride regular transit service safely, achieving more independence.

Trip-chaining

Research on the benefits and barriers posed by different transportation options has shown that people are proud of their **trip-chaining** (e.g., combining errands). This was incorporated into the implementation of Drive Less/Save More and was confirmed by the highest percentage of people willing to commit to reducing auto trips by trip-chaining (84%).[12]

City of Portland Options Ambassador Program

Increases in bike ridership have been posted in the City of Portland including an 18% increase in cyclists crossing four (4) downtown bridges since 2005. Although this is encouraging, the Bicycle Transportation Alliance's blueprint identifies a large gulf between current riders and reluctant yet interested potential-riders. The City of Portland offers an **Options Ambassador** program: 20 volunteers who mentor individuals to reduce the barriers to transportation options including biking.

Tax Credits

Three **tax credits** are available to influence better transportation choices: Oregon Business Energy Tax Credit (BETC), federal tax credits and pre-tax deductions. Oregon Department of Energy (ODOE) offers the Business Energy Tax Credit (BETC) that credits the following:

[9] Car-Sharing: Where and How It Succeeds, 2005, http://trb.org/news/blurb_detail.asp?id=5634
[10] Car-Sharing: Where and How It Succeeds, 2005, http://trb.org/news/blurb_detail.asp?id=5634
[11] Brodie Hylton, Flexcar, presentation to Oregon Statewide Transportation Options meeting, Corvallis, Oregon, Nov. 17th, 2006.
[12] Metro RTO analysis

Solutions include increased use of public transit, commuter pool vehicles (shuttle services, vanpools and carpools), bicycles, carsharing, ride share matching services and telework (telecommuting). Employers can also provide financial incentives or work with a transportation management association to encourage employees to change their travel mode.[13]

Federal tax credits are available to employers who subsidize transit or vanpool costs as an allowable business expense. Federal and Oregon state tax law also allows for tax-free transit benefits, up to $1,200 per employee, per year.[14]

Federal and Oregon state tax law allows employers to offer employees **pre-tax payroll deductions** to reduce taxable earnings to pay for some transportation costs such as transit passes.[15]

The cost to operate an auto is generally applied up front, aside from fuel and regular maintenance. Recent acknowledgement and action is leading toward **distance-based fees** for insurance and auto registration. Changing from flat fee charges to incorporating demand costs "…is estimated to reduce driving by about 9 percent."[16] Oregon tax law provides tax credit to companies that offer insurance policies that charge based on mileage.[17]

Parking Management

Parking costs are associated with a greater impact across the economy. One estimates a range from $600 to $1,200 for annualized costs per parking space. This cost is compounded by an estimate that there are five parking spaces for every car on the road. Because most of this parking is free to the user, there is no economic reason to use it efficiently. When businesses charge for parking indirectly through overhead, the costs are passed along to all their customers. This creates inequity because non-drivers subsidize drivers. Parking management is seen as a solution that can reward both drivers by freeing up parking that is used inefficiently (e.g., to store vehicles) as well as non-drivers (i.e., no longer indirectly charged).[18]

One strategy directed at managing on-street parking calls for performance-based charges subject to market forces. Charges for on street parking would adjust to hold utilization at 85% of spaces filled at any given time.[19] At this level, land is used efficiently while drivers are able to find spaces quickly without circling blocks. This parking management is attractive to adjacent merchants and property owners when revenue generated by parking charges is reinvested locally (e.g., sidewalk maintenance, street trees, security).

Regional Travel Options Subcommittee

The **RTO Subcommittee** identified the following trends:

- More interest in TDM from private sector because of freight and delivery reliability, plus employee retention and Business Energy Tax Credits.

[13] http://www.oregon.gov/ENERGY/TRANS/transhm.shtml
[14] http://trimet.org/employers/taxemployer.htm
[15] http://trimet.org/employers/taxemployer.htm
[16]
[17] http://www.oregon.gov/ODOT/TD/TP/docs/otpSustain/SustainTransDev.pdf
[18] "Parking Management: Innovative Solutions To Vehicle Parking Problems APA" Todd Litman www.planetizen.com
[19] "The Price Of Parking On Great Streets" Donald C. Shoup, FAICP, Urban Land Institute Great Streets Symposium, Washington, DC, January 17-20, 2006 ULI Great Streets Symposium, Washington D.C., http://www.planetizen.com/node/19150

- More interest from the public as global demand for fuel increases the price and greater concerns for climate change issues.
- Growing bike culture showing greater awareness and more use.
- Housing choices (both developers and individuals) increasingly driven by transportation alternatives, often designed for mixed use (e.g., ground floor retail) and often near frequent transit service.
- Greater consideration for the concentration of impacts on one segment of the population, or one area of the region, to advance environmental justice and equity.

The **RTO Subcommittee** identified several trends for better air quality that may represent challenges for land use. Developments in fuel-efficient vehicles and alternatives to petroleum fuels will yield better air quality. Reformulation of diesel also improves air quality. The need to use land for roads and parking is not affected with these improvements. Similarly, two Daimler-Chrysler "Smart" cars fit into one parking space. While that eliminates some land for parked cars, auto trips in any car will likely take use road infrastructure the same as a regular sized vehicle.

When asked what is most important about TDM strategies, the Subcommittee underscored that the public wants good information about realistic transportation choices and alternatives to driving alone that are sensitive to their time, or even save them time. Employers that provide incentives and facilities to employees negatively react when they encounter layers of complicated procedures. At a policy level, the public and government must communicate through common language that roads are increasingly difficult to build and there is less interest in paying for them through public funds. In fact, this is true of all capital-intensive projects. Policy must also account for the effect of the built environment on community health and active living. Finally, the Subcommittee acknowledged a need for better tools by which to rank RTO strategies and make decisions.

Moving forward, the RTO Subcommittee recommends that all new transportation projects implement a TDM component. For example, a transit or road corridor would be complimented by pairing individualized marketing to households one-half mile to either side of the project. While TDM is a cost-savings measure for any new transportation project, TDM strategies must be chosen on the basis of what is most cost-effective for the unique qualities and demographics of the location. TDM then accounts for populations in cities, urban unincorporated areas, suburbs and areas outside of the region. Finally, the Subcommittee would like to see a strengthened culture of TDM implementation, for instance among employment sites and coordinated with groups concerned with public health.

IV. Policy and Regulatory Framework

This section is organized by:

- Federal
- State of Oregon
- Metro Region
- Local
- Other

Federal Context

Congress enacted the Intermodal Surface Transportation Efficiency Act (ISTEA) in 1991. ISTEA gave Metropolitan Planning Organizations (MPOs) increased funding, expanded authority to select projects and mandates for new planning initiatives in their regions. The act emphasizes to a greater degree than previous legislation the need to provide safe accommodation on non-motorized users and that they be

considered throughout the planning, design and construction phases of transportation projects. Bicyclists and pedestrians were to be considered in comprehensive transportation plans developed by each metropolitan planning organization and the State.

The legislation also focused on improving transportation not as end in itself but as the means to achieve important national goals including economic progress, cleaner air, energy conservation and social equity. ISTEA promoted a transportation system in which all modes and facilities were integrated to allow a "seamless" movement of both goods and people. New funding programs provided greater flexibility in the use of funds, supported improved "intermodal" connections and emphasized upgrades to existing facilities over building new capacity – particularly roadway capacity.

To accomplish these goals, ISTEA doubled funding for MPO operations and required the agencies to evaluate a variety of multimodal solutions to roadway congestion and other transportation problems. MPOs were also required to broaden public participation in the planning process and see that investment decisions contributed to meeting the air quality standards of the federal Clean Air Act Amendments.

Transportation Equity Act for the 21st Century (TEA-21)

The next two reauthorizations of Federal Transportation legislation, TEA-21 and SAFETEA-LU continued the multi-modal emphasis of ISTEA. Congress passed the Transportation Equity Act for the 21st Century (TEA-21) in 1998. It reduced the 15 planning factors from ISTEA to seven and continued the majority of its predecessor's programs. TEA-21 recognized that transportation investments impact the economy, environment, and community quality of life.

Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU)

On August 10, 2005, Congress built on both ISTEA and TEA-21 with the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). SAFETEA-LU addresses the many challenges facing our transportation system today, such as improving safety, reducing traffic congestion, improving efficiency in freight movement, increasing intermodal connectivity, and protecting the environment. SAFETEA-LU promotes more efficient and effective Federal surface transportation programs by focusing on transportation issues of national significance, while giving State and local transportation decision makers more flexibility for solving transportation problems in their communities.

In addition, SAFETEA-LU poses key modifications to metropolitan planning processes, one of which concerns operational and management strategies that includes TDM.[20] Such strategies must be included in metropolitan transportation plans to improve the performance of the existing transportation facilities to relieve congestion and maximize safety and mobility of people and goods. Metro's current RTP includes a TDM provision and code citation:

> [Plan must identify] *operational and management strategies to improve the performance of existing transportation facilities to relieve vehicular congestion and maximize the safety and mobility of people and goods..."*

[20] http://www.fhwa.dot.gov/safetealu/legis.htm

State Context

Oregon Transportation Plan (OTP)

The **Oregon Transportation Commission** amended the **Oregon Transportation Plan (OTP)** September 20, 2006.[21] TDM is called for in the following goal, policy and strategy

> *GOAL 2 - MANAGEMENT OF THE SYSTEM - Transportation demand management is an array of techniques that can be used to address congestion and sustainability concerns by seeking to reduce the need to travel. Practices include locating traffic generators near public transit and other transportation facilities, encouraging carpools, and providing flexible work schedule and telework options. Peak period pricing is another technique for reducing demand on a highway. It involves applying tolls which vary according to the level of congestion on the highway. Charging higher tolls when congestion is heavier encourages highway users to drive during offpeak periods or to use alternate modes or routes."*
> *POLICY 2.1 - Capacity and Operational Efficiency, STRATEGY 2.1.1 Promote transportation demand management and other transportation system operations techniques that reduce peak period travel, help shift traffic volumes away from the peak period and improve traffic flow. Such techniques may include high occupancy vehicle lanes with express transit service, truck-only lanes, van/carpools, park-and-ride facilities, parking management programs, telework, flexible work schedules, peak period pricing, ramp metering, traveler information systems, traffic signal optimization, route diversion strategies, incident management and enhancement of rail, transit, bicycling and walking.*

This is complemented by:

> *POLICY 4.3 – Creating Communities, STRATEGY 4.3.5 Reduce transportation barriers to daily activities for those who rely on walking, biking, rideshare, car-sharing and public transportation.*

OTP Discussion on TDM included the importance of land use to provide mobility while reducing auto trips:

> *Oregon Transportation Plan Policy 2A, Land Use states: It is the policy of the State of Oregon to develop transportation plans and policies that implement Oregon's Statewide Planning Goals, as adopted by the Land Conservation and Development Commission. Action 2A.1: Support local land use planning with system plans that implement this policy, with the objective of providing the needed level of mobility while minimizing automobile miles traveled and number of automobile trips taken per capita. Elizabeth Deakin, a Transportation Research Board researcher, estimates that land use planning strategies and aggressive demand management will achieve a six- percent national reduction in greenhouse gas by 2020 and 15 percent by 2040. Travel distance to basic services and land utilization rates are indicators of transportation sustainability.*[22]

OTP policy discussion emphasizes managing existing transportation infrastructure before adding new facilities:

> *Policy 4G - Management Practices: It is the policy of the State of Oregon to manage effectively existing transportation infrastructure and services before adding new facilities.*

[21] http://www.oregon.gov/ODOT/TD/TP/docs/ortransplanupdate/06otp/06otpVol1sep.pdf
[22] http://www.oregon.gov/ODOT/TD/TP/docs/otpSustain/SustainTransDev.pdf

Progress Summary: Priority is on managing existing infrastructure and services before adding new facilities. Practices include access management, demand management, size and weight enforcement of commercial motor vehicles, use of management systems, and training and technology-sharing. More life-cycle costing could be used.[23]

[OTP] Policy 1A, "Balance," recognizes the benefits of creating a balanced set of travel options and of reducing peak hour traffic volumes. Action 4G. Use demand management and other transportation systems operation techniques that reduce peak period single occupant automobile travel, that spread traffic volumes away from the peak period, and that improve traffic flow. Such techniques include HOV (high occupancy vehicle) lanes with express transit service, carpools, parking management programs, peak period pricing, ramp metering, motorist information systems, route diversion strategies, incident management, and enhancement of alternative modes of transportation including bicycling and walking.[24]

Transportation Planning Rule (TPR)

In 1991, the Land Conservation and Development Commission adopted the **Oregon Transportation Planning Rule** (TPR). The TPR implements State Land Use Planning Goal 12, Transportation[25], which was adopted by the Oregon Legislature in 1974, with the purpose "…to promote the development of safe, convenient and economic transportation systems that are designed to reduce reliance on the automobile…." The TPR requires most cities and counties and the state's MPOs, such as Metro, to adopt transportation system plans that consider all modes of transportation, energy conservation and avoid principal reliance on any one mode to meet transportation needs. By state law, local plans in MPO areas must be consistent with the regional transportation system plan (TSP). In the Portland metropolitan region, the Regional Transportation Plan serves as the regional TSP. Likewise, the regional TSP must be consistent with the OTP.

A major goal of the TPR is reducing reliance on the automobile and encouraging pedestrian, bicycle, and transit facilities as part of a multi-modal transportation system. The state TPR also requires that transportation system plans provide an adequate system of improvements that meet adopted performance measures. These objectives are to be achieved by increasing the share of non-automobile trips (pedestrian, bicycle or transit), reducing the number of single occupant vehicle trips, increasing average vehicle occupancy, or reducing the number of trips and/or length of trips required through more intensive land use and/or a better mix of land uses. TPR requirements include:

- Mandates that transportation planning in Oregon reduce reliance on any one mode of transportation.
- Requires vehicle miles traveled (VMT) per capita reduction targets for local jurisdictions. The RTP identifies 2040 Non-SOV modal targets in place of and consistent with the requirement to reduce VMT per capita. As required by the TPR, jurisdictions within the Metro region must adopt policies and actions that support an increase in the share of trips by walking, bicycling, transit and shared ride.
- Requires a plan for transportation demand management for areas within an urban area containing a population greater than 25,000 persons.

[23] http://www.oregon.gov/ODOT/TD/TP/docs/otpSteering2/2Apr04/ReportCard.pdf
[24] http://www.oregon.gov/ODOT/TD/TP/docs/otpSustain/SustainTransDev.pdf
[25] Goal 12 states, "…to promote the development of a safe, convenient, and economic transportation systems that are designed to reduce reliance on the automobile."

ODOT Transportation System Planning Guidelines

ODOT Transportation System Planning (TSP) Guidelines summarize objectives, requirements, applicability and strategies for incorporating TMD into System Plans.[26] The guidelines also call for an "assessment of TDM services and facilities in the course of describing current conditions/deficiencies…and in developing and evaluating system alternatives that eliminate deficiencies…" ODOT says, "TDM works best under the following circumstances:

- Favorable community demographics for employment/residency.
- Appropriate travel distances for the trip to work.
- Appropriate travel patterns for the trip to work.
- Supportive community attitudes.

Oregon Department of Environmental Quality ECO Rule

Oregon Department of Environmental Quality (DEQ) passed the **ECO Rules** July 12, 1996 as part of a larger implementation package to improve air quality. The ECO rules requires large employers to reduce auto trips made to work among their employees by 10% over three years and sustain the reduction through 2006. In 2006, DEQ changed the ECO rules in the following ways:

> *The main changes include 1) raising the compliance threshold from more than 50 to more than 100 employees at a work site, and 2) to require all employers to survey every other year instead of every year.*[27]

DEQ analysis showed that larger employers were contributing proportionately more to auto trip reductions; and, reducing the number of employers affected allows DEQ more resources to enforce the rules. Change takes affect December 2006.

Oregon Department of Energy (ODOE) Business Energy Tax Credits

Oregon Department of Energy (ODOE) includes **Business Energy Tax Credits (BETC)** to cover "…35 percent of the eligible project costs - the incremental cost of the system or equipment that's beyond standard practice."[28]

> *Solutions include increased use of public transit, commuter pool vehicles (shuttle services, vanpools and carpools), bicycles, carsharing, ride share matching services and telework (telecommuting). Employers can also provide financial incentives or work with a transportation management association to encourage employees to change their travel mode.*[29]

In 2003, the Oregon State Legislature passed House Bill 2043 to give tax credit to companies with auto insurance policies that base premiums on distance driven. The underlying policy is; those who own a vehicle should pay fees directly tied to their impact. Researched referenced by the State of Oregon says "A national system of mileage-based automobile insurance is estimated to reduce driving by about 9 percent."[30]

[26] http://www.oregon.gov/ODOT/TD/TP/docs/publications/TSP/tspPart3_9.pdf
[27] http://www.deq.state.or.us/nwr/ECO/eco.htm
[28] http://www.oregon.gov/ENERGY/CONS/BUS/BETC.shtml
[29] http://www.oregon.gov/ENERGY/TRANS/transhm.shtml
[30] http://www.oregon.gov/ODOT/TD/TP/docs/otpSustain/SustainTransDev.pdf

Executive Order (EO) on Sustainability

Governor Ted Kulongoski issued Executive Order No. 06-02 "Sustainability for the 21st Century" in 2006 which directed state agencies to continue work on incorporating sustainable practices and created an interagency team between ODOE, ODOT and DEQ to reduce greenhouse gases.

2003 Oregon Legislature Transportation Options Marketing Program

The 2003 Oregon Legislature appropriated $1.5 million biennially into ODOT budget for transportation options marketing. The money was specifically for media-based marketing to reach drivers in the most congested parts of the state with information about efficient driving and other options. This money began a statewide marketing campaign called "Drive Less/Save More" in the Portland Metro area first and later across the state.

Regional Context

Metro Charter

In 1979, the voters in this region created Metro, the only directly elected regional government in the nation. In 1991, Metro adopted Regional Urban Growth Goals and Objectives (RUGGOs) in response to state planning requirements. In 1992, the voters of the Portland metropolitan area approved a home-rule charter for Metro. The charter identifies specific responsibilities of Metro and gives the agency broad powers to regulate land-use planning throughout the three-county region and to address what the charter identifies as "issues of regional concern." Among these responsibilities, the charter directs Metro to provide transportation and land-use planning services. The charter also directed Metro to develop the 1997 Regional Framework Plan that integrates land-use, transportation and other regional planning mandates.

Regional Framework Plan

Updated in 1995 and acknowledged by the Land Conservation Development Commission in 1996, the RUGGOs establish a process for coordinating planning in the metropolitan region in an effort to preserve regional livability. The 1995 RUGGOs, including the 2040 Growth Concept, were incorporated into the 1997 Regional Framework Plan to provide the policy framework for guiding Metro's regional planning program, including development of functional plans and management of the region's urban growth boundary. The Regional Framework Plan is a comprehensive set of policies that integrate land-use, transportation, water, parks and open spaces and other important regional issues consistent with the 2040 Growth Concept. The Framework Plan is the regional policy basis for Metro's planning to accommodate future population and employment growth and achieve the 2040 Growth Concept.

Chapter 2 of the **Metro Regional Framework Plan (RFP)** contains policy on TDM:

> *2.28.1 Enhance mobility and support the use of alternative transportation modes by improving regional accessibility to public transportation, carpooling, telecommuting, bicycling and walking options.*[31]

The RFP also includes parking management policy:

> *2.29.1 Manage and optimize the efficient use of public and commercial parking in the central city, regional centers, town centers, main streets and employment centers to support the 2040 Growth Concept and related RTP policies and objectives.* [32]

[31] http://www.metro-region.org/article.cfm?articleid=432
[32] http://www.metro-region.org/article.cfm?articleid=432

Title 2 of the Urban Growth Management Functional Plan (Parking)

The region advanced a significant parking policy. "**Title 2**" of the Urban Growth Management Functional Plan was adopted into nearly all city TSPs:

> *Title 2 (Metro Code Sections 3.07.210 - 3.07.220) - Regional Parking Policy*
> *The Metro 2040 Growth Concept calls for more compact development to encourage more efficient use of land, promote non-auto trips and protect air quality. In addition, the federally mandated air quality plan adopted by the state relies on the 2040 Growth Concept fully achieving its transportation objectives. This title establishes regionwide parking policies that set the minimum number of parking spaces that can be required by local governments for certain types of new development. It does not affect existing development. Parking maximums are also specified. By not creating an over supply of parking, urban land can be used most efficiently.*[33]

The table on the next page shows the minimum and maximum parking ratios established by Title 2. The following map shows maximum permitted parking areas associated with zone a and zone b.

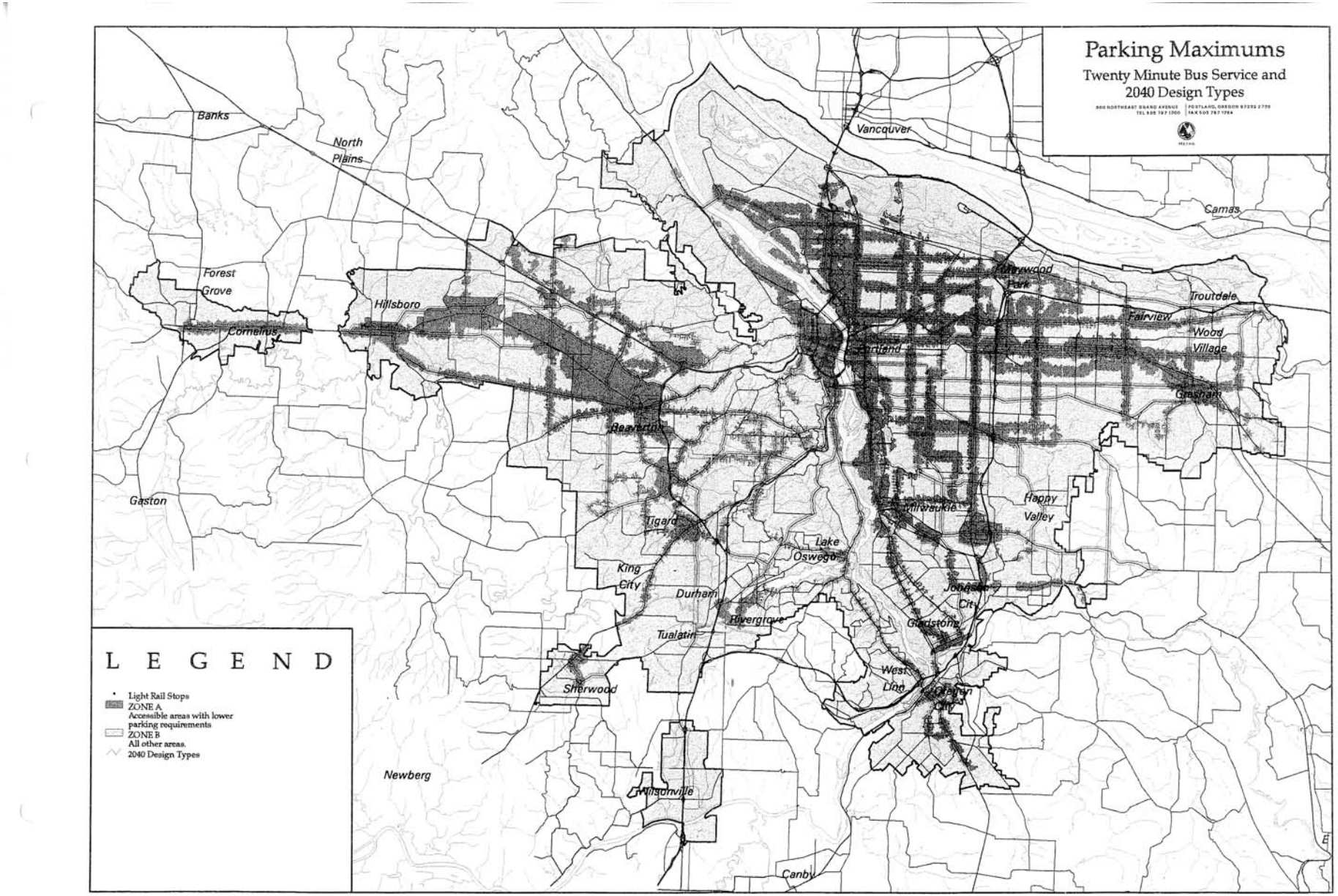
Provision for **bike parking** is included in the current RTP Policy 16.1; "…work with local jurisdictions, ODOT and other public agencies to provide appropriate short and long-term bicycle parking…"[34] Bike parking is also an important component of TDM (i.e., end-of-trip facilities). City of Portland zoning code requires minimums by land use for both short and long-term bike parking.[35] For example, one long-term bike parking space is required in multi-dwelling housing for every 4 units. City of Portland also offers a guide to designing effective bike parking.[36] Other cities likely have bike parking requirements but research was not completed on other jurisdictions.

[33] http://www.metro-region.org/article.cfm?ArticleID=274
[34] 2004 Regional Transportation Plan, chapter 1, page 53, http://www.metro-region.org/library_docs/trans/2004rtp_chapter1no_maps.pdf
[35] Table 266-6 Minimum Required Bicycle Parking Spaces, Chapter 33.266 Title 33, Planning and Zoning Parking And Loading 1/20/06 http://www.portlandonline.com/shared/cfm/image.cfm?id=53320
[36] http://www.portlandonline.com/transportation/index.cfm?&a=58409&c=34813

Table 3.07-2 - Regional Parking Ratios
(Section 3.07.220(A)(1))
(parking ratios are based on spaces per 1,000 sq. ft of gross leasable area unless otherwise stated)

Land Use	Minimum Parking Requirements (See Central City Transportation Management Plan for downtown Portland stds)	Maximum Permitted Parking - Zone A:	Maximum Permitted Parking Ratios - Zone B:
	Requirements May Not Exceed	Transit and Pedestrian Accessible Areas[1]	Rest of Region
General Office (includes Office Park, "Flex-Space", Government Office & misc. Services) (gsf)	2.7	3.4	4.1
Light Industrial Industrial Park Manufacturing (gsf)	1.6	None	None
Warehouse (gross square feet; parking ratios apply to warehouses 150,000 gsf or greater)	0.3	0.4	0.5
Schools: College/ University & High School (spaces/# of students and staff)	0.2	0.3	0.3
Tennis Racquetball Court	1.0	1.3	1.5
Sports Club/Recreation Facilities	4.3	5.4	6.5
Retail/Commercial, including shopping centers	4.1	5.1	6.2
Bank with Drive-In	4.3	5.4	6.5
Movie Theater (spaces/number of seats)	0.3	0.4	0.5
Fast Food with Drive Thru	9.9	12.4	14.9
Other Restaurants	15.3	19.1	23
Place of Worship (spaces/seats)	0.5	0.6	0.8
Medical/Dental Clinic	3.9	4.9	5.9
Residential Uses			
Hotel/Motel	1	none	none
Single Family Detached	1	none	none
Residential unit, less than 500 square feet per unit, one bedroom	1	none	none
Multi-family, townhouse, one bedroom	1.25	none	none
Multi-family, townhouse, two bedroom	1.5	none	none
Multi-family, townhouse, three bedroom	1.75	none	none

[1] Ratios for uses not included in this table would be determined by cities and counties. In the event that a local government proposes a different measure, for example, spaces per seating area for a restaurant instead of gross leasable area, Metro may grant approval upon a demonstration by the local government that the parking space requirement is substantially similar to the regional standard.


Parking Maximums
Twenty Minute Bus Service and
2040 Design Types
LEGEND
Light Rail Stops
ZONE A
Accessible areas with lower parking requirements
ZONE B
All other areas.
2040 Design Types
Banks
North Plains
Vancouver
Camas
Forest Grove
Hillsboro
Cornelius
Fairview
Troutdale
Wood Village
Gresham
Beaverton
Gaston
Tigard
Lake Oswego
Milwaukie
Happy Valley
King City
Durham
Tualatin
Sherwood
Newberg
Wilsonville
Canby
West Linn
Gladstone
Oregon City

2040 Growth Concept

The 2040 Growth Concept text and map identify the desired outcome for the compact urban form to be achieved in 2040. It envisions more efficient land use and a diverse and balanced transportation system closely coordinate with land use plans. Pedestrian facilities are an important element of the transportation concept envisioned in Region 2040. The 2040 Growth Concept has been acknowledged to comply with statewide land use goals by the Land Conservation and Development Commission (LCDC). It is the foundation of Metro's 1997 Regional Framework Plan.

The **Metro 2040 Growth Concept** includes 3.07.920 Performance Measurement B:

> *Protect and restore the natural environment through actions such as…reducing air emissions; [and,]*
> *Provide a balanced transportation system, including facilities for bicycling, walking and transit, as well as for motor vehicles and freight.*

2004 Regional Transportation Plan

The RTP implements the goals and policies in 1995 RUGGOs and the 1997 Regional Framework Plan, including the 2040 Growth Concept. The region's planning and investment in the regional travel options and parking management systems are directed by current RTP policies and objectives described below.

Current Metro **Regional Transportation Plan (RTP)** policy 19.0 (see Appendix A) calls for Regional TDM to:

> *Enhance mobility and support the use of alternative transportation modes by improving regional accessibility to public transportation, carpooling, telecommuting, bicycling and walking options.*[37]

Policy 19.1 (see Appendix A) calls for Regional Parking Management:

> *Manage and optimize the efficient use of public and commercial parking in the central city, regional centers, town centers, main streets and employment centers to support the 2040 Growth Concept and related RTP policies and objectives.*[38]

Policy 19.2 is to:

> *Manage and optimize the use of highways in the region to reduce congestion, improve mobility and maintain accessibility within limited financial resources.*

Central to this policy were strategies for peak period pricing. Such strategies were the subject of the Metro "Traffic Relief Options Study" which found that such a policy would work best with long stretches of new highway, but would not be received well by the public if charging for existing highway infrastructure.[39]

These three policies follow Transportation Systems Management Policy 18.0 to "…optimize performance of the region's transportation systems."

[37] http://www.metro-region.org/library_docs/trans/2004rtp_chapter1no_maps.pdf
[38] http://www.metro-region.org/library_docs/trans/2004rtp_chapter1no_maps.pdf
[39] http://www.metro-region.org/article.cfm?ArticleID=230

The modal target goal for the RTP is to create a regional transportation system where about half of all trips are made using transportation means other than driving alone. The non-SOV modal targets included in the table on this page range from a lower, financially constrained level of investment in the transportation system to the preferred level of investment.[40]

2040 Regional Non-SOV Modal Targets[1]

2040 Design Type	Non-SOV Modal Target
Central city	60-70%
Regional centers Town centers Main streets Station communities Corridors	45-55%
Industrial areas Intermodal facilities Employment areas Inner neighborhoods Outer neighborhoods	40-45%

[1] The targets apply to trips *to and within* each 2040 Design Type. The targets reflect conditions appropriate for the year 2040 and are needed to comply with Oregon Transportation Planning Rule objectives to reduce reliance on single-occupancy vehicles.

The July 2005 "Evaluation of Potential Measures for Achieving Modal Targets" includes findings directly related to RTP changes to the TDM section:.

> *Revise descriptions of transportation elements in Chapter 1 to incorporate information in this report related to…transportation management and parking.; [and],*
>
> *Update modal requirements sections of Chapter 6 to incorporate*
>
> - *Suggested changes to existing requirements for TMAs…*
> - *Potential new minimum mode share target requirements.*
> - *New procedures for measuring impacts of required strategies on mode share.* [41]

July 2005 "Evaluation of Potential Measures for Achieving Modal Targets" looked into a number of local Transportation System Plans (TSPs). The following table (next page) was included in that study to show the status of TDM measures entering into local TSPs.[42]

[40] http://www.metro-region.org/library_docs/trans/2004rtp_chapter1no_maps.pdf
[41] http://www.metro-region.org/article.cfm?ArticleID=12130
[42] http://www.metro-region.org/article.cfm?ArticleID=12130

Table 1. Summary of Major Transportation Demand Management (TDM) Measures by Jurisdiction

TDM Measure	Portland	Beaverton	Gresham	Wilsonville	Oregon City	Clackamas County
Modal Targets (RTP)	●	●	●	●	●	●
Parking Management and Requirements (RTP)	●	●	●	●	●	●
Support of TMAs (RTP)	●	●	●	⊙	o	●
Roadway Connectivity Requirements (RTP)	●	●	●	●	⊙	●
Transit Pass Program in Regional Centers (RTP)	●	●	o	●	o	⊙
Other Transit Strategies	●	●	●	●	●	●
Neighborhood-based Travel Management	●	o	o	⊙	o	o
Development Incentives	●	●	●	●	o	O
Implementing Bicycle/Pedestrian Facilities	●	●	●	●	●	●
Carpool/ Match	●	o	●	⊙	o	●
Other	Carshare support	o	o	Shuttles	o	⊙

Sources of Data: City of Wilsonville TSP, Clackamas County TSP, Clackamas County Zoning Ordinance 1007.07, Clackamas County Comprehensive Plan, City of Gresham TSP, City of Portland TSP, City of Portland Comprehensive Plan, City of Beaverton TSP, City of Oregon City TSP, and telephone interviews with staff of respective jurisdictions.

Legend:
- O Not in TSP or Codes
- ⊙ In TSP
- ● In TSP or Codes and currently implementing

State of Washington Commute Trip Reduction Program

The **State of Washington** passed **Commute Trip Reduction (CTR)** into law in 1991. Vancouver, Washington is subject to this law. The statewide CTR program:

> *…uses partnerships among employers, local jurisdictions, planning organizations, transit systems, and the state to encourage employees to ride the bus, vanpool, carpool, walk, bike, work from home, or compress their workweek. The major goals for the CTR program are to:*
> *• Improve transportation system efficiency*
> *• Conserve energy*
> *• Improve air quality*[43]

The 2006 Washington State Legislature passed the CTR Efficiency Act (ESSB 6566). Changes are to make the program:

- *More effective by reducing more drivealone commute trips,*
- *More efficient by focusing on drivealone trips that, when shifted into other modes, provide the best return for the level of investment,*

[43] http://www.wsdot.wa.gov/tdm/taskforce/tfmaterials.cfm

- *More targeted on those areas with the greatest need for trip reduction,*
- *More integrated with local land use and transportation policies, plans, and regulations, and*
- *More aligned with local, regional and state transportation investments.*[44]

Changes become official January 1, 2008.

To implement the CTR Efficiency Act, the Washington State Department of Transportation (WSDOT) is working with cities, counties, planning organizations, and transit systems to develop the rules and create new plans.[45]

V. Regional Travel Options and Parking Management Systems Profile

This section is organized by:

- regional programs,
- local programs,
- state and national programs.

Regional Implementation Programs

The Regional Travel Options (RTO)/Transportation Demand Management (TDM) and parking management systems are different from other transportation systems, such as transit, in that the infrastructure is weighted towards programs, some operations and few capital elements. Metro and RTO partners offer region-wide programs and operations. Many local organizations implement programs. The impact of the TDM system can be seen through changes in travel behavior, reduced VMT and fewer vehicle trips per capita. Parking management progress can be seen through rules adopted into local transportation system plans. Implementation of RTO is funded through Regional Transportation Priorities, matching amounts from local jurisdictions, and private funds.

Regional Travel Options Program

Metro administers the RTO program, convening regional partners and helping to leverage public and private resources, building on the success of the program. Administration includes awarding RTO Grants for innovative strategies, starting up Transportation Management Associations (TMAs) and will soon include an individualized marketing project.

Regional Rideshare Program

Metro RTO also implements an "umbrella" marketing campaign for regional partners to use. Recently, Metro RTO started operating the regional rideshare program, leading evaluation and offering technical assistance to partners. The rideshare program forms carpools and vanpools by supporting employers and operating ride matching software. The evaluation program records impacts on trip behavior and provides analysis for strategic decision-making. RTO technical service creates tools for partners to coordinate (e.g., contact management), track data and analyze results from individual programs.

[44] http://www.wsdot.wa.gov/tdm/tripreduction/download/CTR_Report_05.pdf
[45] http://www.wsdot.wa.gov/tdm/taskforce/tfmaterials.cfm

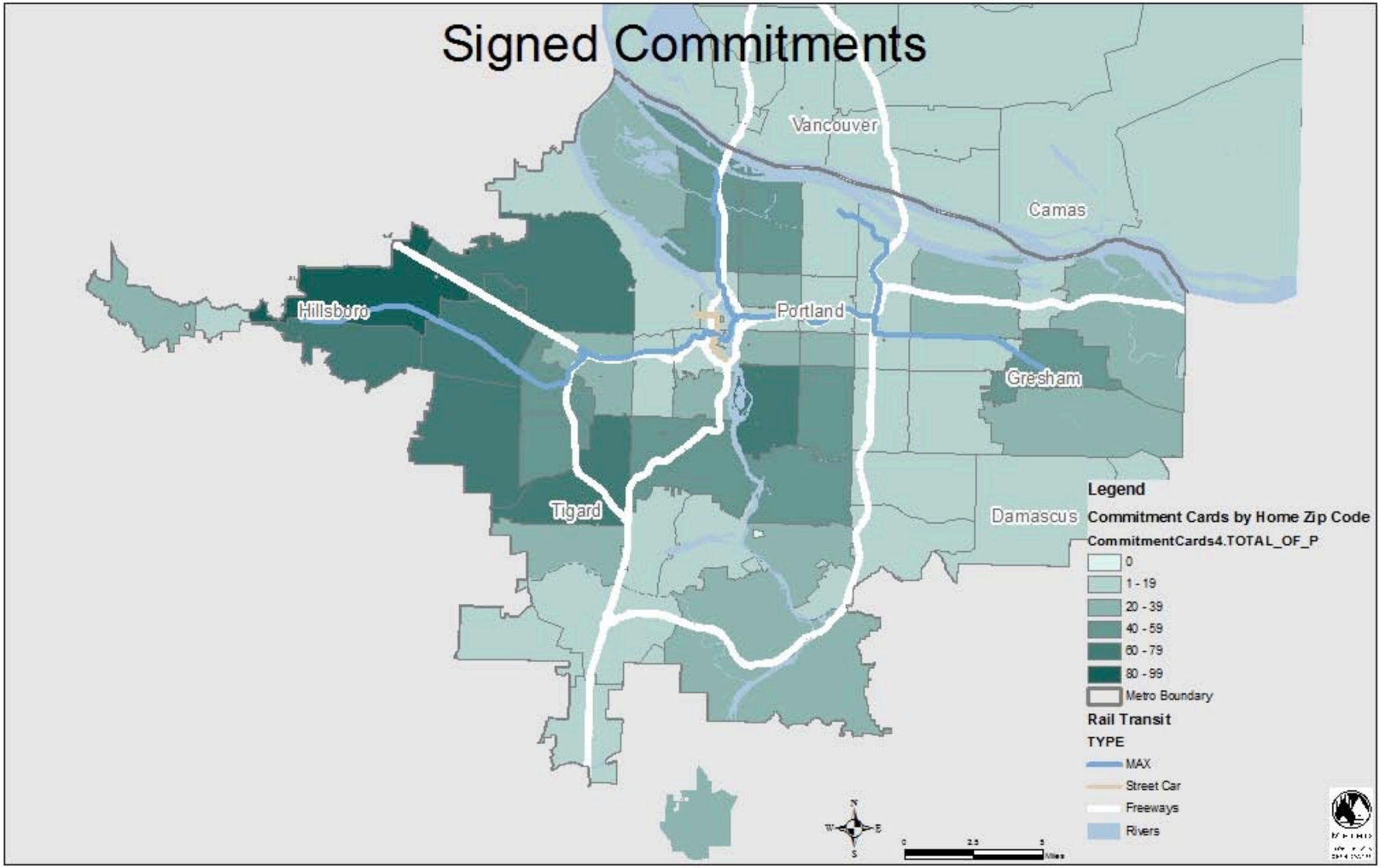
Collaborative Marketing Program

Metro RTO coordinates events and outreach through the **Collaborative Marketing Program**. Metro RTO has provided targeted and tested messages through the Drive Less/Save More marketing campaign.

Drive Less/Save More

ODOT and Metro launched **Drive Less/Save More**. Advertising and earned media began in February 2006 and a summer outreach program reached 6,300 people across the region, 2,600 of them pledged to reduce auto trips (see "Signed Commitments" map). "In 2003, $1.2 million were provided to the RTO program from ODOT Congestion Mitigation Air Quality and Surface Transportation Program funds (both are FHWA programs)."[46]

[46] Oregon Transportation Plan Policy Analysis, October 2005, p4-17, http://www.oregon.gov/ODOT/TD/TP/docs/otpSustain2/3oct05/apdxG.pdf


Signed Commitments
Vancouver
Camas
Hillsboro
Portland
Gresham
Tigard
Damascus
Legend
Commitment Cards by Home Zip Code
CommitmentCards4.TOTAL_OF_P
0
1 - 19
20 - 39
40 - 59
60 - 79
80 - 99
Metro Boundary
Rail Transit
TYPE
MAX
Street Car
Freeways
Rivers

Regional implementation organizations also include DEQ and TriMet. **DEQ** supports employers affected by the ECO rules.[47] **TriMet** supports employers to comply with ECO or manage parking issues by offering programs to subsidize transit, provide an Emergency Ride Home (reducing a barrier employees have toward leaving their car behind) and other transportation program support (see "Participating Employment Sites" map). TMAs also work with employers in their local areas (see "Transportation Management Associations" map). The combined regional result, from participating and surveying employment sites, is a weekday non-SOV commute trip rate above 33% (see chart below).

Organization	Regional program	Awareness and participation	Travel impacts
ODOT/Metro	Drive Less/Save More marketing campaign	Outreach to 6,300 people, 2,600 committed to driving less, TV ads to 98% of adults ages 18+, radio ads to 60% of adults ages 18+, outdoor billboards to 250,000 people/month	To be determined
DEQ, TriMet (and now Metro rideshare program)	Employer outreach	212,000 employees working for employers who offer transportation options program	36.7 million vehicle miles reduced annually[48], 33% non-SOV commute trips
Metro (formerly TriMet)	Traditional vanpools and shuttles)	16 vanpools/ 2 shuttles	1.2 million vehicle miles reduced annually[49]
Metro (formerly City of Portland)	CarpoolMatchNW and rideshare marketing	1,059 carpools	4.1 million vehicle miles reduced[50]

Regional Rideshare Program

The regional **rideshare** (carpool and vanpool) program recently moved to Metro. **CarpoolMatchNW.org** is a database with 4,800 registrants who are able to match their trips with others who have a similar origins and destinations. Several "Cool to Carpool" campaigns got a number of people to register with the system but there is evidence of new registrants being frustrated not finding quality matches. Metro is currently considering ways to improve the quality of the registration pool.

There are currently 16 **vanpools**, many originating in Clark County, Washington. Metro has hired a consultant and vanpool program administrator to find effective and financially sustainable ways of increasing the use of vanpools. A recent rideshare market study identifies many prospective

[47] http://www.deq.state.or.us/nwr/ECO/ECO_Rules.pdf
[48] average of low and high estimates from Regional Travel Options 2004-05 Program Evaluation http://www.metro-region.org/article.cfm?ArticleID=12130
[49] average of low and high estimates from Regional Travel Options 2004-05 Program Evaluation http://www.metro-region.org/article.cfm?ArticleID=12130
[50] average of low and high estimates from Regional Travel Options 2004-05 Program Evaluation http://www.metro-region.org/article.cfm?ArticleID=12130

markets totaling 30,000 commuters that are potential carpoolers and vanpoolers around the region.[51]

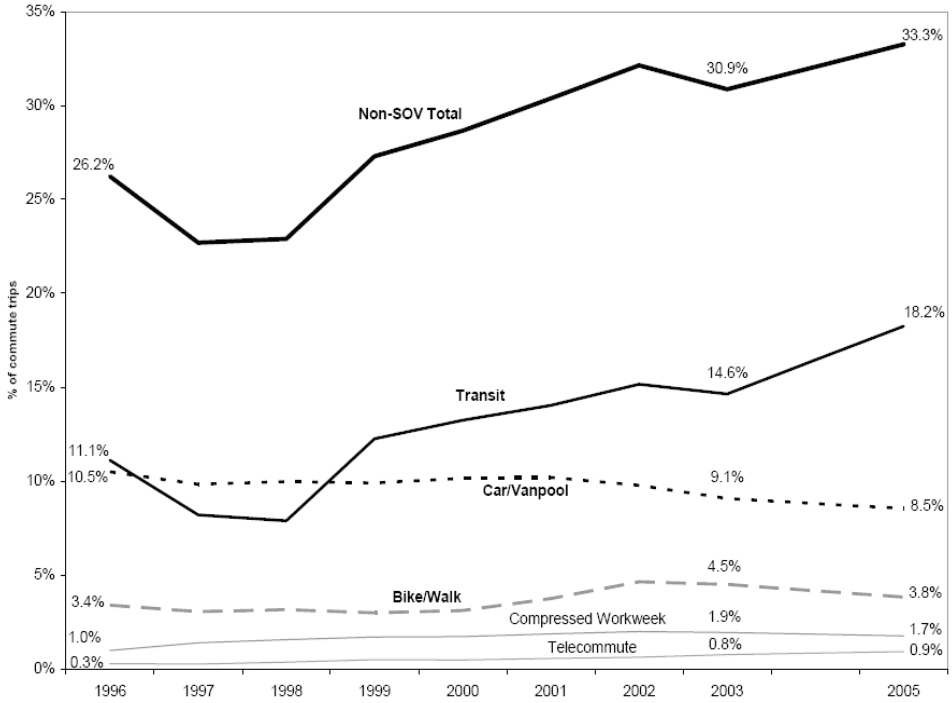
Designated carpool parking spaces exist at approximately 14% of RTO-participating employment sites.[52] The City of Portland administers over 900 carpool parking-lot spaces, plus designated on-street parking (usually at long-term metered spaces) in the Central City. Over 6,000 carpool parking permits were issued in FY03/04 by the City of Portland.[53]

High-Occupancy Vehicle (HOV) Lanes

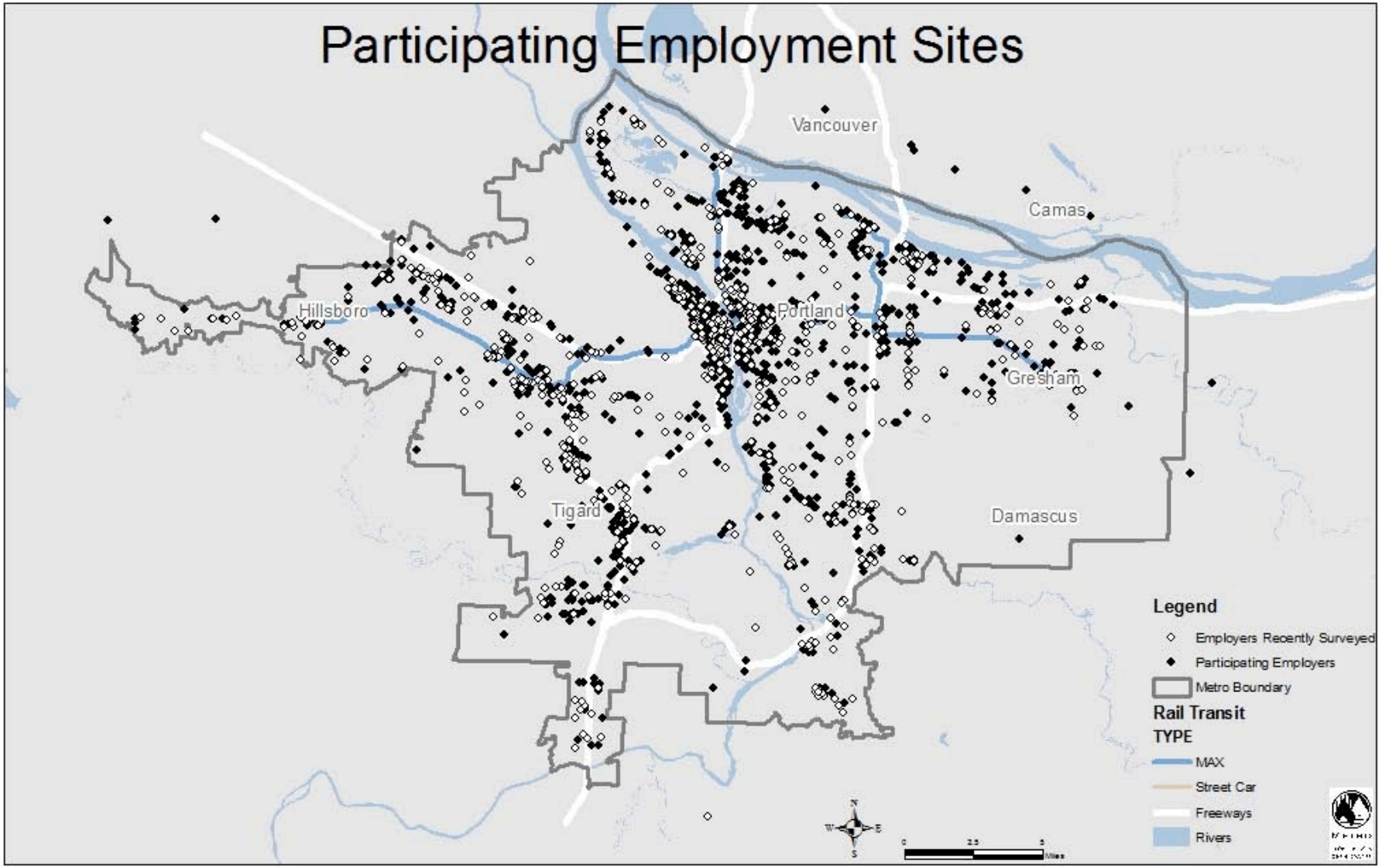
The Portland region has few high-occupancy vehicle (HOV) lanes; one reason for low rideshare figures cited in a recent evaluation of the RTO program.[54] A High Occupancy Vehicle (HOV) facility was opened in the region as a test project in 2001 and was extended as a pilot project in 2003. The HOV lanes run along Interstate 5 for four miles from Northeast 99th Street south to Mill Plain Boulevard. The HOV facility offers carpoolers, vanpoolers and transit users time savings in crossing the Columbia River.[55]

Employee Commute Option Surveys

Employee Commute Option surveys show that RTO partners working on employer outreach have built non-SOV trips to work to 33.3%. The following chart shows the share of trips by mode based on surveys administered between 1996 and 2005.



[51] http://www.metro-region.org/article.cfm?ArticleID=12130
[52] Metro analysis of TriMet ECO survey incentive data.
[53] http://www.portlandonline.com/shared/cfm/image.cfm?id=65168
[54] http://www.metro-region.org/article.cfm?ArticleID=12130
[55] http://www.metro.dst.or.us/library_docs/trans/rideshare.pdf


Participating Employment Sites
Vancouver
Camas
Hillsboro
Portland
Gresham
Tigard
Damascus
Legend
Employers Recently Surveyed
Participating Employers
Metro Boundary
Rail Transit
TYPE
MAX
Street Car
Freeways
Rivers

Regional Travel Options Grants

Recent **RTO Grants** were awarded to projects such as:

- Wilsonville SMART received $32,000 to implement the "Walk Smart" program over two years from 2004-2006. SMART contributed $8,000 in matching funds.
- Swan Island TMA received $12,500 to increase vanpools from Clark County, Washington.
- WTA received $35,653 for the Carefree Commuter Challenge.
- Gresham Regional Center TMA received $29,900, with and local match of $9,800 to promote bicycling in the area.

Transportation Management Associations

The **TMA start-up** process is currently underway. South Waterfront, Southwest Downtown Portland, and the Pearl District (downtown NW Portland) have all expressed interest in starting a TMA. This process is informed by lessons learned over the years of TMAs and requires a feasibility study, local jurisdiction partnership, supportive planning and private interest and funding.

Carsharing

Carsharing in the Portland region is currently provided by Flexcar, a for-profit company with programs in many cities across America. "The first large-scale US program, CarSharing Portland (subsequently sold to Flexcar), also opened for business in 1998, and the early years saw rapid, almost exponential growth in the number of members, vehicles and organizations…"[56] Flexcar has 5,000 members and 130 vehicles in the region. A study shows that auto ownership decreases by 3.5 vehicles for every Portland Flexcar vehicle (not surprisingly lower than the average rate of 6 vehicles per carsharing car in Europe) (TCRP 108, 2005). Prices at the time of TCRP Report 108 were:

> *Regular Plan – $35 annual fee, $9 per hour. Each hour includes 30 miles – $0.35 per additional mile*
> *Bundled Plan – for example, $35 annual fee, $80 per month including 10 hours and 300 miles. Additional hours at $8.50, including 30 miles. Other bundled plans range from $42.50 to $700 per month, including 5-100 hours and 150-3000 miles*
>
> *Cost by example trips:*
> *Groceries (1 hr, 5 miles)= $7-$9*
> *Airport (4 hrs, 75 miles)= $28-$36*
> *Hiking (8 hrs, 25 miles)= $56-$72*

Regional Parking Management

Regional parking management (RTP Policy 19.1) was implemented when cities of the region adopted Title 2 of the Urban Growth Management Functional Plan.[57] New construction of parking is limited by maximums that decrease the number of spaces allowed based on proximity to frequent transit service and 2040 Design Types (e.g., regional centers). Data on existing levels

[56] Car-Sharing: Where and How It Succeeds, 2005, http://trb.org/news/blurb_detail.asp?id=5634
[57] http://www.metro-region.org/library_docs/about/chap307.pdf

of parking and regulations has not been summarized (verify). Objective "e" calls for preferential parking stalls for carpool, vanpool, motorcycle, bicycle and motorized bicycle parking at major retail centers, institutions and employment centers. Data has not been collected to summarize levels of each of these (verify).

DEQ ECO rules allow employers to comply by, "Discontinuing parking subsidies and charging all employees for parking."[58] Another method to compliance is to demonstrate that parking is limited and meets DEQ maximum parking ratios (OAR 340-242-0300 through 340-242-0390). Just under 10% of ECO affected employment sites are complying with ECO rules through parking ratio restrictions (figure needs to be verified).

Local Implementation Programs

Local implementation organizations are local jurisdictions, public-private partnerships and private entities.

Local jurisdictions include:

- City of Portland Transportation Options residential and employer program
- Wilsonville South Metro Area Rapid Transit (SMART) "Smart Options" employer program and WalkSmart program for the general public
- City of Vancouver Commute Trip Reduction (CTR) employer program for Clark County, Washington

Individualized Marketing

Local implementation of **individualized marketing** (e.g. TravelSmart™) by the City of Portland (with RTO partners) brings transportation tools and know-how into households to help residents think about the trips they make, choose options to driving alone and save transportation costs. This strategy supports using travel options for all trips in the household. Individualized marketing campaigns were located in much of North, NE and SE Portland and a small project in Multnomah/Hillsdale neighborhoods.

Individualized marketing has resulted in a five (5) percentage-point shift away from trips made driving alone. Individualized marketing has reached 48,000 households (105,000 people) in Portland (see "Individualized Marketing" map). Extended research in Perth, Australia shows that this shift is sustained from 3 to 5 years.[59]

SMART Options is the transportation demand management arm of Wilsonville's SMART Transit and provides services to area. SMART Option's boundaries are those of the Wilsonville city limits for the TDM outreach, with transit service provided to other areas in the region. SMART Options has provided a number of programs to employers, school children and residents of Wilsonville.

Currently there are 67 employers involved in the Commute Trip Reduction (CTR)

[58] http://www.deq.state.or.us/NWR/ECO/ECO_Rules.pdf
[59] Perth TravelSmart emphasized TravelSmart to build transit ridership while not expanding service. A study of the same households beyond five years would probably suffer in gathering data from the same households since people often move in after that many years.

program in Vancouver, Washington. The Washington State CTR law, which affects most of the participating employers, requires distribution of a CTR brochure on program benefits to employees annually and new employees when hired.

Organization	Awareness and participation	Travel impacts
City of Portland	Individualized marketing to 48,000 households, 105,000 people	5 percentage-point shift away from drive-alone trips
Wilsonville SMART	3,500 employees, 712 people enrolled in WalkSmart (2004/2005), 100 new residents per year contacted	3,200 vehicle miles reduced by WalkSmart (2004/2005), others unknown
Clark County/City of Vancouver CTR	67 employers	Currently being calculated

Transportation Management Associations/Public-Private Partnerships

Public-private partnerships include six Transportation Management Associations (TMAs). Current Metro RTP objectives call for locating these TMAs in the region's centers. Current TMAs are:

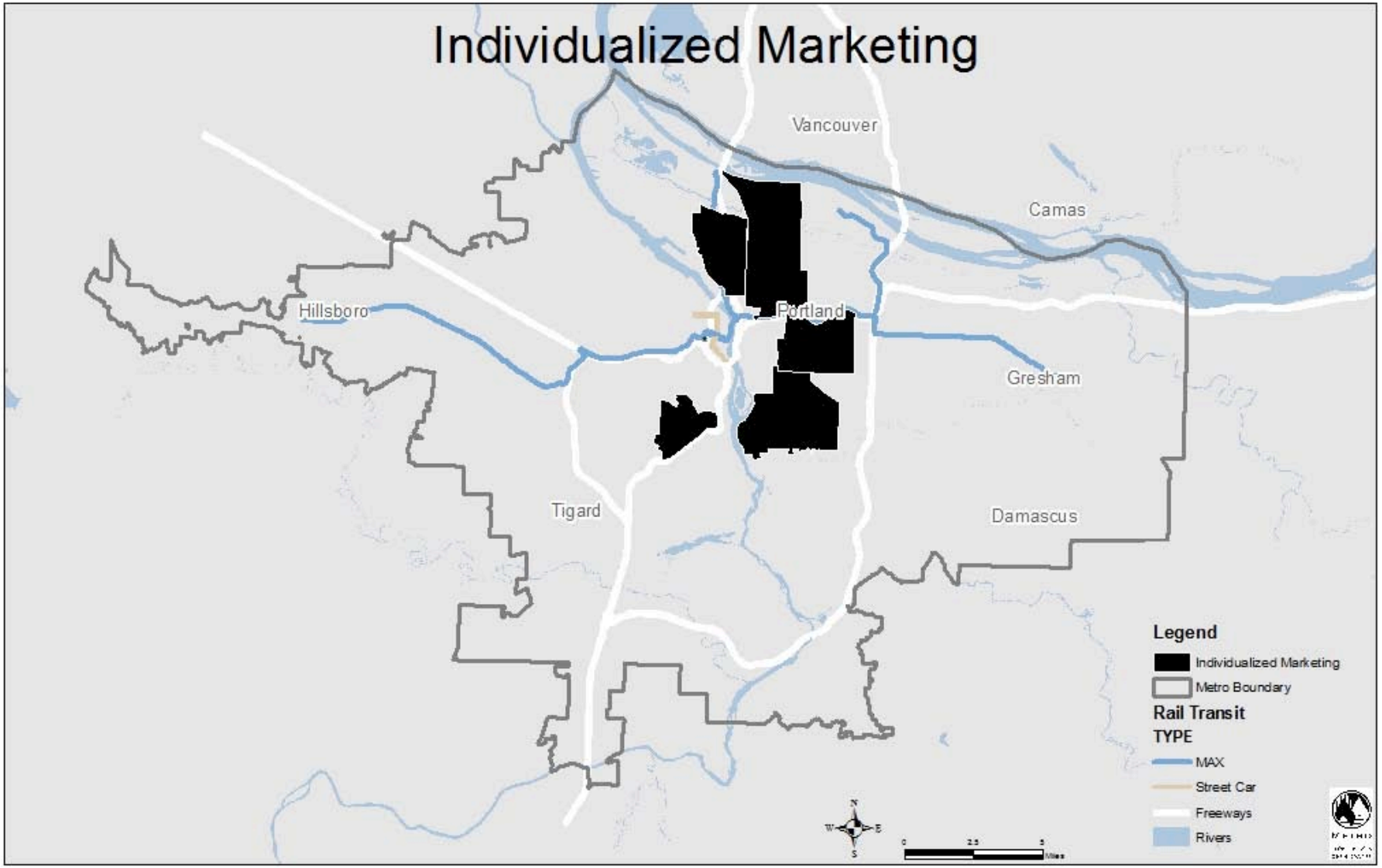
- Clackamas Regional Center TMA, facilitated by the North Clackamas County Chamber of Commerce
- Gresham Regional Center TMA, facilitated by the Gresham Downtown Development Association (a business association)
- Lloyd TMA
- Swan Island TMA
- Troutdale TMA, facilitated by the West Columbia Gorge Chamber of Commerce
- Westside Transportation Alliance

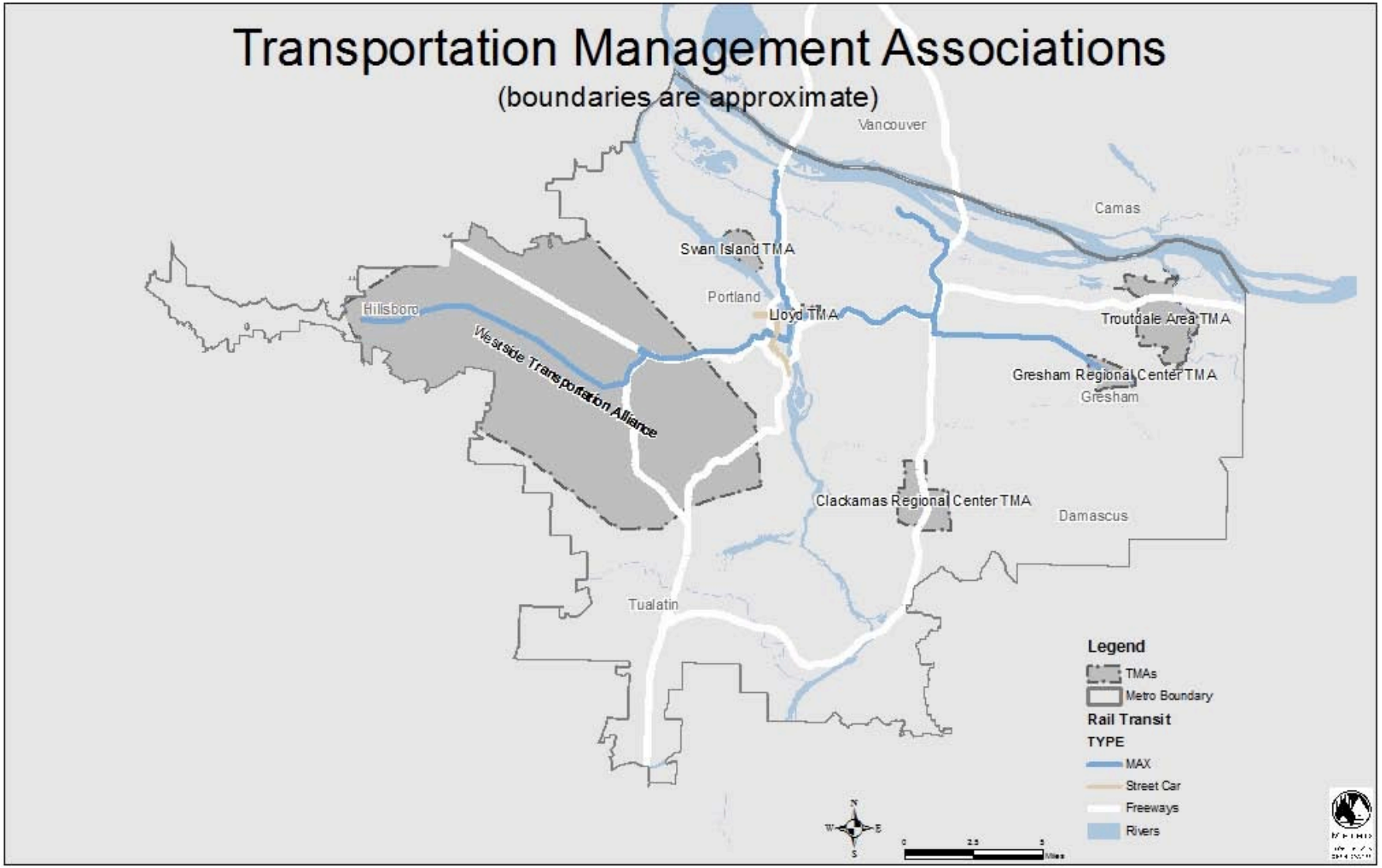
Organization	Awareness and participation	Travel impacts
Clackamas Regional Center TMA	4,000 employees	Unknown
Gresham Regional Center TMA	2,700 employees	20% non-SOV
Lloyd TMA	8,000 employees	3.8 million vehicle miles reduced, 52% non-SOV commute trips
Swan Island TMA	7,000 employees	24% non-SOV commute trips
Troutdale TMA	Unknown	Unknown
Westside Transportation Alliance	29,000 employees	235,000 vehicle miles reduced in Carefree Commuter Challenge

The RTO Subcommittee conducted a study and determined that a TMA would not be feasible in the Kruse Way employment area of Lake Oswego. Although employers supported the TMA concept, County and City plans did not show supportive investment in multi-modal transportation.(needs verification)

Two TMAs were discontinued. Columbia Corridor Association TMA worked in an employment area close to the Portland International Airport. The TMA operated between 1999 and 2001. Three reasons are thought to have contributed to the TMA discontinuing service: the TMA did not begin with a feasibility study; the TMA was an exploratory project for the TMA; and, not enough business partners lent financial support to sustain the TMA.

The Tualatin TMA served Tualatin town center and nearby employment area from 1997 to 2002. Two reasons are thought to have contributed to the TMA discontinuing service: the chamber of commerce (that co-sponsored and hosted the TMA) changed board and executive leadership rapidly and then changed priorities; and, lack of financial support from enough business partners.


Individualized Marketing
Vancouver
Camas
Hillsboro
Portland
Gresham
Tigard
Damascus
Legend
Individualized Marketing
Metro Boundary
Rail Transit
TYPE
MAX
Street Car
Freeways
Rivers


Transportation Management Associations
(boundaries are approximate)
Vancouver
Camas
Swan Island TMA
Portland
Lloyd TMA
Hillsboro
Westside Transportation Alliance
Troutdale Area TMA
Gresham Regional Center TMA
Gresham
Clackamas Regional Center TMA
Damascus
Tualatin
Legend
TMAs
Metro Boundary
Rail Transit
TYPE
MAX
Street Car
Freeways
Rivers

Private Implementation Programs

Private employers help build the TDM program through their dedication of staff time and sometimes capital such as bike racks and carpool spaces. Staff helping with TDM are called Transportation Coordinators (TCs) and spend anywhere from a few hours per year to full-time, assisting with commute options. There are over 1,000 TCs at an equal number of employment sites across the region. A few large employers with multiple sites have dedicated staff, sometimes in the facilities department and sometimes in the benefits department. These employers are Kaiser, Intel, Portland State University and Oregon Health Sciences University. The last two examples are large universities in or near the central city where they also manage parking.

The City of Portland is currently gathering data to analyze **parking** utilization in the downtown Portland area. Data are gathered on parking costs in downtown Portland because they are found to "…have a major influence on the mode of travel for CBD commuters."[60]

Monthly average public **parking rates** in downtown Portland for garages and surface lots have increased slightly more than inflation in the Lloyd District and twice that of inflation in the Pearl and Old/Town Chinatown (areas north of West Burnside Street) (see table below.

Garage and surface lot public parking rates in downtown Portland[61]

Portland Central City Area	Average monthly rate 1995	Average monthly rate 2004	Rate increase since 1995*
Lloyd District	$ 60.59	$ 78.64	30%
CBD, north of Burnside St.	$ 71.52	$ 120.26	68%
CBD, south of Burnside St.	$ 109.84	$ 160.10	46%
Consumer Price Index*	$ 1.00	$ 1.28	28%
*for all urban consumers in the Portland-Salem area.			

[60] "Transportation System Monitoring Activities" Metro, January 1993, p. 3
[61] "Combined Monitoring Report" David Horowitz, Metro 2004

State Implementation Programs

Oregon Department of Energy (ODOE) supports employer auto trip reductions through a Telework program that advises on best practices. ODOE also encourages employers to subsidize transit, join a TMA or provide other transportation options that save energy and qualify the employers for a **Business Energy Tax Credit (BETC)**, returning approximately 1/3 of the cost. (insert number of applications/credits given in Portland region).

The **State of Oregon** supports regional and statewide TDM through the Oregon Department of Transportation (ODOT) and the Oregon Department of Energy (ODOE). ODOT convenes the statewide **Transportation Options** program:

> *Oregon's Transportation Options (TO) program coordinates and promotes travel options including transit, rideshare, cycling and walking. The state TO program centers are housed in ODOT's Public Transit Division and Department of Energy with six additional programs located in the major metropolitan areas. The programs are a part of the state's management of the transportation system to reduce the hours of travel delay caused by congestion and improve air quality. Major objectives are to help employers with 50+ employees develop employee transportation plans to reduce reliance on the automobile and apply available Business Energy Tax Credit. Other program services and activities are listed below with a map of the major areas served." Projects (Program Services):*
>
> *(1) Providing education and outreach that includes mass marketing, employee, and individualized programs to promote to promote transit, rideshare, cycling, walking and rural-to-urban mobility*
> *(2) Marketing and sales of employee group transit passes*
> *(3) Maintaining rideshare carpools and vanpools databases*
> *(4) Promoting employer telework programs*
> *(5) Assisting with transit, corridor, and transit-oriented development planning; and community design related issues*
> *(6) Assisting with Safe Routes to School planning and coordination*
> *(7) Promoting community health through walking and cycling and appropriate community design*

As mentioned previously, ODOT has allocated a significant amount of funding for transportation options marketing, resulting in the Drive Less/Save More campaign that was kicked off in the Portland region before being spread to the rest of the state.

Oregon Department of Energy (ODOE) **Business Energy Tax Credit (BETC)** has supported many regional TDM projects:

> *BETC has been a program within the ODOE for over 25 years. In 2005, BETC had 2,500 projects for over $30,000,000 statewide. Of the four major project categories listed above, transportation services had the highest number of projects (70) and received the most tax credits at $18.2M, transit passes (42) were next at $8.6M, followed by commuter pool vehicles (26) at $1.3M and car sharing (1) at $1.2M. When eligible, BETC provides business dues tax credits to a TMA on behalf of a member which then funds a project for the TMA. Both Lloyd and Swan Island TMAs have participated in this aspect of the program.*
>
> *Metro BETC projects having been growing over the past three years. In addition to the TMA dues, transit pass subsidy and Flexcar are major recipients of the credits in the*

Metro area. One concern raised is that there may not be sufficient [ODOE] staff to process the number of projects and accurately measure program impacts.[62]

Federal Implementation Programs

Federal implementation of TDM in the Portland region occurs when private employers participate in the **Environmental Protection Agency's (EPA) Best Workplaces for Commuters (BWC)**. Beaverton-based Intel was featured as the top BWC among fortune 500 companies.[63] Currently, 23 employers in the region are registered with BWC.[64] RTO and CarpoolMatchNW.org are registered as BWC supporters and included in the BWC network for Oregon resources for employers.

VI. Policy Assessment

This section reviews key findings and implications for the RTP update.

Key Finding	RTP Implication
1. Non-work related travel • Half of peak-hour traffic and the majority of traffic other hours of the day is non-work related travel.	• Continue policies and strategies that apply to all trip purposes at all hours of the day.
2. Targeted and individualized marketing • Employer outreach and individualized marketing continue to show progress shifting trips to non-SOV options. • When asked to commit to reducing auto trips, people most commonly choose trip chaining and walking. • Bike ridership is rising. Potential new groups of bike riders will benefit from mentoring.	• Continue existing, and allow for new targeted strategies. • Pair outreach and marketing with public willingness to change their travel behavior. • Increase support structure for one-on-one travel training.
3. Corridor Planning • Individualized marketing built transit ridership in a corridor greater than the ridership gained by new light-rail transit service alone. • Road design emphasizes through trips, not local trips.	• Pair TDM with corridor and other transportation improvements. • Increase road design for local trips.
4. Technology • Traveler information improves quality and access to transportation systems. • Applications can provide a transportation management service (e.g., using Flexcar	• Increase policy supportive of technological solutions, studying their potential impact and implementing coordinated, cost-effective strategies.

[62] Regional Travel Options 2004-05 Program Evaluation http://www.metro.dst.or.us/article.cfm?ArticleID=12130
[63] http://www.bwc.gov/
[64] http://www.ergweb.com/projects/ccli/search/search_for_bwc_employer_results.asp

Key Finding	RTP Implication
reservation software managing other fleets).	• Increase applications for transportation management (e.g., utilization of fleet vehicles).
5. Economics • Households spend more on transportation than any other expense except housing. • Employers and at least one mortgage broker have facilitated individuals and households to locate near transportation options and their key destinations. • When energy costs rise, households make decisions to drive less or cut other costs. This can affect the regional economy or mobility. • Distance-based fees will reduce driving.	• Continue policy to reduce reliance on the automobile, which supports social and economic resilience. • Increase the ability for individuals and households to locate efficiently. • Incorporate distance-based fees into strategies; consider for policy.
6. Incentives • Employers hold the key to capitalize on several State and Federal tax credits by offering benefits to their employees.	• Continue facilitation of financial incentives that achieve outcomes.
7. Carsharing • Reduces car ownership per capita, offers mobility to individuals who do not own cars and manages employer motor pools.	• Continue policy to reduce reliance on the private automobile.
8. Managing parking • Local jurisdictions have adopted parking minimums and maximums in accordance with the Regional Framework Plan. • "Free" parking poses a big challenge for land use and achieving modal targets. • Charging for parking in areas where spaces are used more than 85% will result in better utilization and reduce miles driven (cars searching for free spaces).	• Review parking minimums and maximums based on land use types, new transit infrastructure ad other transportation systems. • Build on policy for pricing parking. • Increase shared parking. • Study innovative approaches to reducing required parking. Create regional formulae to incorporate parking management into number of spaces required.
9. World economy • Global demand for materials and energy means increased capital and operating costs for transportation systems.	• Increase non-capital-intensive transportation systems.
10. Aging demographic • New transportation decisions are made during the aging process. • Paratransit has seen sharp increases in use.	• Increase support and safety structures to build confidence in aging population to use regular transit.
11. Community health • Ozone (smog) level is within acceptable limits, yet it still affects health conditions such as asthma. • Air toxics (e.g., benzene, particulate matter) are carcinogenic and pose a health	• Continue to reduce auto trips and therefore air pollutants. • Encourage use of transportation options involving physical activity in every age category.

Key Finding	RTP Implication
risk. • Fewer children walk or bike to school. Obesity is an issue for Oregonians. • Safer driving will reduce barriers to non-auto transportation choices.	• Increase safe driving and traffic calming.

VII. Conclusion

Transportation demand management and parking management have increasingly important roles in the regional transportation system. One simply needs to look at the number of empty seats in vehicles stuck in a traffic jam or the number of empty spaces in many parking lots to know that effective management can allow for more trips and better land use.

TDM is versatile and scalable. Maximizing TDM policy means:

1. continuing strategies to reduce auto trips for various trip purposes, all hours of the day;
2. applying strategies anywhere in the region, before, during or after investing in transportation infrastructure;
3. incorporating TDM study, alternatives analysis and implementation into all transportation projects;
4. partnering with a diverse set of interests including those working with air pollution, energy conservation, land use, community health, for-profit ventures, and the economy;
5. creating tools to better access traveler information; and,
6. educating and supporting the public (all ages and abilities) and business community on efficient use of the transportation systems.

Maximizing parking management policy means:

7. weighing the number of parking spaces built with the road capacity to serve trips;
8. associating innovations and management strategies directly with impact on required parking;
9. directing parking costs to users rather than non-users;
10. expanding use of limited space through shared parking agreements; and,
11. reducing vehicle miles traveled for the purpose of finding parking by providing traveler information about parking utilization.

TDM and parking management work best when growth decisions result in:

a) Accessible streetscapes (e.g., grid for walk/bike/transit, traffic calming)
b) Limited parking (e.g., at capacity, regulated, fees)
c) Supportive land use for short trips (e.g., 2040 vision of nodes and centers, affordable housing in every area of the region)
d) Balanced private vs. public cost (e.g., appropriate incentives, tolls, fees, taxes)

Appendix A: Current RTP TDM and Parking Management Policy:

Policy 19.0. Enhance mobility and support the use of alternative transportation modes by improving regional accessibility to public transportation, carpooling, telecommuting, bicycling and walking options.

Objectives:

a. Promote programs that reduce the number of people driving alone and dependence on the automobile.
b. Promote transit-supportive design and infrastructure in 2040 Growth Concept land-use components, including the central city, regional centers, town centers, station communities, main streets and along designated transit corridors.
c. Establish a non-single occupancy vehicle modal target for each 2040 Design Type.
d. Promote, establish and support transportation management associations (TMAs) in the central city, regional centers, industrial areas and intermodal facilities, town centers and employment centers.
e. Promote private and public sector programs and services that encourage employees to use non-SOV modes or change commuting patterns, such as telecommuting, flexible work hours and/or compressed work weeks.
f. Investigate the use of HOV lanes to improve system reliability and reduce roadway congestion.
g. Promote end-of-trip facilities that support alternative transportation modes, such as showers and lockers at employment centers.
h. Investigate the use of market-based strategies that reflect the full costs of transportation to encourage more efficient use of resources.

Policy 19.1. Manage and optimize the efficient use of public and commercial parking in the central city, regional centers, town centers, main streets and employment centers to support the 2040 Growth Concept and related RTP policies and objectives.

a. Objective: Establish minimum and maximum parking ratios to help the region manage the number of off-street parking spaces in the region.
b. Objective: Support local adoption of parking management plans within the central city, regional centers, town centers, main streets and employment centers.
c. Objective: Promote the use and development of shared parking spaces for commercial and retail land uses.
d. Objective: Implement appropriate parking ratios and investigate implementation of other measures throughout the region that reduce the demand for parking or lead to more efficient parking design options.
e. Objective: Encourage the designation of preferential parking stalls for carpool, vanpool, motorcycle, bicycle and motorized bicycle parking at major retail centers, institutions and employment centers.
f. Objective: Conduct further study of market-based strategies such as parking pricing and employer-based parking-cash outs and restructuring parking rates.[65]

[65] http://www.metro-region.org/article.cfm?ArticleID=236

Appendix B: RTO Subcommittee Policies/Outcomes Discussion

Regional Travel Options (RTO) in the Regional Transportation Plan (RTP) Update:
RTO Subcommittee Policies/Outcomes Discussion
Notes from August 10, 2006 meeting

Question 1 - What changes have occurred in the Portland region since the last RTP update (since 2000) that: (a) affect RTO/Transportation Demand Management (TDM) and (b) will utilize RTO/TDM?

Answers –

- Business Energy Tax Credit (BETC) available.
- More alternative fuels and alternative fuel vehicles/hybrids.
- Gap/system analysis inventory – where are the gaps for transit, walk, bike?
- DEQ ECO Rules change.
- More private sector interest in information.
- "Death by a thousand cuts" – lack of public safety messages on TV and radio – promotion of safe driving.
- Formula fund grants – requirements for security cameras, etc.
- Design of roads isn't consistent with safety needs (county vs. city roads).
- More mixed-use development/Transit-oriented Development (TOD).
- More time sensitive.
- Freight more in the picture.
- Population forecast changed.
- Street design for local area or travel that passes through – need to put emphasis on local travel.
- Availability of fuel supplies/peak oil/cost.
- Awareness of global warming.
- Change in type of cars on the road - % of Sport Utility Vehicles (result of federal tax breaks).
- Bike culture is growing – more use of mode, more awareness.
- Need to shift bike facilities/lanes where we need them.
- Environmental justice and health issues – type of pollution from cars is changing – low-income people more impacted – ultra-fine particles etc.

Question 2 - What is most important about RTO strategy to your constituents and/or customers (end-users)?

Answers –

- People want realistic choices/alternatives.
- People want good information.
- The heart of the strategies should be to maximize the transportation system given the limited capital funds.
- Want/need to understand how TDM works/fits.
- Want to know the timeframe and criteria for ranking RTO strategies and how we select the best strategy.
- Make a distinction between traded sector freight and non-traded sector freight.
- Need to link active living with transportation (improved health, health care cost savings).

- Need a common language approach.
- Need to communicate that we just can't build more roads – people don't want to pay for more roads.
- Need to be more time sensitive – strategies need to save people more time
- Employers don't want to add another layer of administration to work load.

Question 3 – What recommendations have you heard or would you like to make that carry the most weight for you in carrying RTO (TDM strategies) forward?

Answers –

- Individualized marketing (the public wants it).
- Any transit investment should have a TDM element included.
- Percentage of population living in urban unincorporated counties vs. cities should be looked at.
- Transit Cooperative Research Program (TCRP) report on carsharing.
- Look at TDM strategy in parallel to road project development.
- Demographics of suburban communities – where are the needs?
- Look at employment sites.
- Coordination of efforts between similar groups (public health for example).
- Focus on programs based on most bang for the buck.
- Create and strengthen the culture of implementation.

New Look
The Regional Transportation Plan

2035 Regional Transportation Plan Update

Background Paper:

A Profile of the Regional Bicycle System in the Portland Metropolitan Region

Prepared by:

METRO
PEOPLE PLACES • OPEN SPACES

November 27, 2006
DISCUSSION DRAFT

Metro
People places • open spaces

Clean air and clean water do not stop at city limits or county lines. Neither does the need for jobs, a thriving economy and good transportation choices for people and businesses in our region. Voters have asked Metro to help with the challenges that cross those lines and affect the 25 cities and three counties in the Portland metropolitan area.

A regional approach simply makes sense when it comes to protecting open space, caring for parks, planning for the best use of land, managing garbage disposal and increasing recycling. Metro oversees world-class facilities such as the Oregon Zoo, which contributes to conservation and education, and the Oregon Convention Center, which benefits the region's economy.

Your Metro representatives

Metro Council President – David Bragdon
Metro Councilors – Rod Park, District 1; Brian Newman, District 2; Carl Hosticka, deputy council president, District 3; Susan McLain, District 4; Rex Burkholder, District 5; Robert Liberty, District 6.
Auditor – Alexis Dow, CPA

Metro's web site: www.metro-region.org

2035 Regional Transportation Plan Update

A Profile of the Regional Bicycle System

TABLE OF CONTENTS

I. Introduction

This paper is one of a series of papers that provide background research and analysis to guide Regional Transportation Plan (RTP) update policy discussions. The papers describe trends and research affecting the regional transportation system, current regional transportation planning policies and regulatory requirements, a profile of the existing transportation system and policy implications to be addressed in the RTP to respond to identified policy gaps and key findings of the background research. Collectively, the background papers will inform future policy discussions by Metro Policy Advisory Committee (MPAC), Joint Policy Advisory Committee on Transportation (JPACT) and the Metro Council and lead to an updated RTP.

This paper provides a profile of the regional bicycle system in the Portland metropolitan region. It identifies trends and research on bicycling and reports on the existing regional bicycle system. The trends shaping future bicycle travel and performance of the current regional bicycle system are essential considerations for the development of effective goals and strategies to address bicycle travel needs in the Portland metropolitan region. The paper concludes with a list of key findings and policy recommendations to be considered during the RTP update process.

II. Background

The benefits of bicycling to society are extensive and well documented. The bicycle is considered the most energy efficient transportation device ever invented, and its use benefits the environment, public health, the economy and other users of the transportation system. Motorists and freight carriers benefit from reduced congestion and wear and tear on roads; pedestrians and transit users benefit from the separation from vehicles provided by a multi-use trail or bicycle lane, and the reduced noise and air pollution along a traffic-calmed bicycle boulevard. Bicycling is a key part of the 2040 Growth Concept, and supports the 2040 Fundamentals adopted by the region in 1997:

1. *Healthy Economy*
2. *Vibrant Communities*
3. *Environment Health*
4. *Transportation Choices*
5. *Equity*
6. *Fiscal Stewardship*

Recent studies, described in Section III demonstrate significant *economic* value created by bicycling. The bicycling industry includes manufacturers, distributors, retailers, repairers, race/event/tour providers, and other bicycling-focused professionals such as advocacy groups, planners and messenger companies. This diverse industry creates jobs, spurs commercial development (increasing local tax revenues) and other related economic activity. Furthermore, public investments in bicycling facilities have seen significant economic return through increased property values and tourism dollars.

Streets that are busy with bicyclists (and pedestrians) are considered to be *vibrant*, human-scaled environments that foster a sense of neighborhood and community. They create more “eyes on the street,” improving perceptions of safety and vitality. They create easy opportunities for residents to live a more active lifestyle by walking and biking to do their errands. Many of the region’s most popular commercial and civic districts are places where bicycling (and walking) is common.

Bicycling produces no pollution and consumes no fossil fuels. The most frequent trips for bicyclists – those less than five miles – produce the greatest *environmental* benefit since auto trips under five miles in length are the least fuel efficient and produce the highest emissions per mile.[1]

The bicycle is an important component in the region's strategy to provide a multi-modal system and maintain quality of life, as it is key to serving shorter trip lengths within and between mixed-use centers. Short trips are often more time efficient and less costly by bicycle. Making bicycling safe and convenient provides a legitimate travel choice to all people in the region, regardless of whether they have access to a car or transit.

Bicycling is a relatively affordable mode of transportation that increases the accessibility and mobility of those who are too young or too old to drive, or who cannot afford to own and maintain a car. Investments in the bicycle system increase *equity* in addressing mobility needs across the region, and improve access to jobs, recreation, and services for people of all income levels. Geographic equity should be considered when developing projects for the regional bicycle system, with special attention to areas lacking basic bicycling facilities and areas demographically more reliant on non-motorized transportation options.

Finally, the bicycle system helps ensure *fiscal stewardship*, due to its relatively inexpensive capital and maintenance costs.

III. Trends and Recent Research

Growing awareness and understanding of economic value of bicycling

Several recent studies, both locally and nationally, have explored the economic value of bicycling, both in terms of the benefits of bicycle facility investments and an extensive bicycle industry.

The Economic Benefits of Trails and Greenways

This Rails to Trails Conservancy study demonstrates the economic benefits of investments in trails and greenways. Such benefits include downtown revitalization, tourism-related opportunities, expansion of businesses related to trail use (equipment, clothes, food, maps, etc.), increased property values and improved quality of life – making an area more attractive to new residents and businesses.

Bikeways to Prosperity

This North Carolina Department of Transportation study is focused on the economic benefits of bicycle tourism in the northern outer banks of coastal North Carolina. It found that bicycle focused tourism and activity has contributed $60 million annually and over 1400 jobs to the local economy. The public has seen a significant return (9:1) on its $6.7 million investment in bicycle facilities over the past ten years.[2]

Bicycle-related Industry Growth in Portland

This Alta Planning study points to the growing importance of the bicycle-related industry as a vibrant economic sector. The industry, currently estimated with an annual value of 63 million dollars, is increasing rapidly in both gross numbers of jobs and dollar value.[3] Activity is grouped into four categories ranging from retail (61 percent of industry), to tours, races rides and events (11 percent), to

[1] Wisconsin Department of Transportation, Wisconsin Bicycling Transportation Plan 2020. December 1998.
[2] Lawrie, Norman, et al. Bikeways to Prosperity – Assessing the Economic Impact of Bicycle Facilities, Institute for Transportation Research and Education, North Carolina State University, 2006.
[3] Alta Planning, Bicycling-Related Industry Growth in Portland, 2006.

distribution and manufacturing (18 percent), and professional services (10 percent). An important factor to increasing bike industry revenues is Portland's reputation as a bicycle-friendly city.

Comprehensive Economic Development Strategy
This ECONorthwest analysis found that livability (which bicycle friendliness contributes to) is one of the region's defining characteristics. It states that most local economic development plans refer to livability as a key component to economic development. Furthermore, most CEOs interviewed for the study cited livability as a key advantage of doing business in the region.

Livability is particularly consequential for attracting highly educated 25-34 year olds to the region. Research by local economist Joe Cortright has found that educated 25-34 year olds are key for growing a region's economy, due to their familiarity with computers, up-to-date training and entrepreneurial tendencies. In recent years, Portland has successfully attracted more of this demographic than most other U.S cities. Between 1990 and 2000 Portland ranked 8th out of the top 50 U.S metropolitan regions with its 12 percent increase in 25-34 year olds.[4]

Economic Impact of Bicycling in Wisconsin
This Governor's Council and Wisconsin Department of Transportation study provides information about the economic impact of bicycling in Wisconsin both in terms of industry and tourism. The state accounts for nearly 20 percent of the entire US bicycling industry, and is home to a large number of manufacturers of bicycles, parts and accessories. The total estimated economic impact of bicycling on Wisconsin's economy ranges from $765 to $835 million.[5]

Getting Western Australians More Active – A Strategic Direction
This Premier's Physical Activity Taskforce report is focused on the benefits of a more active society including the economic costs to organizations with physically inactive employees. It found that increasing the physical activity of the workforce can have substantial benefits, including improved productivity and reduced sick leave. It estimated that if an extra 10 percent of the Western Australian population became physically active, productivity gains of approximately $60 million would accrue each year"[6]. Cycling to work was found to boost employee morale and loyalty and was more acceptable and cost-effective than formal work-site exercise classes.

Increasing Local Awareness and Advocacy for Bicycling
In recent years, the local awareness of bicycling as a transportation option has grown considerably in the media and general public. Likewise, local advocacy has expanded as established groups have matured and new groups have formed.

Blueprint for Better Bicycling
The goal of this Bicycle Transportation Alliance study is to "identify a consistent set of bicycling facilities, policies and programs that will drastically increase bicycling among a wide range of users including adults, elderly and youth."[7] The study identifies four major themes representing regional

[4] Cortright, Joe, Impresa Consulting. The Young and the Restless – How Portland Competes for Talent. Accessed on 11/17/06 at: http://www.restlessyoung.com/public/pdf/Portland.pdf
[5] Bicycle Federation of Wisconsin (in conjunction with the Wisconsin Department of Transportation), The Economic Impact of Bicycling in Wisconsin, Prepared for the Governor's Bicycle Coordinating Council, 2005, http://www.dot.wisconsin.gov/business/econdev/docs/impact-bicycling.pdf
[6] Government of WA (2001) *Getting Western Australians More Active – A Strategic Direction Report from the Premier's Physical Activity Taskforce.*
[7] Blueprint for Better Bicycling – 40 Ways to Get There, 2005, www.bta4bikes.org/at_work/blueprint.php

bicycling challenges: cycling around cars, complete routes, motorist behavior, and quality of facilities (especially poor street conditions and signage).

The report identifies four items to increase cycling in the region.

- Increased User Base -The region's population can be divided into four groups regarding their bicycle behavior: fearless riders (1 percent) who will ride any road, confident riders (7 percent) who ride regularly on most roads, interested and concerned (60 percent) who feel that low-traffic and car-free routes will increase their biking significantly. A final group, non-cyclists (33 percent) is currently not interested in riding.
- Comprehensive Bikeway Network - Low traffic streets will receive bike boulevard treatments while bike lanes will be reserved for high traffic streets. Routes should be designed to meet the needs for each type of rider
- Solutions for Suburbs - Due to the lack of connecting low traffic streets, suburbs are often connected with higher traffic streets. Low traffic bike networks should be expanded to the suburbs.
- Cultural Shift - Use marking and promotions to capture first time riders and reengage experienced cyclists.

The report identifies 40 projects and programs throughout the region that fit into these various themes and strategies. The list was developed though an extensive two-year process that included a survey of more than 900 bicyclists, meetings with technical experts, and meetings with bicycle advisory committees. The top ten projects range from infrastructure projects, such as improving the Sellwood Bridge, to retooling Portland's downtown bike plan to increase ease of biking downtown. Also included are trail projects, bikeways and low traffic routes across the region. Rounding out the top ten is increased enforcement, and the Safe Routes to School program.

Bicycle Transportation Alliance Bike Boulevard Campaign
The Bicycle Transportation Alliance established a goal to increase the number of bicyclists and improve bicycle safety throughout the region by advocating for a comprehensive network of low-traffic bicycle streets, known as "bicycle boulevards." Among the campaign's priorities are the creation of a design toolbox and the integration of bicycle boulevards into city, regional and state plans.

As part of the campaign, the BTA administered an online survey during the summer of 2006. Preliminary results show that large majorities of respondents (especially novice cyclists) prefer a lower traffic environment than typically found on streets with bicycle lanes.

Bike cultural events
In recent years the region has seen a noticeable increase in size and public awareness of bicycle culture. Groups, such as SHIFT focus on the celebration of biking with various activities, rides and festivals. A prominent blog, (bikeportland.org), is another venue for bikers to discuss bicycle related topics. Calendars that track bike events in the city show at least one planned event most days of the month.

Bicycle Friendliness Ratings (League of American Bicyclists)
The League of American Bicyclists has recognized the City of Portland and the City of Beaverton as "Gold" and "Bronze" level, respectively, for bicycle friendliness. The Bicycle Transportation Alliance and City of Portland Commissioner Adams are leading a "Go Platinum" campaign to improve the City of Portland's rating to platinum, which would make it the only large U.S. city to achieve this distinction. The nine part strategy includes enhancement and expansion of the existing bike network, updating the Bicycle Master Plan, education and encouragement activities, expanded law enforcement, development of tourism

and other economic opportunities, increased funding for bicycle projects and a city council resolution on the campaign and a review of City policy changes.

Local citizen bike advisory committees
In September and October 2006, staff met with several local citizen bicycle advisory committees (Portland, Beaverton, Clackamas County, Multnomah County, Washington County[8]) to seek input on existing conditions for bicycling in the region. Each group was asked what changes have occurred since the last RTP update that affect bicycling conditions, what are the barriers to biking in their communities, what types of solutions would be most helpful, and what locations feel unsafe for biking. Some of the common themes heard are described below:

Changes since last RTP update in bicycling conditions
- There are many more cyclists (and drivers) on the road.
- High growth areas in the region are playing catch up such that new bicycle facilities have helped, but have not been built as fast as the growth in population.
- Problems of success - choke points have emerged in inner Portland areas with high bike traffic.
- There is a growing awareness that high speed/volume streets with bike lanes are not attractive cycling options for children and elderly.

Barriers to bicycling
- Large, high traffic volume intersections with no bike facilities.
- Difficulties crossing arterial streets when using low-traffic streets (no gaps in traffic).
- Poor street connectivity outside of downtowns and eastside Portland neighborhoods
- Lack of education amongst drivers and bicyclists regarding traffic laws and sharing the road safely.
- Perceptions that bicycling is not safe.
- Lack of end-of-trip facilities such as bicycle parking and lockers.

Recommended solutions to improve bicycling conditions
- Identify corridors in the region appropriate to apply a low-traffic bicycle route design treatments, i.e. "bicycle boulevards" with good signage and improved crossings of higher traffic arterial streets.
- Retrofit bicycle/pedestrian accessways to better connect existing neighborhoods and subdivisions.
- Increase education for drivers and bicyclists:
    - Start a regional "Share the Road" campaign
    - Increase bicycling-related content on Oregon driver's exam
- Expand areas supported by regional funding beyond the major streets in regional centers.
    - Fund bike facilities along parallel lower classification streets that serve the same corridor.
    - Fund bike facilities that connect to centers rather than being completely within a center.

Unsafe areas to bicycle
- High-speed and high-traffic arterials, with or without bicycle lanes

Regional trails working group
The Regional Trails Working Group is a group of local and state trail planners, professionals and advocates that meets quarterly to discuss and coordinate trail planning efforts in the region. Staff attended their September 2006 meeting seeking input for the RTP update. Suggestions from the work group included:

[8] Washington County does not have a bicycle advisory committee, so staff met with the Washington County bicycle coordinator.

- Prioritize the regional trails system to identify the most critical gaps in the system.
- Consider the difficulties of trail projects competing for regional funding with lower-cost and longer distance bicycle boulevard projects.
- Consider the value of trail projects that connect 2040 centers, rather than being located within a center's boundary.

Increasing Emphasis on the Link Between Public Health, Transportation and Land Use in the Active Living Movement

The active living movement has grown out of the national health crisis that obesity has become in the United States and elsewhere. Much research is being done on the subject of urban form and physical activity levels. According to the organization *Active Living by Design* "the chief aim of Active Living Research is to increase knowledge about active living by supporting research to identify environmental factors and policies with potential to substantially increase levels of physical activity among Americans of all ages, incomes and ethnic backgrounds."[9] Bicycling has become a key focus in the discussion of active living and the improvements to public health that occur when people bike more. It is an easy and relatively safe way to improve health for people of all ages and the active living community has realized that the transportation system, particularly on-street bicycle facilities and trails are essential for providing opportunities for people to bike. The body of work in this area is growing rapidly as are people's awareness of the benefits of living more actively. Locally, research funded by the Active Living program is being conducted at Portland State University.

Of particular concern is the lack of active lifestyles amongst children. The national decline in bicycling (and walking) to school has received much attention in recent years. In 1969, 42 percent of children 5 to 18 years of age walked or biked to school, whereas only 16 percent did so in 2001.[10]

Increasing Emphasis on Managing the Existing System and Intelligent Transportation Systems (ITS)

In recent years there has been an increased focus at the federal, state, regional and local level on how to best manage existing infrastructure. In the bicycling context this involves:

- Maintenance of facilities so that they are safe and usable, including clearing debris, restriping and repaving.
- Providing information to the public about how to travel via bicycle, including:
    - Individualized marketing increases awareness off non-SOV transportation options, i.e. Travelsmart, regional Drive Less Save More campaign
    - Local and regional bicycle maps help new cyclists find safe and convenient routes.
    - An online regional bicycle trip planner (similar to MapQuest) is currently under development under a partnership between Metro and Bycycle.org.
    - Increased bicyclist and driver education through local campaigns to "Share the road"
- ITS technology to make traffic signals more bicycle friendly.

[9] Active Living by Design Website (Research Page, viewed on Oct. 5, 2006) www.activelingbydesign.org.
[10] National Center for Safe Routes to School, website: viewed on November 15, 2006: http://www.saferoutesinfo.org/ask_a_question/answer.cfm?id=124

IV. Policy and Regulatory Framework

Federal

Congress enacted the Intermodal Surface Transportation Efficiency Act (ISTEA) in 1991. ISTEA gave Metropolitan Planning Organizations (MPOs) increased funding, expanded authority to select projects and mandates for new planning initiatives in their regions. ISTEA requires MPOs to consider bicycles in developing regional transportation plans and restructured federal transportation funding into several new programs with increased flexibility for funding bicycle projects. The legislation also focused on improving transportation not as end in itself but as the means to achieve important national goals including economic progress, cleaner air, energy conservation and social equity. ISTEA promoted a transportation system in which all modes and facilities were integrated to allow a "seamless" movement of both goods and people. New funding programs provided greater flexibility in the use of funds, supported improved "intermodal" connections and emphasized upgrades to existing facilities over building new capacity – particularly roadway capacity.

To accomplish these goals, ISTEA doubled funding for MPO operations and required the agencies to evaluate a variety of multimodal solutions to roadway congestion and other transportation problems. MPOs were also required to broaden public participation in the planning process and see that investment decisions contributed to meeting the air quality standards of the federal Clean Air Act Amendments.

The next two reauthorizations of Federal Transportation legislation, TEA-21 and SAFETEA-LU continued the multi-modal emphasis of ISTEA. Congress passed the Transportation Equity Act for the 21st Century (TEA-21) in 1998. It reduced the 15 planning factors from ISTEA to seven and continued the majority of its predecessor's programs. TEA-21 recognized that transportation investments impact the economy, environment, and community quality of life.

In 2005, Congress built on both ISTEA and TEA-21 with the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). SAFETEA-LU addresses the many challenges facing our transportation system today, such as improving safety, reducing traffic congestion, improving efficiency in freight movement, increasing intermodal connectivity, and protecting the environment. SAFETEA-LU promotes more efficient and effective Federal surface transportation programs by focusing on transportation issues of national significance, while giving State and local transportation decision makers more flexibility for solving transportation problems in their communities.

All provisions for Metropolitan Planning are consolidated in a new section 5303. The requirement for separate transportation plans and transportation improvement programs is maintained. The Long Range Transportation Plan and the Transportation Improvement Program are to be updated every four years. Provisions regarding Transportation Management Areas (TMAs) are included in the metropolitan transportation planning section. Metropolitan Planning Organizations (MPOs) are encouraged to consult or coordinate with planning officials responsible for other types of planning activities affected by transportation. Safety and security are factors to be included in metropolitan planning.

State

Executive Order (EO) on Sustainability

Governors Kitzhaber and Kulongoski both issued EO's on sustainability that support increasing sustainable modes of transportation in Oregon, such as bicycling. The legislature codified much of Governor Kitzhaber's EO into statue in 2001 known as the Sustainability Act. Under the EO, ODOT has developed a Sustainability Plan, renewing the agency's vision of a balanced, multimodal transportation system.

Oregon Transportation Plan (OTP)
Amended in September 2006 by the Oregon Transportation Commission, the OTP includes several policies that address bicycling:

- Policy 1.1 – Development of an Integrated Multimodal System
- Policy 1.2 – Equity, Efficiency, and Travel Choices
- Policy 1.3 – Relationship of Interurban and Urban Mobility
- Policy 3.2 – Moving People to Support Economic Vitality
- Policy 3.4 – Development of the Transportation Industry
- Policy 4.3 – Creating Communities
- Policy 5.1 – Safety
- Policy 5.2 – Security

Most requirements will be included in specific modal plans. Oregon Bicycle & Pedestrian Plan update is underway. Future RTP updates will be developed to be consistent with the updated state plan.

Oregon Transportation Planning Rule (TPR)
In 1991, the Land Conservation and Development Commission adopted the Oregon Transportation Planning Rule (TPR). The TPR implements State Land Use Planning Goal 12, Transportation[11], which was adopted by the Oregon Legislature in 1974. The TPR requires most cities and counties and the state's Metropolitan Planning Organizations, such as Metro, to adopt transportation system plans that consider all modes of transportation, energy conservation and avoid principal reliance on any one mode to meet transportation needs. By state law, local plans in MPO areas must be consistent with the regional transportation system plan (TSP). In the Portland metropolitan region, the Regional Transportation Plan serves as the regional TSP. Likewise, the regional TSP must be consistent with the OTP.

The state TPR also requires that transportation system plans provide an adequate system of improvements that meet adopted performance measures. TPR requirements for bicycle planning include:

- Mandates that transportation planning in Oregon reduce reliance on any one mode of transportation.
- Requires vehicle miles traveled (VMT) per capita reduction targets for local jurisdictions. The RTP identifies 2040 Non-SOV modal targets in place of and consistent with the requirement to reduce VMT per capita. As required by the TPR, jurisdictions within the Metro region must adopt policies and actions that support an increase in the share of trips by walking, bicycling, transit and shared ride.
- Requires a region wide network of bicycle facilities.

Recent updates to the TPR do not affect the requirements for bicycle planning.

[11] Goal 12 states, "To provide and encourage a safe, convenient, and economic transportation system."

Regional

Metro Charter
In 1979, the voters in this region created Metro, the only directly elected regional government in the nation. In 1991, Metro adopted Regional Urban Growth Goals and Objectives (RUGGOs) in response to state planning requirements. In 1992, the voters of the Portland metropolitan area approved a home-rule charter for Metro. The charter identifies specific responsibilities of Metro and gives the agency broad powers to regulate land-use planning throughout the three-county region and to address what the charter identifies as "issues of regional concern." Among these responsibilities, the charter directs Metro to provide transportation and land-use planning services. The charter also directed Metro to develop the 1997 Regional Framework Plan that integrates land-use, transportation and other regional planning mandates.

Regional Framework Plan
Updated in 1995 and acknowledged by the Land Conservation Development Commission in 1996, the RUGGOs establish a process for coordinating planning in the metropolitan region in an effort to preserve regional livability. The 1995 RUGGOs, including the 2040 Growth Concept, were incorporated into the 1997 Regional Framework Plan to provide the policy framework for guiding Metro's regional planning program, including development of functional plans and management of the region's urban growth boundary. The Regional Framework Plan is a comprehensive set of policies that integrate land-use, transportation, water, parks and open spaces and other important regional issues consistent with the 2040 Growth Concept. The Framework Plan is the regional policy basis for Metro's planning to accommodate future population and employment growth and achieve the 2040 Growth Concept.

2040 Growth Concept
The 2040 Growth Concept text and map identify the desired outcome for the compact urban form to be achieved in 2040. It envisions more efficient land use and a diverse and balanced transportation system closely coordinate with land use plans. Bicycling is an important element of the transportation concept envisioned in Region 2040. The 2040 Growth Concept has been acknowledged to comply with statewide land use goals by the Land Conservation and Development Commission (LCDC). It is the foundation of Metro's 1997 Regional Framework Plan.

2004 Regional Transportation Plan
The RTP implements the goals and policies in 1995 RUGGOs and the 1997 Regional Framework Plan, including the 2040 Growth Concept. The region's planning and investment in the regional bicycle system are directed by current RTP policies and objectives for the regional bicycle system as shown in Table 1.

Table 1. 2004 Regional Transportation Plan – Regional Bicycle System Policies

Policy 16.0 Regional Bicycle System Connectivity Provide a continuous regional network of safe and convenient bikeways connected to other transportation modes and local bikeway systems, consistent with regional street design guidelines. a. Integrate the efforts of the state, counties and cities in the region to develop a convenient, safe, accessible and appealing regional system of bikeways. b. Design the regional bikeway system to function as part of the overall transportation system and include appropriate bicycle facilities in all transportation projects. c. Integrate multi-use paths with on-street bikeways, consistent with established design standards. d. Work with local jurisdictions, ODOT and other public agencies to identify high-frequency bicycle-related crash locations and improvements to address safety concerns in these locations Policy 16.1 Regional Bicycle System Mode Share and Accessibility Increase the bicycle mode share throughout the region and improve bicycle access to the region's public transportation system. a. Promote increased bicycle use for all travel purposes b. Coordinate with TriMet to improve bicycle access and parking facilities at existing and future light rail stations, transit centers and park-and-ride locations c. Work with local jurisdictions, ODOT and other public agencies to provide appropriate short and long-term bicycle parking and other end-of-trip facilities at regional activity centers through the use of established design standards. d. Develop travel-demand forecasting for bicycle use and integrate with regional transportation planning efforts.

A major goal of the RTP is to provide a regional network of safe and convenient bikeways, including bike lanes, multi-use paths and bicycle boulevards. The 2004 RTP regional bikeway system (see Figure 1.19) identifies a network of bikeways throughout the region that provide for bicyclist mobility between the central city, regional centers and town centers. A complementary system of on-street and off-street regional bikeway corridors, regional multi-use trails and local bikeways is proposed to provide a continuous network. The following are the regional bicycle system functional classification categories. These are on-street bikeways that would be designed using a flexible toolbox of designs. The appropriateness of each design is based on adjacent motor vehicle speeds and volumes.

Regional access bikeway – focus on accessibility to and within the central city, regional centers, and some of the larger town centers. They generally have higher volumes as they serve areas with higher population and employment density.

Regional corridor bikeway –the longer routes that provide connectivity between the central city, regional centers and larger town centers. They generally have higher automobile speeds and volumes than regional accessways and community connectors.

Community connector – These longer routes connect smaller town centers, main streets, station areas, industrial areas and other regional attractions to the regional bikeway system.

Multi-use trail - These are physically separated from motor vehicle traffic by open space or a barrier, and are used by pedestrians, joggers, skaters and other non-motorized travelers. Trails that support both utilitarian and recreational bicycle functions are included as part of the regional bicycle system.

Non-SOV Modal Targets Project

In 2005, Metro studied the region's Non-SOV modal targets to support efforts by Metro and local jurisdictions to reduce drive-alone trips in the region to comply with the TPR. The study made the following recommendations to Metro to improve the regional bicycle policy framework:

- Construct bicycle improvements as required by state and federal regulations, and consistent with local TSPs and regional guidelines. Local governments and Metro should prioritize improvements that enhance connectivity of the bicycle and pedestrian system and access to transit.
- Support and coordinate Safe Routes to School programs and projects. Local jurisdictions and Metro should support and help coordinate these efforts by seeking and procuring project funding from federal, state and local sources, and providing technical assistance.
- Keep a region-wide database tracking total mileage of bikeway facilities in the region.
- Develop a region-wide database of bicycle user counts, provide guidance on the methodologies, help organize or provide PSU students or interns to carry out these counts, and track the progress over time.

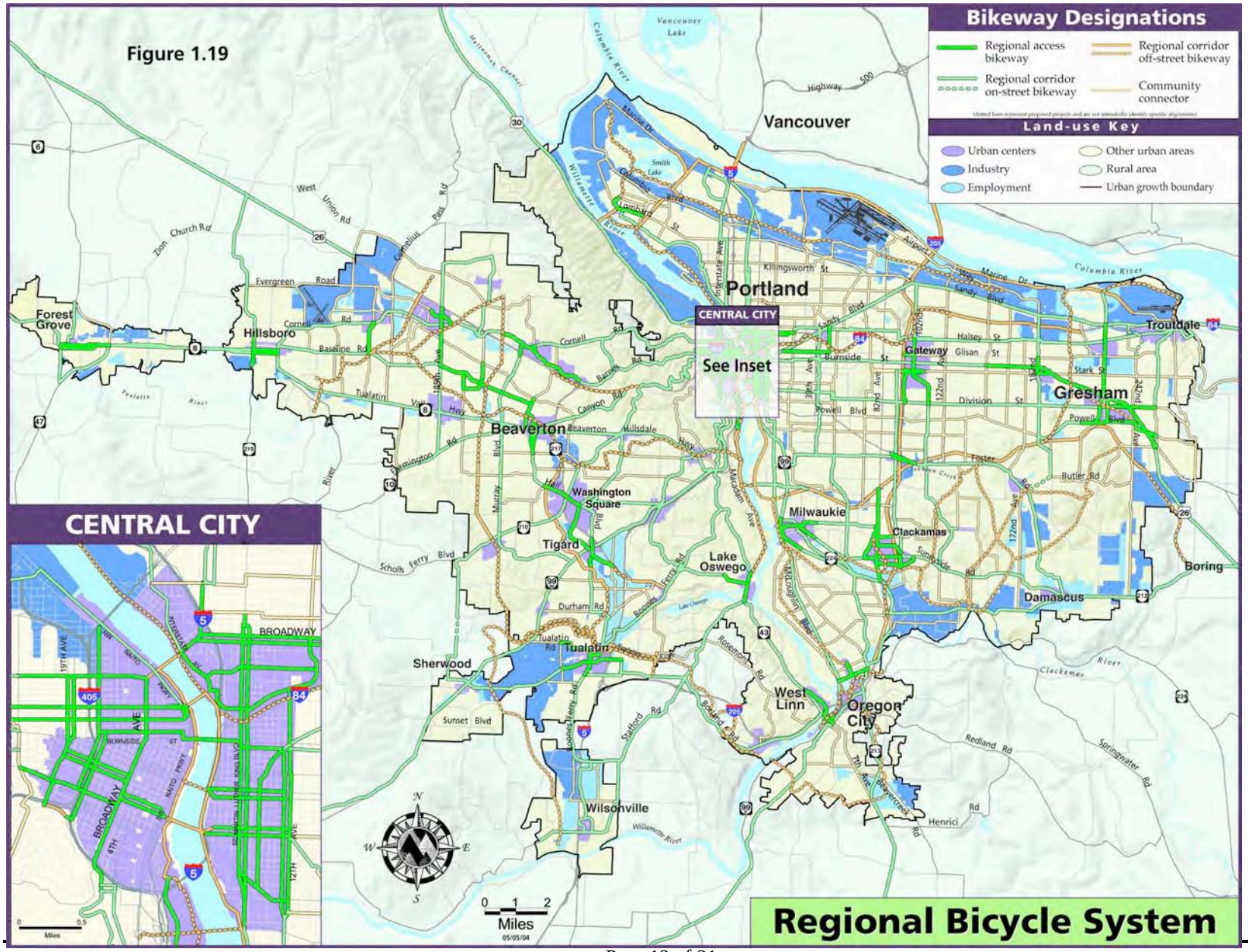


Figure 1.19
Bikeway Designations
Regional access bikeway
Regional corridor off-street bikeway
Regional corridor on-street bikeway
Community connector
Land-use Key
Urban centers
Other urban areas
Industry
Rural area
Employment
Urban growth boundary
Vancouver
Portland
CENTRAL CITY
See Inset
Forest Grove
Hillsboro
Beaverton
Tigard
Tualatin
Sherwood
Lake Oswego
Milwaukie
Clackamas
Gresham
Troutdale
Damascus
Boring
West Linn
Oregon City
Wilsonville
Washington Square
Gateway
CENTRAL CITY
BROADWAY
Miles
Regional Bicycle System

V. Bicycle System Profile

Regional Bicycle System Gap Analysis

It is important to evaluate how well the regional bicycle system is currently meeting regional bicycle policies. Figure 2 shows the regional bicycle routes that currently have a bicycle facility (i.e. bicycle lane or multi-use trail, or low-traffic bike boulevard) and the areas where gaps exist.

As table 2 shows, a higher percentage of Regional Accessway and Corridor routes have been completed compared to Community connector routes. This demonstrates that the region has been effectively implementing the current vision for the regional bikeways system, by prioritizing off-street trails and on-street facilities that serve (or are located within) the larger centers.

Table 2. Progress in completion of Regional Bicycle System

	Total	Regional Access	Regional Corridor	Community Connector	Multi-Use trails
Proposed regional bikeway system (miles)	773	103	344	326	238
Existing regional bikeway system (miles)	380	54	199	127	153
Percent complete	**49%**	**52%**	**57%**	**39%**	**64%**

Table 3 and Figures 2 and 3 show how the regional bicycle system serves schools, libraries, transit centers and park and rides. The data shows that access from regional bicycle routes is not as great for public schools as for libraries, transit centers, and park and rides.

Table 3. Trip generators served by existing regional bicycle routes

	Public Schools[12] within ¼ mile	% of Libraries within ¼ mile	% of Transit Centers within ¼ mile	% of Park and Rides within ¼ mile
Existing regional on-street bikeways	154 of 318	25 of 39	12 of 18	37 of 54
Existing regional off-street trails	24 of 318	4 of 39	6 of 18	4 of 54

- MAKE SEPARATE MAP (FIGURE 3) FOR SCHOOLS – INCLUDE ALL SCHOOLS AS VARYING SIZE DOTS – ELEMENTARY, SECONDARY, HIGH SCHOO, COLLEGES.
- FIGURE 2 ADD REGIONAL PARKS,

ANTICIPATED COMPLETION DATE – 11/28

- *TABLE 3 -ADD COLLEGES TO SCHOOL DATA AND ADD REGIONAL PARKS*

ANTICIPATED COMPLETION DATE – EARLY DECEMBER

[12] Does not include colleges/universities, technical schools, private schools, and non-traditional schools.

INSERT FIGURE 2 EXISTING AND PROPOSED REGIONAL BICYCLE SYSTEM MAP

INSERT FIGURE 3 SCHOOL LOCATIONS VS EXISTING AND PROPOSED REGIONAL BICYCLE SYSTEM

Increasing supply of local bicycle routes

As an educational and navigational aid to bikers, Metro publishes the *Bike There* map. The map contains information about existing and planned striped bike facilities, off street paths, bike shops, light rail and shared roadways. Its data for bike lanes and multi-use trails can be used to track progress in building bike facilities across the region. As Table 4 shows, local jurisdictions have added bike facilities at a slower rate between 2002 and 2005 compared with 1999 to 2002. For bicycle lanes, this may be partially explained due to having added them in the most easily retrofitted locations during the 1990s. Adding bike lanes to areas with constrained right-of-way areas may prove more difficult.

At the same time, low-traffic bicycle boulevards have gained popularity with local jurisdictions and bicycle advocacy organizations, due to their perceived attractiveness to a larger demographic of users. The City of Portland currently has 30 miles of bike boulevards. Tracking the completion of these facilities will be needed in the future, as it provides a broader perspective on the supply of bicycle facilities for all users of the system and their benefits.

Table 4. Miles of bike lanes and multi-use trails in the region

	1999	2002	2005
Bicycle lanes	430	512	547
Multi-Use trails	41	110	127

Source: Metro Data Resource Center, Bike There map

Increasing bicycle ridership

In addition to tracking the inventory (supply) of bicycle facilities in the region, it is also important to track their usage (demand). Anecdotal reports have shown that bicycle ridership has increased throughout the region over the past fifteen years. Quantitative bicycle count data is limited mostly to the City of Portland. A recent study, *Bridging the Gaps: How the Quality and Quantity of a Connected Bikeway Network Correlates with Increasing Bicycle Use*, looked at the success of Portland's "build it and they will come" philosophy toward bicycle facility construction.

During the last ten years, the City of Portland invested $12 million dollars and increased the city's developed bikeway network from 83 to 260 miles.[13] Coincident with this mileage increase was a doubling of citywide bicycle commute trips from the 1990 to 2000 census. A large share of this money was invested on and around bridge crossings near the downtown core. Improvements ranged from widening bridge facilities, to striping and signing, bike boulevard implementation, minimizing areas that create safety conflicts, and ramp redesign to meet ADA compliance.

Annual counts conducted by the city across the four major bridges show a 78 percent increase in bike traffic during the 1990s, while population increased by 14 percent and motor vehicle traffic increased 8 percent. The authors state their belief that two key factors: quantity of facilities (completeness of network) and quality of facilities have led to these increases. Of particular interest are figures for the Hawthorne and Broadway bridges. In both cases, completion of the network feeding the bridge increases in tandem with number of bicycle trips using the bridge. In specific years, increases in the number of bike trips across a given bridge appear to be linked to system improvements. For example, the number of bike trips across the Broadway bridge increased by about 50 percent between 1998 and 1999 when the lift span was replaced with a non-slippery surface.

[13] Birk, Mia and Geller, Roger. Bridging the Gaps: How the Quality and Quantity of a Connected Bikeway Network Correlates with Increasing Bicycle Use, 2005.

The findings from the Portland study were affirmed at the national level in a study that evaluated data from 35 large cities across the U.S, and found that cities with higher levels of bicycle infrastructure saw higher levels of bicycle commuting.[14]

Portland's ridership gains during the 1990s reported in the Bridging the Gap study have continued during the 2000s. Bicycle counts released for 2006 shows significant increases across the city. Dramatic increases occurred in areas such as the four central city bike friendly bridges, which captured 12,000 daily trips, an 18 percent increase since last year and 10 percent of the total trips across the bridge.[15] Also worthy of note is the increasing presence of female bikers. Overall, women represented 32 percent of all riders counted this year, up from 25 percent in 2000. Nationally, women represent about 25 percent of bikers.

Local Outreach on the Regional Bicycle System

In October 2006, staff held a bicycle and pedestrian workshop with local bicycle and pedestrian planners from local and state governments, advocacy groups and the private sector. The discussion focused on trends/research, barriers to developing the bicycle system and a review of current regional bicycle policy.

Key workshop recommendations identified for consideration during the RTP update include:

- Improve data collection at regional level.
    - Coordinate bicycle counts region-wide through the purchase of infrared counter to share with local jurisdictions to conduct bicycle and pedestrian counts.
    - Conduct annual regional user satisfaction surveys.
- Expand consideration of low-traffic bicycle boulevards in the regional bicycle system.
    - Current RTP bicycle map classifications favor bike lanes on arterial and collector streets, however, additional attention is needed to adequately serve potential riders that may favor lower-traffic routes to increase the bicycle mode share in the region.
    - More research is needed on the return on investment of bicycle facility improvements, including a comparison of bike lane retrofits on major arterial streets with parallel low-traffic bicycle boulevard design treatments.
    - Suburban areas face difficulties in implementing bicycle boulevards due to limited local and regional street connectivity, and road capacity projects that create limited opportunities for safe bicycle crossings.
- Update MTIP criteria to prioritize bicycle projects with greatest benefits to safety and ridership:
    - Current criteria favor projects within center boundaries (regional accessways).
    - Current criteria favor bicycle facilities along designated bicycle corridors, however, crossings of arterial streets have been identified as the biggest barrier to bicycle travel. Consider funding packages of arterial crossings improvements that benefit bicyclists.
- Explore role/responsibility for funding bicycle infrastructure:
    - Federal, state, regional, local – who's responsible for what?
    - Transportation impact fees, System Development Charges

Safety

Outreach

Staff asked local Citizen Bike Advisory Committees which locations were unsafe for bicyclists. The responses were primarily high traffic / high speed arterials and intersections. Local bicycle planners also

[14] Dill, Jennifer and Carr, Theresa. Bicycle Commuting and Facilities in Major U.S. Cities: If You Build Them, Commuters Will Use Them. Transportation Research Board, 2003, accessed at http://www.ce.umn.edu/~levinson/pa8202/Dill.pdf.

[15] Portland Office of transportation, Bicycle Count Report, 2006.

gave feedback that bike crash data did not tend to cluster at specific locations, thus they focus on unsafe bicycling "conditions" rather than "locations".

Existing regional policies/programs impact on safety
It is important to recognize that existing RTP projects, programs and policies have a positive impact on bicycle (and pedestrian) safety. These include regional street connectivity requirements, parking maximums, transit service planning requirements, 2040 growth concept (mixed-use centers, compact urban form, UGB), regional street design guidelines and the Bike There map. Recent studies have examined the link between sprawling regions and traffic fatalities and found that the more compact / less sprawled a region, the fewer the rates of traffic fatalities of all modes.[16]

Crash Data
There are serious limitations with the crash data available for bicycling, particularly due to underreporting. First, bicycle crash data from Oregon DMV are required to be reported to ODOT only if the incident involves a motor vehicle. Bicycle-only crashes are not reported, even though a recent FHWA study of 8 emergency rooms (in urban, suburban and rural areas) found that 70 percent of bicycle injuries did not involve a motor vehicle.[17]

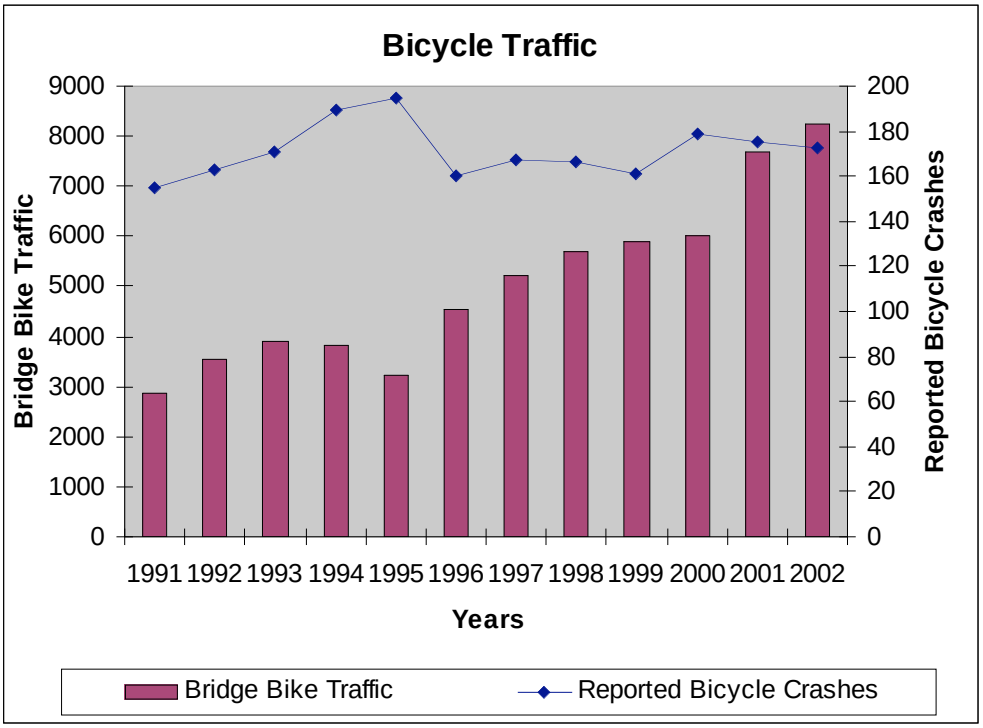
Second, Oregon relies heavily on driver self-reporting, which inherently leads to some accidents not being reported. An Oregon study showed as many as 50 percent of all crashes are not reported.[18] Furthermore, the causes of bicycle crashes are difficult to determine from the DMV data.

Despite the limitations in bicycle crash data, the City of Portland has done extensive localized bicycle crash analyses. They compared analyzed crashes in the Hawthorne corridor of SE Portland between 1991 and 2000. During this period far more crashes occurred on Hawthorne (80 percent) than on either of the two parallel low-traffic bike routes – Salmon/Taylor or Lincoln/Harrison (20 percent). Anecdotal evidence suggests that the low-traffic bike routes received higher bicycle volumes than Hawthorne, with the conclusion being that they are much safer bike routes.

<u>Declining bicycle crash rate</u>
As Figure 4 shows, despite increasing numbers of people biking in the City of Portland, the number of bicycle crashes is holding constant. This continues the trend of the decreasing bicycle crash rate within the City. Helmet usage has also grown in the City from 59 percent in 1992 to 73 percent in 2006.[19]

[16] Ewing, R, Schieber, R, and Vegeer, C. "Urban Sprawl as a risk factor in Motor Vehicle Occupant and Pedestrian Fatalities." American Journal of Public Health. 2003.
[17] FHWA, Injuries to Pedestrians and Bicyclists: An Analysis of Hospital Emergency Room data, FHWA-RD-99-078, accessed 11/20/06 at http://www.tfhrc.gov/safety/pedbike/research/99078/99-078.htm
[18] S. Malik, R.L. Bertini, C. Monsere, "Crash Data Reporting and Analysis—An Oregon Case Study," Presented at the Annual Meeting of ITE, Seattle, WA.
[19] 2006 City of Portland Bicycle Count Report – Significant Findings & Analysis.

Figure 4. Bicycle Traffic vs Bicycle Crashes in City of Portland 1991-2002



Safety in numbers: more walkers and bicyclists, safer walking and bicycling

This study analyzed the relationship between the number of people walking or bicycling and the frequency of collisions between motorists and walkers and bicyclists. The research focused on California roadways for the year 2000. The results demonstrated that a motorist is less likely to collide with a person walking and bicycling in areas with more pedestrians and bicyclists. The implication is that when drivers expect to see walkers or cyclists, they alter their behavior and drive more slowly/cautiously.

VI. Policy Assessment

Key finding	RTP Implication
1. Investing in bicycle facilities and encouraging growth of the bicycling industry benefits the economy.	• Acknowledge economic benefit of bicycle facilities in RTP.
2. The current regional bicycle system favors bike lanes on high-traffic streets. Local survey work asserts that many potential cyclists prefer low-traffic routes (i.e. bicycle boulevards).	• In future research, study the impact on ridership and safety of implementing retrofitting bike lanes on a major arterial streets versus. a parallel low traffic bicycle boulevard. • Consider bicycle boulevards part of the regional system if: o The regional street system does not meet arterial spacing standards. o Due to a constrained right-of-way, bicycle lanes are not feasible on an adjacent regional route. • Consider adopting stricter requirements and/or greater incentives for more street connectivity and/or bicycle and pedestrian accessways which could improve ability to develop low-traffic bicycle routes in suburban areas
3. Current technical criteria for regional funding decision favors projects within centers, but many key gaps are located outside centers.	• Consider increasing priority for bicycle projects along corridors that directly connect to 2040 centers.
4. Current technical criteria for regional funding decision favors long-distance projects, but crossings of arterials are considered biggest barrier to bicycling.	• Consider funding packages of bicycling focused arterial improvements.
5. Lack of regional bicycle count data.	• Consider requiring local jurisdictions to collect regular bicycle count data, particularly "before and after" counts when a new facility is constructed. Facilitate this effort with purchase of infrared counter to be shared with local jurisdictions. Provide guidance on count methodology.
6. Lack of bicycle crash data and analysis of conditions attributing to crashes. Local jurisdictions have not found much clustering of bicycle crashes during their safety analyses.	• Consider requiring local jurisdictions to submit bicycle crash data annually. • Change language of Policy 16.0 D to reference "high crash *conditions*" rather than "high crash locations."
7. Active Living movement is gaining momentum.	• Develop a regional policy that supports the active living / public health /transportation/land use connection.
8. Bicycle ridership has increased as the bicycle network has expanded.	• Continue to prioritize and fund bicycle infrastructure projects and include

	appropriate bicycle facilities in all transportation projects.
9. Lack of awareness of how to ride a bicycle (and drive near a bicycle) safely.	• Explore potential for regional safety/education campaign that could be administered through the Regional Travel Options program if more funding became available.
10. Declining revenues available for transportation projects, particularly at federal and state levels.	• Research potential for using local funding mechanisms such as traffic impact fees or system development charges for bicycle projects (beyond bike lanes on suburban arterial). • Consider ways to ensure that future major road projects funded through public-private partnerships include bicycle-friendly design treatments.
11. Increasing competition between trail projects and bicycle boulevards for regional funding.	• Prioritize the most important regional trails (with transportation function) on RTP bicycle system map. • Make trails its own category for technical evaluation in the Transportation Priorities process.

VII. Conclusion

The role of bicycling in the regional transportation system has grown greatly since the last RTP update. The region has experienced many successes in the realm of bicycling. Greater levels of bicycle infrastructure have led to increased ridership. Despite these successes, challenges remain. New infrastructure has not been built as fast as growth in bicycle riders. Many suburban areas face obstacles due to a lack of connecting streets, and large auto-focused intersections.

All across the region, there may be a large group of potential cyclists being left out, since they do not feel safe using bicycle lanes on high-traffic arterials. More research is needed to determine whether low-traffic bicycle boulevards would compel these individuals to bicycle for short trips. If so, the regional bicycle policies/classifications should be updated to reflect the needs of the next wave of potential cyclists. It will also be important to continue to integrate the efforts of the state, counties and cities in the region to develop a convenient, safe, accessible and attractive regional system of bikeways that are complemented by more locally-oriented bikeway routes.

Finally, in order to better plan for the future, better data is needed. Much available data is either anecdotal or limited to the City of Portland. More bicycle count and crash data from throughout the region would be useful to track the progress of the regional bicycle system and forecast future use.

New Look
The Regional Transportation Plan

2035 Regional Transportation Plan Update

Background Paper:

A Profile of the Regional Transit System in the Portland Metropolitan Region

Prepared by:

METRO
PEOPLE PLACES • OPEN SPACES

DISCUSSION DRAFT
November 27, 2006

Metro
People places • open spaces

Clean air and clean water do not stop at city limits or county lines. Neither does the need for jobs, a thriving economy and good transportation choices for people and businesses in our region. Voters have asked Metro to help with the challenges that cross those lines and affect the 25 cities and three counties in the Portland metropolitan area.

A regional approach simply makes sense when it comes to protecting open space, caring for parks, planning for the best use of land, managing garbage disposal and increasing recycling. Metro oversees world-class facilities such as the Oregon Zoo, which contributes to conservation and education, and the Oregon Convention Center, which benefits the region's economy.

Your Metro representatives

Metro Council President – David Bragdon
Metro Councilors – Rod Park, District 1; Brian Newman, District 2; Carl Hosticka, deputy council president, District 3; Susan McLain, District 4; Rex Burkholder, District 5; Robert Liberty, District 6.
Auditor – Alexis Dow, CPA

Metro's web site: www.metro-region.org

2035 Regional Transportation Plan Update

A Profile of the Regional Transit System in the Portland Metropolitan Region

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LIST OF TABLES AND FIGURES

I. INTRODUCTION

This paper is one of a series of papers that provide background research and analysis to guide Regional Transportation Plan (RTP) update policy discussions. The papers describe trends and research affecting the regional transportation system, current regional transportation planning policies and regulatory requirements, a profile of the existing transportation system and policy implications to be addressed in the RTP to respond to identified policy gaps and key findings of the background research. Collectively, the background papers will inform future policy discussions by Metro Policy Advisory Committee (MPAC), Joint Policy Advisory Committee on Transportation (JPACT) and the Metro Council and lead to an updated RTP.

This paper provides a profile of the regional transit system in the Portland Metropolitan region. It identifies trends and research in public transportation and reports on the existing regional public transportation system. The trends shaping future public transportation travel and performance of the current regional public transportation system are essential considerations for the development of effective goals and strategies to address transit travel needs in the Portland metropolitan region. The paper concludes with a list of key findings and policy recommendations to be considered during the RTP update process.

II. BACKGROUND

At the backbone of a balanced, regional multi-modal transportation system is transit. Transit efficiently links other travel options in the region, including bicycling and walking. Additionally, park and ride lots offer motor vehicle drivers with a transit connection and alternative to single occupant vehicle travel to work or other destinations. TriMet bus and MAX light rail operations as well as other emerging transit service providers give individuals transportation options and will play an important role in shaping the future growth of the Portland metropolitan region.

Transit is a key component of the 2040 Growth Concept and supports the six 2040 Fundamentals adopted by the region in 1997:

1. *Healthy Economy*
2. *Vibrant Communities*
3. *Environment Health*
4. *Transportation Choices*
5. *Equity*
6. *Fiscal Stewardship*

Transit supports a *healthy economy* by providing essential linkages to regional and town centers throughout the region. These connections support job growth by supplying workers with access to job and business centers. Additionally, transit offers an alternative to the automobile and can help reduce the number of cars on the road. Reductions in traffic volume help manage congestion and improve the movement of freight across the region.

Transit supports the concept of *vibrant communities* and helps to encourage compact, mixed-use development. This type of development relies on a transit system to support the higher density development necessary to address mobility and provide access to new development. Transit spawns transit-oriented development that offer walkability and mobility based on the transit options, encouraging social interaction and creating interesting 24-hour neighborhoods.

Similarly, transit preserves *environmental health*. Alternative transportation allows for more compact development that preserves the natural environment and agricultural land, reduces air pollution and is more energy efficient. A public transportation system that is fast, reliable and that has competitive travel times to the automobile provides individuals with *transportation choices*. It facilitates access to bicycle and pedestrian facilities and supports regional goals to increase the percentage of trips made by bicycling, walking and transit to provide an integrated system of travel options.

Transit addresses issues of transportation *equity* by offering equitable access for individuals of all income levels and special needs residents of the region, including seniors and people with disabilities. Public transportation also serves the economically disadvantaged throughout the region by connecting low-income individuals to employment areas and related social services. Equity also applies to the allocation of services and distribution of new transit equipment and amenities across the region. Transit also helps to support *fiscal stewardship* as investments in public transportation, although in some cases as capital intensive as major road projects, have higher returns on investment and lower long-term maintenance and preservation costs compared to roadway projects[1].

III. TRENDS AND RESEARCH

Increasing Interest in Economic Benefits of Transit

A topic of recent critical interest is the strength and competitiveness of the region's economy based on the extent, condition and performance of transportation. Evidence is mounting suggesting that the region is under investing in the transportation network that is directly connected to our economic interests. With that in mind, and as competition grows for limited transportation funding resources, it is important to examine the economic benefits of public transportation.

Investment in public transportation produces a variety of positive economic impacts. Studies have shown that transit capital investment is a significant source of job creation as well as increased revenues for local businesses. A report by Cambridge Systematic Inc. found that for every $10 million dollars invested in transit, 314 jobs are created in the year following investment and businesses realize a gain in sales three times the

[1] Camph, Donald H. "Dollars and Sense: The Economic Case For Public Transportation in America." July 1997. < http://www.ctaa.org/pubs/dollars/>.

investment ($30 million)[2]. Additionally, transit has been shown to produce a high net return on investment (4 or 5 to 1)[3]. This high rate of return is substantial considering the federal investment in transit is less than a third than for highway projects. Other economic impacts include "quality of life" benefits, changes in land use, social welfare benefits and reductions in other public sector costs, but these are difficult to quantify and require more analysis.

Economic Development and Transit Oriented Development (TOD)

Transit Oriented Development (TOD) refers to compact, mixed-use developments that are centered around high quality transit like light rail or commuter rail stations. National research shows that TODs offer multiple primary and secondary benefits listed in Table 1.

TABLE 1. Transit Oriented Development Benefits

Class of Benefit	Benefit Recipient	
	Public Sector	Private Sector
Primary	Increased transit ridership	Increase land values, rents, and real estate performance
	Neighborhood revitalization	
	Increase in affordable housing	
Secondary/Collateral	Ease of traffic congestion and VMT-related costs, like pollution and fuel consumption	Increase retail sales
	Increase sales and property tax revenue	Increased access to labor pools
	Reduce sprawl/conserve open space	Reduced parking costs
	Reduce road expenditures and other infrastructure outlays	Increased physical activity

TCRP 102 [4]

Research on TODs in the Portland metropolitan region shows similar benefits. A survey of four TODs (Orenco/NW 231st Station, Elmonica/SW 170th Avenue Station, Beaverton Central, and The Merrick/Convention Center MAX) revealed increases in transit ridership, 15 percent of riders are 65 years old and older, and that residents of TODs take transit to work or school at a higher rate with 23-33 percent using it as their primary mode of transportation[5].

[2] "Public Transportation and the Nation's Economy: A Quantitative Analysis of Public Transportation's Economic Impact." Cambridge Systematics, Inc. p. E-1. Oct. 1999.
[3] Camph, Donald H. "Dollars and Sense: The Economic Case For Public Transportation in America." July 1997. < http://www.ctaa.org/pubs/dollars/>.
[4] "Transit-Oriented Development in the United States: Experiences, Challenges and Prospects." TCRP 102. p. 120. Jan. 2004.
[5] Dill, Jennifer. "Travel and Transit Use at Portland Area TODs." p. 49-50. May 2006.

Increasing Understanding of Other Benefits of Transit

With rising fuel prices transit ridership across the country is increasing. More focus has been given to expanding bus and rail services. Critics claim that such transit expansions are capital intensive, present little impact on congestion and are not cost effective. Recent research shows quite the opposite. Research compiled by the Victoria Transportation Policy Institute shows that high quality, transit in exclusive right-of-way helps ease congestion. Traffic congestion growth rates have actually been shown to decline in several U.S. cities after the establishment of light rail service[6]. Additionally, per capita congestion delay is significantly lower in cities with high quality rail transit systems than in otherwise comparable cities with little or no rail service[7]. The VTPI research also compares the relative advantages of bus and rail transit investments.

Both buses and rail have positive effects on mobility. Because rail transit offers a higher quality of service (speed, comfort and integration with land use) it often attracts more choice riders than buses. Rail transit is also regarded as predictable, meaning the route is clearly apparent to the user. Buses on the other hand offer flexibility because they don't require special facilities. However, when similar sized US cities were compared, those with bus-only systems and those with bus and rail systems fared differently over the period from 1996 – 2003. Over this period, bus and rail cities saw ridership grow sixteen percent compared with 1.7 percent in bus only cities[8]. As of 2003, New Start rail cities experienced 74 percent less in operating and maintenance costs per passenger mile than bus only cities[9].

Increasing Emphasis on Accessibility and Service Coordination

Regionally, research has focused on the accessibility of transit services to the elderly and disabled. The population of seniors is growing, particularly at the edges of the Metro region. TriMet offers LIFT demand-response service to transport the elderly and disabled. LIFT ridership has averaged 7.1 percent annually for the last five years with the cost per one-way trip climbing to $22[10]. Annual operating costs are increasing $1.5 million annually. Research shows that between 35 percent and 59 percent of LIFT riders could potentially walk and use existing fixed route transit. However, barriers exist like discontinuous sidewalk segments and a lack of transit stops/destinations within a quarter of a mile of where the elderly and disabled reside. The study suggests that a focus should be put on providing housing for the elderly and disabled along transit corridors. However, current zoning often precludes locating housing for the elderly or disabled in transit corridors. Additionally, an emphasis should be placed on addressing issues of sidewalk connectivity near existing bus stops and MAX light rail stations.

[6] Litman, Todd. "Comprehensive Evaluation of Rail Transit Benefits."
[7] Litman, Todd. "Comprehensive Evaluation of Rail Transit Benefits."
[8] Litman, Todd. "Comprehensive Evaluation of Rail Transit Benefits."
[9] Litman, Todd. "Comprehensive Evaluation of Rail Transit Benefits."
[10] "Elderly and Disabled Transportation and Land Use Study." p. 19.

Issues of sidewalk connectivity do not just affect the elderly and disabled. TriMet research shows that the majority of riders access transit by walking. Roughly ninety percent of the Metro region's population lives within half-mile of a bus stop or light rail station. However, sidewalks connect only 69 percent of the stops[11]. The 2007 TriMet Transit Investment Plan (TIP) emphasizes the "total transit system." This is defined as focusing on service, reliability, passenger amenities, customer information and access. The total transit system is the number one priority of the 2007 TIP, over capital investment in new bus and light rail service. Another recent TriMet focus is the increased development of frequent service buses that operate on headways of fifteen minutes or less.

The TCRP recently published Report 91, "Economic Benefits of Coordinating Human Service Transportation and Transit Services." This report examines the net economic benefits associated with various strategies and practices for coordinating human service transportation and general public transit, provides quantitative estimates of these strategies and practices, and identifies innovative and promising coordination strategies and practices. Human service is defined as the transportation services offered to the elderly and disabled generally consisting of demand responsive paratransit and dial-a-ride services. Some of the economic benefits of coordinating human service transportation and fixed route service identified were:

- Increased efficiency – reduced cost per vehicle hour or per mile
- Increased productivity – more trips per month or passengers per vehicle hour
- Enhanced mobility – increased access to jobs or health care, or trips provided to passengers at a lower cost per trip
- Additional economic benefits – increased levels of economic development in the community or employment benefits for those persons associated with the transportation service[12]

There are additional benefits from coordinating services that are not expressed in economic terms including: improving service quality and expanding availability of services to more people and larger geographic areas[13]. With such tangible benefits research supports exploring more regional level service coordination efforts.

There are numerous human service transportation providers in the region, each offering similar transportation options. In addition, the population of seniors is growing, particularly at the edges of the region. Providers range from other transit agencies like South Metro Area Rapid Transit (SMART) and non-profit providers like Ride Connection, Inc. Each provides demand response services for the elderly and disabled. With multiple providers and overlapping services within a region, there is a need for more coordination of services.

[11] TriMet. "2007 Transportation Improvement Program." p. 10.
[12] "Economic Benefits of Coordinating Human Service Transportation and Transit Services." TCRP 91. p. 2. March 2003.
[13] "Economic Benefits of Coordinating Human Service Transportation and Transit Services." TCRP 91. p. 2. March 2003.

Increasing Interest in Commuter Rail

The feasibility of commuter rail depends on many factors. Ultimately, the feasibility of commuter rail is based largely on the costs and ridership. The studies that have been done to date show that adequate ridership does not currently exist in most corridors. However, the most recent Oregon Transportation Plan (OTP) update identified a research trend towards commuter rail. One OTP background paper examined commuter rail feasibility and potential throughout Oregon as well as identifying possible policy changes. Citing the Beaverton to Wilsonville project as an example, the paper suggests that commuter rail is a transportation mode that can potentially support compact, mixed-use development that provides necessary connections between other modes (i.e. bike, pedestrian and other transit) and better connect communities.

A significant challenge is that commuter rail is limited to existing rail lines and requires complex agreements with freight rail operators, which may preclude its development in some corridors. The paper recommends that the new OTP continue to support commuter rail as a viable alternative as well as encouraging ODOT to work with MPOs in developing agreements with the railroads where service would extend beyond a community's traditional service boundary. The following corridors have been identified for study to determine the feasibility of potential commuter rail service as population and employment centers expand in the region:

- Portland-Milwaukie-McMinnville-Corvallis-Eugene
- Portland-Scappose-St. Helens
- Wilsonville-Salem

Many factors need to be taken into consideration when evaluating the feasibility of service, including impacts to freight service movement, rail line ownership, cost-effectiveness of proposed service for anticipated ridership and other social and environmental impacts and benefits.

Increasing Emphasis on A Coordinated and Integrated Transportation System

Another OTP background paper explored the shifts in direction of public transportation in Oregon. The research identifies the shift in TriMet's focus to considering the total trip experience, emphasizing the quality of the transit customer's experience, utilizing state-of-the-art information technologies to aid travelers, and concentrating on mobility. TriMet's new emphasis not only includes exploring service expansion, but also seeks to address access issues by identifying sidewalk gaps and dangerous roadway crossings that effect ridership. These issues all center on managing the existing transit system. Additionally, the paper suggests encouraging integration of small city service providers. An example is facilitating better connections between SMART and TriMet. Similar partnerships should be explored at the edges of the TriMet service boundary.

Growth in Suburban-to-Suburban Commuting Travel

Mobility is becoming increasingly complex. Significant economic and population growth is occurring in suburban communities throughout the region, creating a complex environment for the provision of transit service. In many cases, these communities are less dense and more auto dependent environments making traditional fixed route service difficult and costly. Increasingly, the region's transit agencies are struggling with how to provide services in areas that cannot support fixed-route services. Some of the alternatives are developed with the goal of expanding transit service coverage counter to the goal of fixed-route service in maximizing productivity.[14] Changing commute trip patterns necessitate a rethinking of traditional geographic and political boundaries of service areas and the current model of service provision in the region.

Employment centers in Oregon have moved towards less dense suburban areas that are not easily served by traditional suburban-to-center transit spokes[15]. One new response to the changing travel patterns may be commuter rail. The proposed Beaverton to Wilsonville commuter rail would provide a suburb-to-suburb transit connection as well as a linkage to TriMet's MAX light rail system and bus service. The paper also concludes that the role of transit in sustainable development needs to be defined and that mobility needs to be defined in a way such that it considers total trips and total mobility as opposed to simply transit linkages, a trend that is evident in the focus of TriMet's service planning activities and Transit Investment Plan.

Increasing Emphasis on Managing the System and Intelligent Transportation Systems (ITS)

Intelligent Transportation Systems (ITS) apply advanced and emerging technologies in information processing, communications, control, and electronics to surface transportation needs. Examples of Transit ITS applications, in addition to those mentioned above, include fixed-route and paratransit software, electronic fare payment, in-vehicle transit information, and station/facility surveillance. Figure 1 below lists various ITS applications used across the country and by TriMet.

[14] "Guidebook for Evaluating, Selecting, and Implementing Suburban Transit Services." TCRP 116. p. 1-2. June 2006.
[15] OTP Background Paper. "Shifts in Direction of Public Transportation." p. 13.

FIGURE 1

Federal Transit Administration ITS Matrix[16]

[16] Federal Transit Administration ITS Matrix. <http://itsweb.mitretek.org/its/aptsmatrix.nsf/framemain?OpenFrameSet>.

IV. POLICY AND REGULATORY FRAMEWORK

Federal

Congress enacted the Intermodal Surface Transportation Efficiency Act (ISTEA) in 1991. ISTEA gave Metropolitan Planning Organizations (MPOs) increased funding, expanded authority to select projects and mandates for new planning initiatives in their regions. The legislation also focused on improving transportation not as end in itself but as the means to achieve important national goals including economic progress, cleaner air, energy conservation and social equity. ISTEA promoted a transportation system in which all modes and facilities were integrated to allow a "seamless" movement of both goods and people. New funding programs provided greater flexibility in the use of funds, supported improved "intermodal" connections and emphasized upgrades to existing facilities over building new capacity – particularly roadway capacity.

To accomplish these goals, ISTEA doubled funding for MPO operations and required the agencies to evaluate a variety of multimodal solutions to roadway congestion and other transportation problems. MPOs were also required to broaden public participation in the planning process and see that investment decisions contributed to meeting the air quality standards of the federal Clean Air Act Amendments.

Congress passed the Transportation Equity Act for the 21st Century (TEA-21) in 1998. It reduced the 15 planning factors from ISTEA to seven and continued the majority of its predecessor's programs. TEA-21 recognized that transportation investments impact the economy, environment, and community quality of life.

In 2005, Congress built on both ISTEA and TEA-21 with the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). SAFETEA-LU addresses the many challenges facing our transportation system today, such as improving safety, reducing traffic congestion, improving efficiency in freight movement, increasing intermodal connectivity, and protecting the environment. SAFETEA-LU promotes more efficient and effective Federal surface transportation programs by focusing on transportation issues of national significance, while giving State and local transportation decision makers more flexibility for solving transportation problems in their communities.

All provisions for Metropolitan Planning are consolidated in a new section 5303. The requirement for separate transportation plans and transportation improvement programs is maintained. The Long Range Transportation Plan and the Transportation Improvement Program are to be updated every four years. Provisions regarding Transportation Management Areas (TMAs) are included in the metropolitan transportation planning section. Metropolitan Planning Organizations (MPOs) are encouraged to consult or coordinate with planning officials responsible for other types of planning activities affected by transportation. Safety and security are factors to be included in metropolitan planning.

In developing a Long Range Transportation Plan, MPOs are now required to include transit agencies in making funding estimates; consult with state and local agencies responsible for land use management, natural resources, environmental protection, conservation, and historic preservation; and have a participation plan that provides reasonable opportunities for all parties' comments.

Other key changes for transit are:

- Preserved key features of the two previous authorization acts providing flexibility for state and local decision makers and emphasizing multi-modal solutions to major transportation challenges.
- Increased funding for rural transit significantly, which will help systems meet escalating operational costs and allow for modest service expansion.
- Provided funding for non-motorized alternative transportation, including a Safe Routes to School program.
- Establishes a new Small Starts Program as part of the New Starts Program for smaller transit projects such as Bus Rapid Transit. However, the discretionary nature of the New Starts program, which is the second largest transit program, makes it difficult to predict the total level of transit funding the region might receive over the life of the bill.

State

Transportation Planning Rule (TPR)

In 1991, the Land Conservation and Development Commission adopted the Oregon Transportation Planning Rule (TPR). The TPR implements State Land Use Planning Goal 12, Transportation[17], which was adopted by the Oregon Legislature in 1974. The TPR requires most cities and counties and the state's Metropolitan Planning Organizations, such as Metro, to adopt transportation system plans that consider all modes of transportation, energy conservation and avoid principal reliance on any one mode to meet transportation needs. By state law, local plans in MPO areas must be consistent with the regional transportation system plan (TSP). In the Portland metropolitan region, the Regional Transportation Plan serves as the regional TSP. Likewise, the regional TSP must be consistent with the OTP and TPR.

The TPR defines mass transit as any form of passenger transportation that carries members of the public on a regular and continuing basis. The state TPR also requires that transportation system plans provide an adequate system of improvements that meet adopted performance measures. TPR requirements for public transportation planning include:

- Mandates that transportation planning in Oregon reduce reliance on any one mode of transportation.
- Requires vehicle miles traveled (VMT) per capita reduction targets for local jurisdictions. The RTP identifies 2040 Non-SOV modal targets in place of and consistent with the requirement to reduce VMT per capita. As required by the

[17] Goal 12 states, "To provide and encourage a safe, convenient, and economic transportation system."

TPR, jurisdictions within the Metro region must adopt policies and actions that support an increase in the share of trips by walking, bicycling, transit and shared ride.

Recent updates to the TPR do not affect the requirements for public transportation planning.

Oregon Transportation Plan (OTP)
Amended in September 2006 by the Oregon Transportation Commission, the OTP includes several policies that address public transportation:

- Policy 1.1 – Development of an Integrated Multimodal System
- Policy 1.2 – Equity, Efficiency, and Travel Choices
- Policy 1.3 – Relationship of Interurban and Urban Mobility
- Policy 3.2 – Moving People to Support Economic Vitality
- Policy 3.4 – Development of the Transportation Industry
- Policy 4.3 – Creating Communities
- Policy 5.1 – Safety
- Policy 5.2 – Security

Most requirements will be included in specific modal plans. Future RTP updates will be developed to be consistent with the updated state Public Transportation plan.

Regional
Metro Charter
In 1979, the voters in this region created Metro, the only directly elected regional government in the nation. In 1991, Metro adopted Regional Urban Growth Goals and Objectives (RUGGOs) in response to state planning requirements. In 1992, the voters of the Portland metropolitan area approved a home-rule charter for Metro. The charter identifies specific responsibilities of Metro and gives the agency broad powers to regulate land-use planning throughout the three-county region and to address what the charter identifies as "issues of regional concern." Among these responsibilities, the charter directs Metro to provide transportation and land-use planning services. The charter also directed Metro to develop the 1997 Regional Framework Plan that integrates land-use, transportation and other regional planning mandates.

Regional Framework Plan
Updated in 1995 and acknowledged by the Land Conservation Development Commission in 1996, the RUGGOs establish a process for coordinating planning in the metropolitan region in an effort to preserve regional livability. The 1995 RUGGOs, including the 2040 Growth Concept, were incorporated into the 1997 Regional Framework Plan to provide the policy framework for guiding Metro's regional planning program, including development of functional plans and management of the region's urban growth boundary. The Regional Framework Plan is a comprehensive set of policies that integrate land-use, transportation, water, parks and open spaces and other important regional issues consistent with the 2040 Growth Concept. The Framework Plan is the regional policy basis for Metro's planning to accommodate future population and employment growth and achieve the 2040 Growth Concept.

2040 Growth Concept

The 2040 Growth Concept text and map identify the desired outcome for the compact urban form to be achieved in 2040. It envisions more efficient land use and a diverse and balanced transportation system closely coordinate with land use plans. Bicycling is an important element of the transportation concept envisioned in Region 2040. The 2040 Growth Concept has been acknowledged to comply with statewide land use goals by the Land Conservation and Development Commission (LCDC). It is the foundation of Metro's 1997 Regional Framework Plan.

2004 Regional Transportation Plan

The RTP implements the goals and policies in 1995 RUGGOs and the 1997 Regional Framework Plan, including the 2040 Growth Concept. The region's planning and investment in the regional public transportation system are directed by current RTP policies and objectives for the regional public transportation system as shown in Table 1.

REGIONAL PUBLIC TRANSPORTATION POLICIES

Policy 14.0. Regional Public Transportation System
Provide an appropriate level, quality and range of public transportation options to serve this region and support implementation of the 2040 Growth Concept, consistent with Figures 1.15 and 1.16.

a. Objective: Serve this region with appropriate public transportation service as defined in Figures 1.15 and 1.16.
b. Objective: Continue to work with local jurisdictions and TriMet to implement TriMet's Transit Choices for Livability community transit plan.
c. Objective: Provide transit service that is accessible to the mobility impaired and provide para-transit to the portions of the region without adequate fixed-route service to comply with the Americans with Disabilities Act of 1990.
d. Objective: Develop a long-term strategy for potential use of freight railroad lines for passenger use and work with jurisdictions inside and outside of the Metro area to explore other commuter rail opportunities.

Policy 14.1. Public Transportation Awareness and Education
Expand the amount of information available about public transportation to allow more people to use the system.

a. Objective: Increase awareness of public transportation and how to use it through expanded education and public information media and easy to understand schedule information and format.
b. Objective: Improve mechanisms for receiving and responding to feedback from public transportation users.
c. Objective: Explore new technologies to improve the availability of schedule, route, transfer and other service information.

Policy 14.2. Public Transportation Safety and Environmental Impacts
Continue efforts to make public transportation an environmentally friendly and safe form of motorized transportation.

a. Objective: Continue to reduce the amount of air pollutants and noise generated by public transportation vehicles.
b. Objective: Support efforts by the region's transit providers to improve the existing level of passenger safety and security on public transportation and reduce the number of avoidable accidents involving transit vehicles.

Policy 14.3. Regional Public Transportation Performance
Provide transit service that is fast, reliable and has competitive travel times compared to the automobile.

a. Objective: Transit travel time (in-vehicle) for trips on light rail transit and rapid bus routes during the peak hours of service should be no slower than 150 percent of the auto travel time during the off-peak hours. Exceeding this threshold would result in considering preferential treatment to the road system for transit and express operation.
b. Objective: Total transit travel time (in-vehicle + non-weighted wait time) for trips on regional bus routes should be no slower than 200 percent of the total auto travel time.

Policy 14.4. Special Needs Public Transportation
Provide an appropriate level, quality and range of public transportation options to serve the variety of special needs individuals in this region and support the implementation of the 2040 Growth Concept.

a. Objective: Continue to work with TriMet, SMART, special needs providers, and local jurisdictions to meet the adopted minimum standards for service levels established for the Metro area.
b. Objective: Ensure public transportation that serves the special needs population is sensitive to and balances the cultural, functional or age related needs of the elderly and disabled individuals with the need to utilize resources in a cost-effective manner.
c. Objective: Improve the accountability of the special needs transportation network by enhancing customer input and feedback opportunities.
d. Objective: Support informal (family, neighbors, self) and formal (paid and volunteer special needs transportation options by establishing training and information services.

14.4 Special Needs Public Transportation
Provide a seamless and coordinated public transportation system for the special needs population.
a. Objective: Continue to work with TriMet, SMART special needs providers, and local jurisdictions to provide a customer information system that improves community familiarity with, access to and understanding of the elderly and disabled transportation network.
b. Objective: Employ technology to create a seamless, coordinated and single point of entry system for the user's ease that maximizes efficiency of operation, planning and administrative functions.

14.7 Special Needs Public Transportation
Encourage the location of elderly and disabled facilities in areas with existing transportation services and pedestrian amenities.
a. Objective: Encourage new and existing development to create and enhance pedestrian facilities near elderly and disabled developments, including sidewalks, crosswalks, audible signals, etc. and provide incentives for the future pedestrian orientation in areas serving elderly and disabled individuals.
b. Objective: Incorporate elderly and disabled housing into mixed use developments that includes public facilities such as senior centers, libraries and other public services as well as commercial and retail services such as stores, medical offices and other retail services.
c. Objective: Provide for audible signals, curb cut tactile strips and appropriately timed signalized crosswalks at major retail centers or near bus stops for arterial street, high volume neighborhood circulators or other major roadways near elderly or disabled facilities or in neighborhoods with significant elderly or disabled populations.

Metro's role is to establish a 20-year plan for regional transit improvements through the RTP. TriMet is the primary public transportation provider for the metropolitan region and is committed to providing the appropriate level of transit service to achieve regional 2040 Growth Concept objectives. TriMet implements transit improvements identified in the RTP through annual updates and expansions to their service plan. This also includes improvements to community level transit service.

The TGM Modal Targets survey was produced in July 2005. The report examined Metro's 2040 modal targets incorporated into the 2004 RTP that establish Non-Single Occupancy Vehicle (Non-SOV) targets to reduce vehicle miles travel per capita. For Central City, Regional and Town Centers, and Industrial and Employment Areas the modal targets are 60-70 percent, 45-55 percent, and 40-45 percent respectively. To help achieve these targets the report offered the following recommendations to:

- Construct bicycle and pedestrian improvements as required by state and federal, and consistent with local TSPs and regional guidelines. Improvements should be prioritized that enhance connectivity of the bicycle and pedestrian system and access to transit.
- Continued provision of frequent, reliable, and comprehensive transit service by TriMet and other transit agencies.

A variety of transit strategies were offered as a means of achieving the modal targets. Each strategy seeks to increase transit ridership by enhancing convenience, cost savings, accessibility and mobility. Because convenience is often cited as the most important factor in shifting drivers to other forms of travel, the frequency of bus service and overall accessibility of transit services are essential to reducing SOV trips. Making bus service improvements and efficient demand responsive/ADA service adjustments can increase transit ridership. High-capacity transit (HCT) like bus rapid transit and light rail transit provide frequent, fast and reliable service. Changes in transit pricing, like with fareless square is another way to increase transit ridership.

V. REGIONAL TRANSIT SYSTEMS PROFILE

TriMet Services

Created in 1969 by the state, TriMet is the primary transit service provider in the Metro region. The TriMet service district now encompasses 575 square miles and serves 1.3 million people in the urban portions of Clackamas, Multnomah, and Washington counties. More than one-half of the district's population lives within one-half mile of TriMet service that operates every 15 minutes or better. Ninety percent of the Metro population lives within one-half mile of TriMet service. TriMet operates the bus system, the MAX Light Rail System as well as LIFT service and Medical Transportation Programs to meet the needs of elderly and disabled individuals.

TriMet's fixed route service is comprised of bus and rail lines. It operates 626 buses that serve more than ninety bus lines and seasonal shuttles. Currently there are 16 frequent bus service routes covering 164 miles that offer riders fifteen minute or better service seven days a week. The MAX Light Rail has three routes and is 44 miles long. Ridership on bus and rail lines has increased every year since 1988.

TABLE 2. Fixed Route Summary

Fixed Route Summary

	MAX Light Rail	Frequent Service Bus	Standard Service Bus
Routes	3	16	77
Length	44 miles	164 miles	728 miles

TriMet 2007 Transit Improvement Program

TABLE 3. MAX Light Rail Summary

MAX Light Rail Summary

Line	Segment	Opening Date	Length (Miles)	Annual Ridership Opening Year	Annual Ridership FY 2006	Stations	Park & Ride Spaces
Blue - Hillsboro to Gresham	Eastside - Portland to Gresham	September 1986	15	6,600,000	32,591,800	30	3,054
	Westside - Hillsboro to Portland	September 1998	18	5,900,000		20	3,613
Red - Beaverton to Airport	Airport - Gateway to Airport	September 2001	5.5	571,484		4	193
Yellow - City Center to Expo	Interstate - Rose Quarter to Expo	May 2004	5.8	3,900,000		10	604

TriMet 2007 Transit Improvement Program

TABLE 4. Top 25 Transit Routes in TriMet Service Boundary

Route Description	Boarding Rides	Rides Per Revenue Hour	Rides Per Vehicle Hour	Cost Per Ride	Passenger Miles	Passenger Miles Per Vehicle Mile	Average Trip Length
100 - MAX Blue Line	66,090	223.30	190.00	$1.04	420,810	68.90	6.4
090 - MAX Red Line	24,490	165.00	132.60	$1.49	105,670	35.30	4.3
072 - Killingsworth / 82nd Ave	17,540	73.80	55.50	$1.47	65,840	16.20	3.8
190 - MAX Yellow Line	11,500	137.30	96.40	$2.05	30,620	25.90	2.7
075 - 39th Ave / Lombard	10,560	50.70	40.50	$2.02	39,940	11.90	3.8
020 - Burnside / Stark	9,110	43.80	35.70	$2.29	38,460	10.50	4.2
109 – Powell	8,490	66.90	52.80	$1.55	34,050	16.00	4.0
014 – Hawthorne	8,420	62.70	43.80	$1.87	27,480	13.10	3.3
104 – Division	8,370	58.30	46.30	$1.76	36,630	14.30	4.4
006 - ML King Jr Blvd	8,290	61.90	45.80	$1.78	30,780	14.20	3.7
071 - 60th Ave / 122nd Ave	8,010	45.20	36.50	$2.24	31,250	10.50	3.9
004 – Fessenden	7,720	58.30	45.30	$1.81	28,840	13.30	3.7
057 - TV Hwy / Forest Grove	6,730	50.40	37.10	$2.20	36,710	13.20	5.5
015 – Belmont	6,520	54.20	42.40	$1.93	22,930	11.70	3.5
012 - Barbur Blvd	6,260	52.70	39.70	$2.06	33,680	14.50	5.4
112 - Sandy Blvd	5,680	51.30	39.80	$2.05	24,420	12.40	4.3
033 – Mc Loughlin	5,270	44.70	35.20	$2.32	37,790	16.10	7.2
117 – Holgate	4,850	52.10	42.10	$1.94	19,920	13.30	4.1
008 - NE 15th Avenue	4,750	48.20	34.30	$2.38	16,280	11.00	3.4
077 – Broadway / Halsey	4,720	35.50	27.70	$2.95	20,730	9.30	4.4
108 - Jackson Park	4,110	82.40	69.20	$1.18	10,000	13.70	2.4

119 – Woodstock	3,930	40.20	32.10	$2.55	18,720	11.30	4.8
052 - Farmington / 185th Ave	3,560	46.30	34.30	$2.38	13,790	10.80	3.9
044 - Capitol Highway	3,310	56.90	39.80	$2.05	14,580	14.20	4.4

TriMet 2006

Table 4 shows the top 25 routes operated by TriMet. The rankings are by average weekday boarding rides.

The Portland Streetcar was constructed by the City of Portland and business owners and currently serves a six mile loop that links Riverplace, Portland State University, the Pearl District, the Northwest Neighborhood and MAX Light Rail. It is managed by a non-profit that was organized by the City, but is operated by TriMet personnel through an agreement with the City. Both the City of Portland and TriMet share operating costs.

TABLE 5. Streetcar Ridership 2001 – 2006

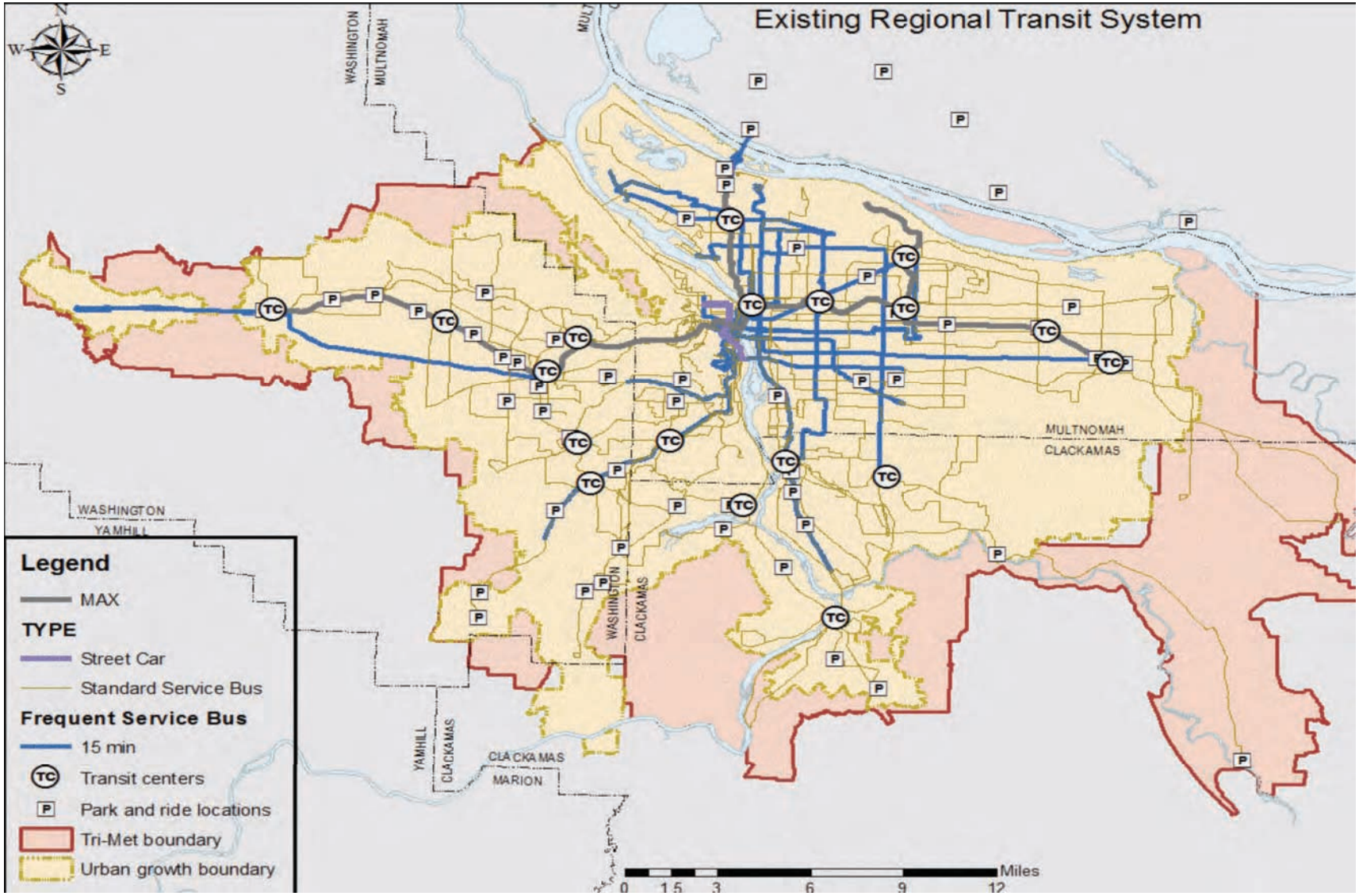
MONTH	FY 01/02	FY 02/03	FY 03/04	FY 04/05	FY 05/06
TOTAL	**1,357,878**	**1,653,648**	**1,872,133**	**2,191,097**	**2,587,033**

Portland Streetcar

Table 5 shows annual ridership for the Portland Streetcar. Ridership has increased by an average of 17.4 percent since 2001.

LIFT services are door-to-door paratransit provided by TriMet to people who because of disability cannot use or access fixed route transit. TriMet offers services throughout the service district from 4 a.m. to 2 p.m. There are one million annual boardings on TriMet LIFT service with an average cost of $22. Ridership is growing at about 7.5 percent per year. LIFT has more than 10,000 registered customers and provides roughly 3,000 rides each weekday and about 920,000 rides annually.

Ride Connection, Inc. is a network of over thirty non-profit, community service organizations. It was established in 1988 to provide accessible transportation and to respond to community needs. Ride Connection, Inc. partners with TriMet in providing supplemental ADA paratransit and demand-responsive transportation. It uses volunteer drivers to offer a cheaper service and schedules more than 300,000 rides for 11,000 individuals annually.


Existing Regional Transit System
N
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E
S
WASHINGTON
MULTNOMAH
CLACKAMAS
YAMHILL
MARION
Legend
MAX
TYPE
Street Car
Standard Service Bus
Frequent Service Bus
15 min
Transit centers
Park and ride locations
Tri-Met boundary
Urban growth boundary
Miles
0
1.5
3
6
9
12

Other Regional Service Providers

South Metro Area Rapid Transit (SMART)
SMART is operated by the City of Wilsonville with a payroll tax of 0.3 percent and has gradually expanded its services since 1989. When it first formed, SMART was only providing demand response service by contract. In 1991 it began operating demand response service on its own and in 1993 started providing fixed route service to the Tualatin Park and Ride lot and the Barbur Transit Center. Then in 1994, SMART started in town service. It offers five fixed route service throughout the City as well as connections to Canby, Salem, and the south end of Portland. SMART also provides Wilsonville residents with Dial-A-Ride service, a special demand response service for the elderly and the disabled. All in town services are provided to riders free of charge.

Clark County Public Transportation Benefit Authority (C-TRAN)
C-TRAN has been providing Clark County residents with public transit for more than 25 years. In 2005, C-TRAN services were reduced to the City of Vancouver and its Urban Growth Boundary. It currently offers fixed route service, premium commuter bus service to Portland, and dial-a-ride Paratransit service for the elderly and disabled. In all, C-TRAN operates seventeen local urban routes, eight premium commuter service routes, and five dial-a-ride routes.

Sandy Area Metro (SAM)
SAM has become the hub of transportation alternatives in east Clackamas County providing connectivity to the TriMet Bus/MAX in Gresham and the greater Portland Metropolitan region. Sandy Transit has grown from one bus on one route providing 77,000 rides in 2000 to seven vehicles on four fixed routes and a demand-response route that provided over 185,000 rides in 2005. Services now extend from Sandy east to the Hoodland Corridor, south to Estacada and west to Gresham and the greater Portland Metropolitan region. Services offer connections to TriMet in Gresham and Estacada. These services provide much needed regional access to jobs, education, shopping, social activities, medical and social services for transit dependent as well as discretionary riders. This transit system is critical to relieving costly traffic congestion on Highways 26 & 211 by taking 160,000 commute trips off those roads each year.

SAM also operates the Mountain Express, which began service in June 2004 with grants from Mount Hood Economic Alliance and ODOT Rural Transit funds. It operates a deviated fixed route six times daily on weekdays between Sandy and Rhododendron. Deviations are made for ADA eligible residents within a 3/4-mile of the route. Area residents who are elderly or have disabilities and need door-to-door transportation receive service to and from the Welches Senior Center. Ridership currently averages 1000 trips per month.

South Clackamas Transit District (SCTD)
The SCTD runs three deviated fixed route services. It provides service between Clackamas Community College and Molalla along Highway 213. Connections with TriMet lines can be made at the college.

Canby Area Transit (CAT)
CAT began service in September 2002 and currently operates three fixed routes. The three fixed routes all operate within the Canby city limits and offer a connection to the Oregon City transit center. Additionally, the routes link up with service provided by SMART that connects Canby with Wilsonville and with SCTD's Mollala to Canby service.

Columbia County Rider (CCR)
The CCR serves Columbia County and the communities of Scappoose, St. Helens, Columbia City, Raineer, Clatskenie and Verona. It currently offers two connections to TriMet and the Metro region. One connection goes from St. Helens to the Portland transit mall at 5th and Hoyt. Another route that recently started transports riders from St. Helens and Scappoose to the Portland Community College - Rock Creek campus and the Willow Creek Transit Station at 185th and Baseline Road connecting to the MAX Blue Line. The rest of CCR service is demand-response and service areas are the same as local school districts.

Tillamook County Transportation District (TCTD)
Tillamook County Transportation District was formed July 1, 1997 to serve the transportation needs of the residents and visitors to Tillamook County. TCTD provides three types of service, all wheelchair accessible. Dial-a-ride is a demand response curb-to-curb program that utilizes both paid and volunteer drivers who help people get around their communities. The TCTD also operates fixed route bus lines throughout the county on timed schedules, but may deviate off route to assist senior or disabled riders. InterCity provides daily bus service between Tillamook and metro Portland and connects riders to other forms of public transportation (AMTRAK, Greyhound, TriMet, Airport MAX). TCTD services are primarily supported by rider fares, state and federal grants, and a local permanent property tax levy with timber revenue sharing.

Yamhill County Transportation (YCAP)
YCAP offers a variety of fixed route, dial-a-ride and commuter express services. YCAP also operates Volunteer Medical Transport (VMT) that provides Yamhill County residents with transportation to medical appointments in the Portland area. VMT relies on volunteer drivers to operate the YCAP vans and provide this service free of charge. Chehalem Valley Senior Citizens Council provides dial-a-ride service to residents in Newberg and Dundee. YCAP offers fixed route service along Highway 47 between McMinnville and Hillsboro connecting to the MAX Blue Line. The 99W Corridor link operates along Highway 99W from McMinnville to Meridian Park Hospital and linking to TriMet in Sherwood. YCAP also provides funds for YAMCO that provides three fixed routes for McMinnville.

Institutional Facilities Coalition (ICF)
An often forgotten piece of the regional transportation system are those services that are offered by public and private institutions. The ICF represents research and educational institutions, colleges and universities, and hospitals and health care providers across the

region, many of which operate semi-private services to connect with TriMet. Lewis and Clark University, Portland Community College, Reed College, and the University of Portland each operate shuttle services that connect to TriMet. Annual ridership on these services is almost 250,000. It is also important to note the institutions represented by the ICF have higher than average demands for transit access.

It is also important to note that there exist a number of private and publicly funded service providers that serve specific clientele. Churches and other non-profits, as well as private businesses offer a variety of special shuttle services. Such providers are eligible to receive Job Access and Reverse Commute (JARC) funds to pay for these services. The tables below show they types of services offered using JARC funds and ridership figures.

TABLE 6. Jobs Access Transportation Services in the Metro Region

Service	Description	Annual Rides
Community Cycling Center (CCC) - Create a Commuter Program	Social service clients are referred to the CCC and are eligible for a free (restored) bicycle and all necessary safety gear after completing safety and maintenance classes. Clients are encouraged to use their bikes on transit.	No direct rides provided
Swan Island Evening Shuttle	Evening shuttle service is available from 7pm to 12am to serve areas not covered by TriMet.	13,295
Tualatin Shuttle	Connects riders between TriMet service and the large Industrial district in Tualatin between I-5 and Hwy 99.	7,694
Rockwood Employer Shuttle	Off-peak shuttle service to MAX Rockwood station.	3,068
TriMet service	Bus service in low-income communities and employment areas.	1,218,695

TABLE 7. Jobs Access Support Services in the Metro Region

Support Service	Description	Annual Rides
Ride Connection Travel Training (RideWise, Worklink).	Train new riders on the basic skills needed to ride public transportation (e.g. fares, reading signage, trip planning, etc.).	No direct rides provided
Steps to Success Northeast Shuttle	Provides a valuable link between job training facilities, transit connections, and job interviews for Steps to Success clients.	3,501
Portland Community College (PCC) - JobLink	Designed to help people retain employment by assisting them with transportation, childcare, and personal issues. Funds are used to support dispatch services and emergency childcare.	2,000
Clackamas County - Travel Training	Train new riders on the basic skills needed to ride public transportation (e.g. fares, reading signage, trip planning, etc.).	No direct rides provided
Non Commute Vouchers	Taxi Vouchers	500 (estimate)

TABLE 8. Jobs Access Transportation Services Outside the Metro Region

Service	Description	Annual Rides
Ride Connection Washington County Service	Provide commute and non-commute demand-responsive service for low-income residents in Washington County.	11,527
South Metro Area Rapid Transit (SMART) Reverse Commute Service	Increased bus service between Wilsonville and the Barbur Transit Center in Portland. New service between Canby and Wilsonville.	134,026
South Clackamas Transit District (SCTD) – Enhanced rural service	Fixed route service between Canby and Molalla.	13,071
Sandy Area Metro (SAM) – Enhanced rural service	Service between Sandy and Eagle Creek.	9,935

Intercity Transit Providers

Amtrak operates the *Amtrak Cascades* through Oregon. With more than 600,000 riders in 2005, the Amtrak Cascades is the seventh most heavily traveled service in the United States and is often viewed as a model partnership among two states, Amtrak, freight railroads and local governments. It conducts two daily roundtrips from Eugene to Portland and four daily roundtrips from Portland to Seattle. The Portland connections are at the South Metro station in Oregon City and at Union Station downtown.

Greyhound operates service across the state of Oregon. In the Metro region this service includes twice daily intercity connections from McMinnville to Portland. This route makes stops in Newberg and Tigard in route to the Portland Greyhound station.

Transit Accessibility

Ridership is affected by accessibility to transit services. Ninety percent of the region's population lives within one-half mile of a bus or light rail platform. Walking is the predominant mode by which users access transit. Currently, only 69 percent of transit stops have connecting sidewalks. TriMet and Metro recently completed an inventory of the region sidewalk inventory aimed at identifying gaps and discontinuous segments of sidewalk on major arterials. The study is used to locate gaps in pedestrian access within one-quarter mile of existing and proposed frequent service routes.

Bicycle infrastructure also affects transit ridership, but to a lesser extent than pedestrian access. All TriMet operated buses and trains are equipped with bike racks. Most stations are similarly equipped with bike racks and lockers.

Park-and-ride lots account for the second highest share of a rider's access to transit. They provide access outside of downtown Portland to transit in locations not well served by bus routes. The goal is to provide and extend transit access to lower density neighborhoods not directly efficiently served by transit. Lots are either owned by TriMet or operated in a shared capacity arrangement through churches, movie theatres, and retail establishments. TriMet owns twenty-one lots, sixteen of which are located on MAX lines. Dedicated lots account for more than eighty percent of the total park-and-ride capacity. Table 9 shows the average daily usage for 2005 and 2006 for TriMet owned lots and the overall total for shared use lots. Overall, daily park-and-ride lot usage dropped one percent from 2005 to 2006; however significant increases in usage occurred at several locations.

TABLE 9. Park-and-Ride Counts

PARK & RIDE USAGE COUNTS	2005			2006			% Change
	Capacity	Daily Use	% Use	Capacity	Daily Use	% Use	
TriMet Owned Park & Ride Lots							
Westside MAX							
Hatfield Government Center	250	200	80%	250	240	96%	20%
Fairplex/Hillsboro Airport	396	157	40%	396	153	39%	-3%
Orenco/231st	180	125	69%	180	141	78%	13%
Quatama/NW 205th	310	310	100%	310	265	85%	-15%
Willow Creek/185th TC	595	250	42%	595	200	34%	-20%
Elmonica/SW 170th	435	300	69%	435	344	79%	15%
Beaverton Creek	417	180	43%	417	189	45%	5%
Milikan Way	400	400	100%	400	400	100%	0%
Sunset Transit Center	630	630	100%	630	630	100%	0%
Westside Bus							
Barbur Boulevard**	368	368	100%	368	357	97%	-3%
Tigard	220	100	45%	220	93	42%	-7%
Progress (Washington Square)**	122	70	57%	122	74	61%	6%
Tualatin**	466	426	91%	466	423	91%	-1%
I-5 South/Mohawk	232	85	37%	232	70	30%	-18%
Eastside MAX							
Cleveland Avenue	392	319	81%	392	370	94%	16%
Gresham Garage	540	150	28%	540	140	26%	-7%
Gresham City Hall	417	417	100%	417	417	100%	0%
181st Avenue/Rockwood	247	40	16%	247	49	20%	23%
122nd/Menlo Park	612	400	65%	612	271	44%	-32%
Gateway**.	474	474	100%	690	690	100%	46%
Parkrose**	193	193	100%	193	193	100%	0%
TOTAL TriMet Owned Lots	**8,081**	**5,779**	**72%**	**8112**	**5709**	**70%**	-1%
Interstate MAX (defined as shared use - 2 total)							
Expo Center	300	50	17%	300	75	25%	50%
Delta Park	300	160	53%	300	150	50%	-6%
Interstate Totals	**600**	**210**	**35%**	**600**	**225**	**38%**	7%
Other Typical Shared Use Lots (34 total)							
Sum of ALL shared lots	1,311	460	35%	1,217	444	36%	-3%
GRAND TOTAL	**9,992**	**6,449**	**65%**	**9,929**	**6378**	**64%**	**-1%**

TriMet 2006

**Partial/Full Land under ODOT ownership.

Quick Drop is offered at many centrally located MAX stations and transit centers, providing curbside locations where transit riders can be met or dropped off. These facilities are intended to make it easier for carpoolers to coordinate trip making. Quick Drop locations were added to the regional transportation system in conjunction with the opening of the Airport MAX Red Line to afford easier access to stations for passengers with luggage. As MAX stations and transit centers are redeveloped, TriMet continues to incorporate Quick Drop facilities.

Transit Equity: Serving Seniors, People with Disabilities and Economically Disadvantaged Residents of the Region

TriMet seeks to ensure that the allocation of service and amenities is fair and equitable throughout the system. Transit equity is a key consideration in decisions regarding:

- Transit service to low-income neighborhoods and communities of color
- Placement of bus stops and shelters
- Allocation of new low-floor buses
- Service for non-English speaking populations[18]

Traditional service development and street amenity placement was focused on achieving the highest ridership potential with little emphasis on income, race and neighborhood. In 2003, TriMet adopted new evaluation criteria for expanding Frequent Service. The core factor is still ridership, but now the density of transit dependent populations is also a factor. The transit dependency factor is calculated by examining areas with high proportions of low-income residents, seniors and people with disabilities.

To analyze how transit service lines match up with equity goals, TriMet used 2000 Census information to identify where minority and low-income populations are located in the District. TriMet service was then evaluated in relation to serving these neighborhoods. Most Frequent Service lines are in North, Northeast, and Southeast Portland, providing high quality service to transit dependent and low-income populations. These routes are also designed for multiple trip purposes, locations and times, including commuting, medical appointments, special events and school. TriMet also provides numerous information materials in multiple languages. Guidebooks are available in six languages besides English. Rider alerts are usually printed in English and Spanish, TriMet's website houses basic information in six different languages and the 503-238-RIDE is available in multiple languages. Ticket machines have a Spanish option and MAX audio messages are played in both Spanish and English.

According to the Elderly and Disabled Land Use Study conducted by TriMet, "Seniors as a percentage of population is increasing, especially at the edges of the Portland region.[19]" Ten percent of the region's population was 65 and over in 2000. Table 10 summarizes the elderly, disabled, and economically disadvantaged populations across the Metro region.

[18] TriMet. "2007 Transportation Improvement Program." p. 54.
[19] Tri-Met Elderly and Disabled Land Use Study, Page 1.

TABLE 10. Summary of Metro Region Elderly, Disabled & Economically Disadvantaged Population

	Tri-County	Tri-County Outside Metro UGB	Tri-County Outside TriMet District
Total Population	1,444,219	151,398	135,398
Aged 65 and Over	150,386	15,772	14,188
Economically Disadvantaged	136,255	----	----
Disabled	225,345	30,411	24,132

Census 2000

Elderly adults tend to have different travel patterns than adults of other age groups, because they are less likely to drive themselves and more likely to ride in cars as passengers, walk, and use transit.[20] Lower-income elderly adults take fewer trips than higher-income elderly adults, perhaps due to limited access to travel options. It is important to plan for the increase in elderly population, particularly in access to transit and pedestrian facilities.

Disabled, as defined by the US Census Bureau, refers to individuals that possess a long-lasting physical, emotional, or mental condition. Disabled persons also have different transit needs, requiring more demand-response LIFT service. Economically disadvantaged is referring to the number of individuals at or below the federal poverty level. Such persons have different service needs like direct access to industrial areas and employment centers and are often dependent on transit. Commute patterns differ for economically disadvantaged individuals as some work evenings and nights during non-peak hours. The travel demands of the disabled and economically disadvantaged also need to be important considerations in developing a regional transit system.

Security

TriMet has instituted new security procedures since 2001 including more transit police and security personnel patrols, random sweeps on vehicles and facilities, fare inspectors, security cameras, and GPS tracking of buses and trains. TriMet also coordinates emergency response with the police department, fire department, and ambulance services.[21] TriMet works closely with the Urban Area Working Group, and coordinates the Regional Transit Security Working Group and the Regional Transit Security Strategy. TriMet has used its Urban Area Security Initiative funds to replace obsolete CCTV recorders, install yard security gates, provide increased staff training, and create a communications system plan.

[20] Tri-Met Elderly and Disabled Land Use Study, Page 8.
[21] See http://www.trimet.org/howtoride/security.htm.

Access Safety

TriMet's mission is to assure people increased mobility in our growing, compact urban regional metropolitan area. These transit services must be safe, reliable, efficient and cost-effective. TriMet's Strategic Direction and System Safety Policy establishes safety as paramount and a core value in all TriMet operations, including planning design, construction, testing and maintenance of the transit system. Similarly, all TriMet employees serve as "eyes and ears" for security awareness.

There are various dimensions to providing a safe transit environment:

- Safety from harm in the everyday use of the system, including on-street access and egress and including all mobile members of our community.
- Safety from crime or disruptive conduct within the transit environment.
- Safety in the strategic sense – redefined with terrorist awareness – from catastrophic acts of violence.

Creation of a safe transit-riding environment needs to apply to all members of the community who might use transit at all hours of the day – including children and seniors and those who might be mobility disabled.

The safe operation of the transit system is every employee's responsibility. Employee awareness and training is supplemented with state-of-the-art systems to prevent incidents and to minimize harm when they do occur. TriMet's Operations Command Center, linked to the region's 9-1-1 system is at the center of the crime and emergency preparedness efforts. These policies and programs are vested in TriMet's Safety and Security Director.

Safe Facilities and Systems Design
The procurement of new buses and light rail vehicles and the construction of facilities include safety requirements in both design and performance specifications, which are verified in design reviews and testing. Safety hazards are anticipated with the development of specifications and designs. Equipment and facilities are examined and tested before acceptance. TriMet facilities and systems are based on formally adopted Design Criteria to assure consistent application of standards. These Design Criteria are placed in the hands of contractors and vendors as projects and procurements are developed.

An example of these safety features, developed over time, are the various warning devices at light rail stations that assert attention by sight and sounds and in some instances, force your attention to the direction of a potential train. Special consideration, for example is also given to light rail operations, for example in the West Hills tunnel – with staff well versed in emergency evacuation procedures.

Compliance with the Americans with Disabilities Act
TriMet is vigilant in address accessibility needs of all population groups including those with mobility devices or those who may be sight impaired. The level of detail in making facilities accessible is best exemplified at light rail stations, but applies as well to bus

stops and other facilities. The great challenge in this regard is safe access beyond the bounds of the transit facilities, as persons cross busy streets or navigate streets without sidewalks or curb ramps.

Partnerships are required to identify, design, fund and correct pedestrian hazards. TriMet has worked with ODOT, the City of Portland and other road-jurisdictions to improve crosswalks, install medians and fill in sidewalk gaps to facilitate safe transit access. TriMet, Metro and ODOT have studied the condition of the pedestrian infrastructure and prepared a framework for setting priorities for improvements. More needs to be done in this regard.

Safety from Criminal Activities

Real or perceived fear from crime around transit facilities is a major concern, especially at night or at isolated locations. TriMet works with the local communities to address this in the following ways:

- Since 1989 TriMet has contracted with area police departments to create a dedicated transit police unit that patrols TriMet facilities and responds to incidents. They also take proactive steps to reduce crime – with stakeouts and undercover presence.
- TriMet also contracts with Wackenhut Security to provide a visible, but lighter security presence, including crowd management at major events. Rider Advocates are citizen volunteers who ride the system in North/Northeast Portland to lend an additional visible security presence with a focus on working with at-risk youth.
- Clean, well-lighted bus and light rail stops are also important. TriMet works with jurisdictions or electric utilities to provide indirect lighting where practical. Many bus shelters are lighted (or have lighted advertising panels). TriMet is exploring the use of bus shelter solar light units to illuminate stops where power connections are not immediately available.
- TriMet works to eliminate vandalism as soon as possible in order to reduce further destructive activities and treats to individual safety.

Safety from Major Threats

Events of recent years have demonstrated the vulnerability of society to harm in various ways. This vulnerability extends to crowded transit systems. TriMet has worked closely the Federal Homeland Security Department to put in place measures that have the greatest promise of deterring acts of mass violence. Some examples of how this has been accomplished include:

- TriMet personnel have been trained to be alert for unusual circumstances or packages. This raised awareness has also been communicated to the public through on-board information and posters.
- TriMet security personnel noted above are trained to respond to extreme events and incident training exercises are periodically held.
- Most TriMet buses and light rail vehicles have recording closed circuit television cameras. Many light rail stations are equipped with security cameras, linked real-time to the control center.

- All TriMet vehicles are radio equipped and have locator devises. Incidents are picked up and addressed though a state-of-the-art control center.
- The design of facilities has been judiciously modified – including the redesign and placement of trashcans and bike lockers around light rail stations.
- TriMet has purchased two bomb-sniffing dogs that are use with transit police to monitor activities on the system.
- Possible Sensitive Security Information is screened and shared on a "need to know basis".
- TriMet maintains a Security and Emergency Preparedness Plan as required by the Federal Transit Administration and the U.S. Department of Homeland Security.

VI. POLICY ASSESSMENT

This section provides a list of key findings from the trends and research and transit system profile. Potential RTP policy implications as a result of the findings are also provided.

Key Finding	RTP Implication
1. Increasing emphasis on accessibility and service coordination. a. Increased growth in elderly populations and increased demand for LIFT/paratransit service. b. Multiple benefits can be achieved by coordinating human service transportation.	• Consider regional policy emphasizing the coordination of services for the elderly and disabled with existing fixed route services where appropriate. • Encourage regional transit providers to work with the Regional Travel Options program to market existing fixed route services and provide information to employers, TMAs and elderly and disabled populations. • Encourage expansion of voluntary non-profit service providers like Ride Connection, Inc. as well as private providers to accommodate growth of demand-response service.
2. Investing in transit, both capital and operating, provide economic benefits.	• Acknowledge the economic benefits of transit facilities in the RTP to facilitate increased transit investment.
3. Pedestrian accessibility to transit stops is a growing concern. Approximately, 90 percent of Metro residents live within ½ mile of a bus stop, but only 69 percent of stops have adequate sidewalks.	• Establish regional policy for addressing sidewalk gaps near transit stops at the local and regional level.
4. Emerging focus of managing the existing system.	• Emphasize investment in the total transit system, reinforcing TriMet's 2007 TIP, focusing on addressing

Key Finding	RTP Implication
	sidewalk connectivity, traveler information, and bus shelters and other amenities.
5. Growing need to better address suburban-to-suburban travel options to respond to increasing growth in population and employment centers in these areas of the region. a. Emergence of commuter rail to serve suburban-to-suburban travel needs. b. Increased growth of local transit service providers, like SMART, SAM and others.	• Consider policy to emphasize transit service planning and expansion to better address suburban-to-suburban travel patterns. • Consider the role of local service providers like SMART to address transit needs of suburban communities and implications for TriMet's role in regional transit system from a planning and operational perspective. • Expand existing RTP policy to continue to explore future role of commuter rail options.
6. Current policies do not specifically address the service needs of low-income riders, and little ridership information is available about this traditionally transit-dependent segment of the region's population.	• Expand Special Needs Public Transportation policy to include transit dependent populations and low-income individuals. • Collect survey information and data about low-income residents who cannot afford to use transit. • Consider flexing regional funds to support a program to subsidize transit passes for low-income riders.
7. Coordination among the various transit service providers is critical to providing an integrated and efficient transportation system.	• Consider regional policy for increased coordination between local and regional transit service providers.
8. Declining revenues available for transportation projects and increasing competition of LIFT service with fixed-route service for limited operating revenues need to be addressed in a comprehensive and coordinated fashion.	• Identify new financing approaches to address regional and local transit needs. • Consider different service provision models to more cost-effectively meet local and regional transit needs and support the 2040 Growth Concept.

VII. CONCLUSION

As the backbone of a balanced multi-modal transportation system, transit is vital to serve current and future travel needs as the region grows. Previous RTP's established a basic policy framework to guide investments in the regional public transportation system. Recent trends and research and an examination of the system profile provide a basis to begin to identify areas for refinements to these policies during the RTP update. In particular, refinements to the regional public transportation system policies should address human service coordination issues and the needs of low-income residents in the region, in addition to addressing issues raised by the growing trend of suburban-to-suburban travel patterns and the need to emphasize the total transit system.

Finally, transit service in the region is funded from a variety of sources. Large projects, like construction of MAX Light Rail, are funded through a combination of local and federal dollars. Operating expenses are paid for from several sources, primarily fares and a tax on payrolls in the case of TriMet. Increasingly, transit service providers have been faced with difficult decisions because of the economic conditions over the past few years. For example, jobs in the Metro region decreased by approximately 53,000 (6.5 percent) between January 2001 and January 2004. This loss of jobs has a direct impact on TriMet's primary source of operating revenue, a tax on gross payrolls. At the same time, LIFT service provided by TriMet continues to be expanded to respond to the growth in seniors and people with disabilities who cannot use fixed route service. These issues also need to be addressed in a comprehensive and coordinated manner to most effectively serve the 2040 Growth Concept and future growth in communities throughout the region.

New Look
The Regional Transportation Plan

2035 Regional Transportation Plan Update

Background Paper:

Environmental Justice in Metro's Transportation Planning Process:

Implications for the 2035 Regional Transportation Plan Update and the 2008-2011 Metropolitan Transportation Improvement Program

Prepared by:

METRO
PEOPLE PLACES • OPEN SPACES

September 18, 2006

Metro
People places • open spaces

Clean air and clean water do not stop at city limits or county lines. Neither does the need for jobs, a thriving economy and good transportation choices for people and businesses in our region. Voters have asked Metro to help with the challenges that cross those lines and affect the 25 cities and three counties in the Portland metropolitan area.

A regional approach simply makes sense when it comes to protecting open space, caring for parks, planning for the best use of land, managing garbage disposal and increasing recycling. Metro oversees world-class facilities such as the Oregon Zoo, which contributes to conservation and education, and the Oregon Convention Center, which benefits the region's economy.

Your Metro representatives

Metro Council President – David Bragdon
Metro Councilors – Rod Park, District 1; Brian Newman, District 2; Carl Hosticka, deputy council president, District 3; Susan McLain, District 4; Rex Burkholder, District 5; Robert Liberty, District 6.
Auditor – Alexis Dow, CPA

Metro's web site: www.metro-region.org

2035 Regional Transportation Plan Update

Environmental Justice in Metro's Transportation Planning Process

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INTRODUCTION AND METHODS

The purpose of this report is to provide information and guidance on ways in which federal environmental justice regulations can be integrated into the planning processes of the 2035 Regional Transportation Plan (RTP) update and the 2008-11 Metropolitan Transportation Improvement Program (MTIP).

In a memorandum dated October 7, 1999, the Federal Highway Administration and the Federal Transit Administration describe the procedure for assuring state and metropolitan agency's compliance with Title VI requirements. The memorandum states that it is important for agencies to complete the following actions[i]:

- Develop a demographic profile of the metropolitan planning area that identifies the locations of socio-economic groups.
- Identify the transportation needs of low-income and minority populations.
- Assess the regional benefits and burdens of transportation system investments in the RTP and TIP for different socio-economic groups.
- Have a public involvement strategy for engaging minority and low-income populations in transportation decision-making.

Those requirements form the outline of this report. Section 1 will explain the important federal legislation guiding environmental justice work as well as the methodology used to conduct the analysis. Section 2 will provide a demographic profile of the Portland metropolitan region that identifies the locations of socio-economic groups. Section 3 will identify the transportation needs of low-income and minority populations. Section 4 will assess the benefits and burdens of proposed transportation system investments, and Section 5 will explain the relevant environmental justice public involvement strategy. Section 6 will discuss the results of this process and the implications for the RTP and MTIP.

FEDERAL LEGISLATION AND GUIDANCE

Title VI of the Civil Rights Act of 1964 mandates, "No person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance."[ii] As the designated Metropolitan Planning Organization (MPO) for the Portland metropolitan region, Metro is responsible for transportation planning and implementation of transportation projects, and is thus required to comply with this law.

In 1994, President Clinton issued Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." The order states that the duty of each public agency is to identify and address "disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations."[iii] E.O. 12898 expands

upon the law set forth in Title VI, and proposes three main actions that public agencies need to address:

- "Avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects on minority populations and low-income populations"
- "Ensure the full and fair participation by all potentially affected communities in the transportation decision-making process"
- "Prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority populations and low-income populations"

The Americans with Disabilities Act of 1990 prohibits discrimination against persons with disabilities, and in Title II requires that public transit be accessible to persons with disabilities. The Act states that all new transit vehicles must be made accessible to persons with disabilities, and that paratransit can be used to complement existing fixed-route service.[iv]

In 2002, the National Cooperative Highway Research Program published a manual entitled "Technical Methods to Support Analysis of Environmental Justice Issues." The manual states the following:

- The most common measures of transportation benefits are accessibility, travel time to jobs or other activities, and availability of transportation services.
- Measures of burden should be evaluated at the project level; these should include NEPA-specific effects (aesthetic, historic, cultural, economic, social and health).
- Environmental justice should be addressed based on the magnitude of the effects, and not the size of the population in question.
- Agencies should utilize population projections that are at least 20 years out.
- Agencies should look at the distribution of who pays for the transportation project based on the existing tax structure.
- Agencies should consider creating "quality of life" system maps by overlaying bus and rail services, arterials and highways, Jobs Access Reverse Commute services, hospitals, and employment centers, and by examining their proximity to environmental justice populations.
- Agencies should develop regression models for transportation benefits using an Index of Dissimilarity.
- Transportation modeling is a good way to examine transportation benefit distribution and travel forecasts.
- Use the Census as the main source of data, but supplement it with other sources, such as the Department of Human Services' welfare client data or school lunch program data.[v]

Current Environmental Justice Practices in the Regional Transportation Plan and Metropolitan Transportation Improvement Program

The Metro Council adopted a policy on public involvement in 2004 entitled "Transportation Planning Public Involvement Policy." It included two environmental justice-specific objectives[vi]:

- "Involve those traditionally under-served by the existing system and those traditionally under-represented in the transportation process and consider their transportation needs in the development and review of Metro's transportation plans, programs and projects."

- "Remove barriers to public participation for those traditionally under-represented in the transportation planning process."

The 2004 RTP included the following environmental justice-related policies:

- Policy 1.0, Public Involvement, states that its goal is to "Provide complete information, timely public notice, early and continuing involvement of the public in all aspects of the transportation planning process…this includes involving those traditionally under-served by the existing system, those traditionally under-represented in the transportation process, the general public, and local, regional, and state jurisdictions that own and operate the region's transportation system"[vii]

- Policy 5.0, Barrier-Free Transportation, states as its goal to "Provide access to more and better transportation choices for travel throughout the region and serve special access needs for all people, including youth, elderly, and disabled"[viii]

- Policy 5.1, Interim Job Access and Reverse Commute Policy, states as its goal to "Serve the transit and transportation needs of the economically disadvantaged in the region by connecting low-income populations with employment areas and related social services"[ix]

The 2006-09 MTIP used 2000 Census data to map and summarize environmental justice information that informed public comment meetings and decision makers during the decision process; this led to a technical analysis of concentrations of environmental justice populations. MTIP applications were screened for adequate outreach to affected environmental justice populations. Information regarding potential benefits and impacts to environmental justice was distributed at all public meetings as well as to decision makers.[x]

Report Methodology

Data from the 2000 Decennial Census was used to assess the distribution of environmental justice populations in the Portland metro region. Table 1 explains each population analyzed and its definition and source within the Census.

Table 1: Census 2000 Data Sources and Definitions

Demographic Category	Definition	Source Table(s) within the 2000 Census
White Alone	Persons who identified themselves as only White (no other racial category)	Summary File 1, P7: Race (Total Population)
Minority	All persons who did not self-identify as White, non-Hispanic	Summary File 1, P7: Race (Total Population) and P4: Hispanic or Latino, and Not Hispanic or Latino by Race (Total Population)
Black Alone	Persons who identified themselves as only Black (no other racial category)	Summary File 1, P7: Race (Total Population)
American Indian or Alaska Native Alone	Persons who identified themselves as only American Indian or Alaska Native (no other racial category)	Summary File 1, P7: Race (Total Population)
Asian Alone	Persons who identified themselves as only Asian (no other racial category)	Summary File 1, P7: Race (Total Population)
Hawaiian or Pacific Islander Alone	Persons who identified themselves as only Hawaiian or Pacific Islander (no other racial category)	Summary File 1, P7: Race (Total Population)
Hispanic	Persons of any racial group who identified as Hispanic	Summary File 1, P4: Hispanic or Latino, and Not Hispanic or Latino by Race (Total Population)
Non-English-Speaking	Persons who stated that they didn't speak any English at all in 2000	Summary File 3, P19: Age by Language Spoken at Home by Ability to Speak English for the Population 5+ Years
Very Low-Income	Persons who earned between 0 and .99 times the federal Poverty Level in 1999	Summary File 3, P88: Ratio of Income in 1999 to Poverty Level and P151A: Household Income in 1999 (White Alone Householder)
Low-Income	Persons who earned between 1 and 1.99 times the federal Poverty Level in 1999	Summary File 3, P88: Ratio of Income in 1999 to Poverty Level and P151A: Household Income in 1999 (White Alone Householder)
Total Low-Income	Persons who earned between 0 and 1.99 times the federal Poverty Level in 1999	Summary File 3, P88: Ratio of Income in 1999 to Poverty Level and P151A: Household Income in 1999 (White Alone Householder)
Disabled	All persons 5 years or older with any type of disability: sensory, physical, mental, self-care, go-outside-the-home, or employment.	Summary File 3, P41: Age by Types of Disability for the Civilian Noninstitutionalized Population 5+ Years with Disabilities
Elderly	Persons 65 years of age or older in 2000	Summary File 1, P12: Sex by Age (Total Population)
Total Population	All persons residing within the census-defined area in 2000	Summary File 1, P1: Total Population

Source: U.S. Census Bureau, 2000

The data were aggregated and incorporated into a Geographic Information Systems database, and combined with base layers from Metro's Regional Land Information System (RLIS). The base layers used included: Metropolitan Planning Organization (MPO) Boundary from 2004, Major Rivers, Major Arterials, Metro Urban Growth Boundary, 2000 Census Block Groups and Freeways. A map was created to assess the distribution of each environmental justice population regionally. The region was defined

using the MPO Boundary from 2004. Data shown is for Census Block Groups within the MPO Boundary. The urban growth boundary is also represented on each map for purposes of comparison.

DEMOGRAPHIC PROFILE

The first step in the environmental justice analysis for the RTP and MTIP is to determine the locations of environmental justice populations within the region.

Table 2 shows the raw numbers and percentages for each environmental justice population within Clackamas, Multnomah, and Washington Counties, within the Portland metropolitan region as a whole (defined as the tri-county area), and within the United States. This provides a way to compare the distribution of each population across counties and compare the regional average to the national average.

Table 2: Environmental Justice Demographics in the Tri-County Area and Nationwide in 2000

Demographic Category	Clackamas County	Multnomah County	Washington County	Metro Region	United States
White Alone	91% *308,512*	79% *521,482*	82% *365,382*	83% *1,195,376*	75% *211,460,626*
Black Alone	1% *2,184*	5% *35,854*	1% *4,510*	3% *42,548*	12% *34,658,190*
American Indian or Alaska Native Alone	1% *2,095*	1% *6,674*	1% *2,919*	1% *11,688*	1% *2,475,956*
Asian Alone	2% *8,114*	6% *37,280*	7% *29,946*	5% *75,340*	4% *10,242,998*
Hawaiian or Pacific Islander Alone	0% *616*	0% *2,511*	0% *1,399*	0% *4,526*	0% *398,835*
Hispanic*	5% *17,021*	7% *49,474*	11% *49,476*	8% *115,971*	13% *35,305,818*
Non-English-Speaking	0% *180*	0% *717*	0% *530*	0% *1,427*	1% *3,366,132*
Very Low-Income**	6% *21,969*	12% *81,711*	7% *32,575*	9% *136,255*	12% *33,899,812*
Low-Income	12% *40,827*	17% *109,149*	13% *58,468*	14% *208,444*	17% *47,294,797*
Total Low-Income	19% *62,796*	29% *190,860*	20% *91,043*	24% *344,699*	30% *81,194,609*
Disabled	12% *40,710*	12% *78,873*	10% *46,150*	11% *165,733*	15% *38,305,189*
Elderly	11% *37,428*	11% *73,607*	9% *39,351*	10% *150,386*	12% *34,991,753*
Total Population in 2000	*338,391*	*660,486*	*445,342*	*1,444,219*	*281,421,906*

Source: U.S. Census Bureau, 2000
*The Hispanic category is considered to be an ethnicity, not a race. Therefore, people who listed themselves as Hispanic/Latino also needed to specify a racial category such as White, Black, Asian, etc.
**See Table 1 for an explanation of the distinction between the three low-income categories.

As shown in Table 2, the Portland metropolitan region has a lower average percentage of all minority groups than the United States as a whole. Multnomah County has the highest proportion of Black, Asian, and Hawaiian/Pacific Islander persons, and is equal to Washington County in proportions of American Indian/Alaska Native and Hispanic populations. All three counties have equally low proportions of non-English-speaking persons, and the proportions are lower than the national average. Multnomah County has the highest proportion of low-income and very low-income populations, and is close to the national average proportions of these populations. Clackamas and Washington

Counties have lower proportions of both low-income and very low-income populations. Clackamas and Multnomah Counties have equal proportions of disabled and elderly persons that are higher than Washington County's but lower than the national average. Table 3 describes the locations of significant population concentrations within each demographic category.

Table 3: Environmental Justice Population Locations

Figure	Population	Location of Significant Concentration(s)
1	American Indian/ Alaska Native	Throughout Metro area
2	Asian	Outer Northeast and Southeast Portland; Along Highway 26 between Beaverton and Hillsboro
3	Black	North and Northeast Portland
4	Hawaiian/ Pacific Islander	Throughout Metro area
5	Hispanic	Gresham, Hillsboro, Beaverton, Tigard, North Portland
6	Disabled	Downtown Portland and Inner East Portland
7	Elderly	Outer Northeast Portland, Tigard, Clackamas, Wilsonville
8	Low-Income	Downtown Portland, Northeast Portland, Gresham
9	Very Low-Income	Downtown Portland, North and Northeast Portland; Gresham, Clackamas, Troutdale, Forest Grove
10	Non-English Speaking	Hillsboro, Forest Grove, East Portland, Gresham, Oregon City

Source: U.S. Census Bureau, 2000

Figures 1 through 10 are maps that show each environmental justice population distribution separately by Census Block Group within the 2004 MPO Boundary. The maps show block groups that contained greater than 2.5 times the regional average of the environmental justice population in 2000; these are labeled as "significant population" and are highlighted within each map. Figure 11 is a map that shows Census Block Groups where there is a significant concentration of more than one environmental justice population.

Figure 12 and Figure 13 are maps that show population densities, and were created in such a way so as to avoid double-counting any one person (as being a member of more than one environmental justice population: for example, one person can be both low-income and a part of a minority racial group). Figure 12, Low-Income, Minority, and Hispanic Populations in 2000, started with all minorities in each block group, added all White Hispanic people, and then added White, non-Hispanic, low-income people. Similarly, Figure 13 added people with disabilities ages 5-64 to elderly people.

Figure 11, "Environmental Justice Analysis of Target Areas," illustrates the Census Block Groups that contain more than one environmental justice population. The highlighted block groups are located in downtown, North, Northeast, and outer Southeast Portland, Gresham, Troutdale, Hillsboro, Beaverton, and Forest Grove.

Figure 12, "Elderly and Disabled Populations in 2000" shows the density of elderly and disabled persons. High and very high densities of these populations are located in downtown Portland, Clackamas, and Tigard.

Similarly, Figure 13, "Low-Income, Minority, and Hispanic Populations in 2000" shows the density of those populations. High and very high densities are located in downtown Portland, North and Northeast Portland, Gresham, and Hillsboro.

Nearly all areas of the Portland metropolitan region contain at least one environmental justice population. The next chapter will discuss the transportation needs of each environmental justice population within the Portland metropolitan region.

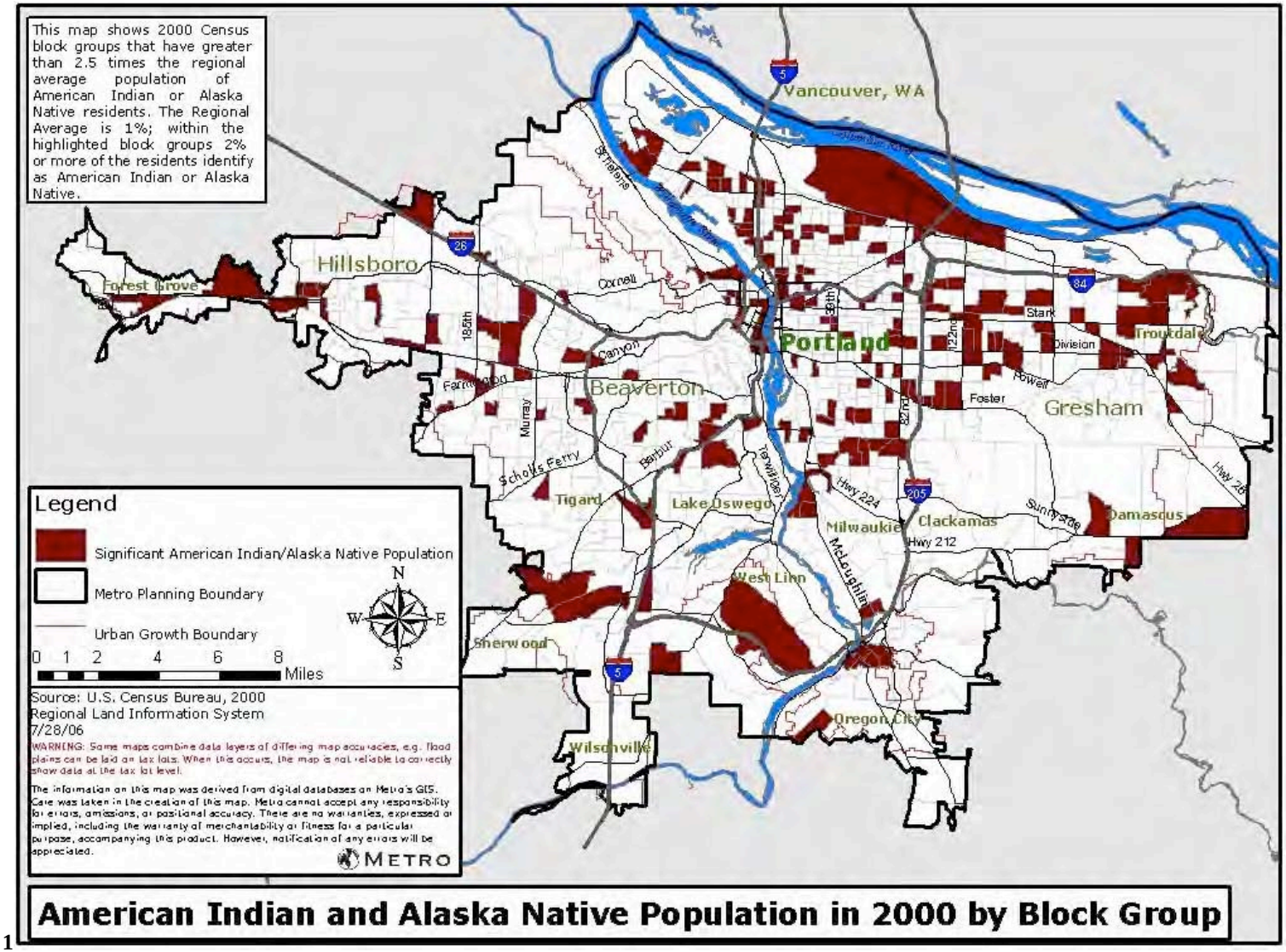
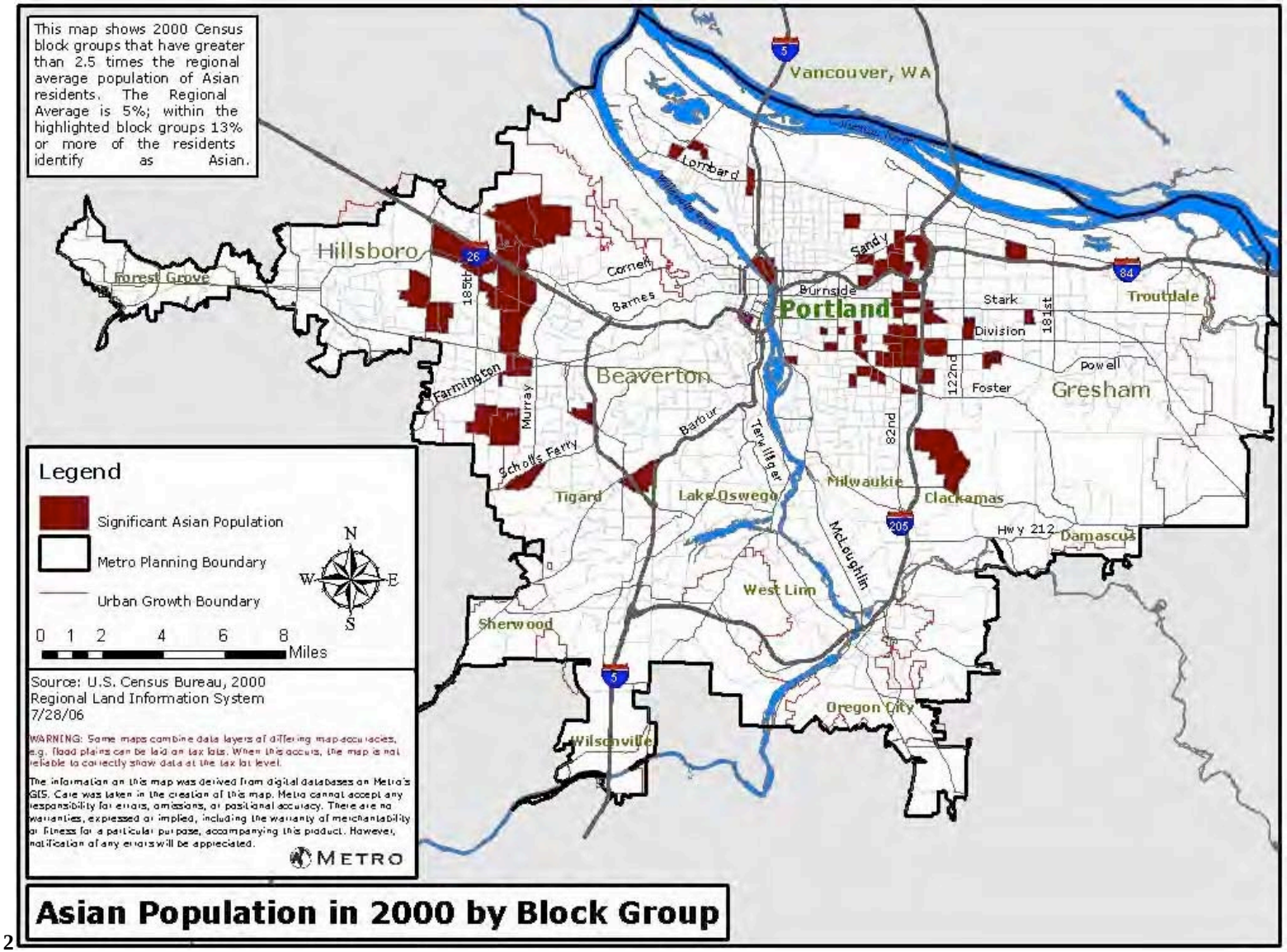

This map shows 2000 Census block groups that have greater than 2.5 times the regional average population of American Indian or Alaska Native residents. The Regional Average is 1%; within the highlighted block groups 2% or more of the residents identify as American Indian or Alaska Native.
Vancouver, WA
Hillsboro
Forest Grove
Beaverton
Portland
Gresham
Troutdale
Tigard
Lake Oswego
Milwaukie
Clackamas
Damascus
West Linn
Sherwood
Oregon City
Wilsonville
Legend
Significant American Indian/Alaska Native Population
Metro Planning Boundary
Urban Growth Boundary
0 1 2 4 6 8 Miles
N
W
E
S
Source: U.S. Census Bureau, 2000
Regional Land Information System
7/28/06
WARNING: Some maps combine data layers of differing map accuracies, e.g. flood plains can be laid on tax lots. When this occurs, the map is not reliable to correctly show data at the tax lot level.
The information on this map was derived from digital databases on Metro's GIS. Care was taken in the creation of this map. Metro cannot accept any responsibility for errors, omissions, or positional accuracy. There are no warranties, expressed or implied, including the warranty of merchantability or fitness for a particular purpose, accompanying this product. However, notification of any errors will be appreciated.
METRO
American Indian and Alaska Native Population in 2000 by Block Group

Figure 1


This map shows 2000 Census block groups that have greater than 2.5 times the regional average population of Asian residents. The Regional Average is 5%; within the highlighted block groups 13% or more of the residents identify as Asian.
Vancouver, WA
Lombard
Hillsboro
Forest Grove
Cornell
Barnes
Burnside
Portland
Sandy
Stark
Division
Powell
Foster
Gresham
Troutdale
Beaverton
Farmington
Murray
Scholls Ferry
Barbur
Tigard
Lake Oswego
Tualatin
Milwaukie
Clackamas
Hwy 212
Damascus
McLoughlin
West Linn
Sherwood
Oregon City
Wilsonville
Legend
Significant Asian Population
Metro Planning Boundary
Urban Growth Boundary
N
W
E
S
0 1 2 4 6 8
Miles
Source: U.S. Census Bureau, 2000
Regional Land Information System
7/28/06
WARNING: Some maps combine data layers of differing map accuracies, e.g. flood plains can be laid on tax lots. When this occurs, the map is not reliable to correctly show data at the tax lot level.
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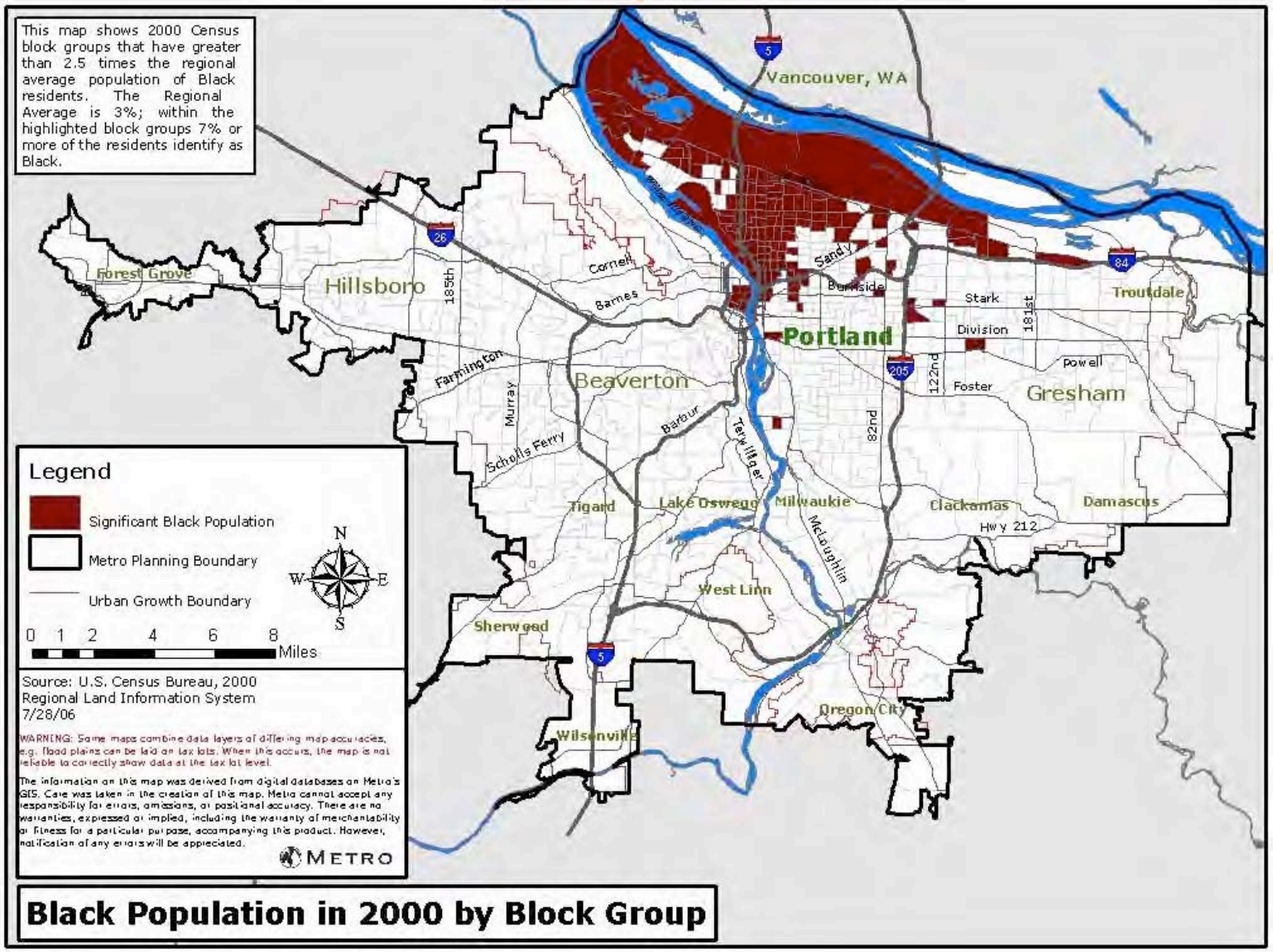
METRO
Asian Population in 2000 by Block Group

Figure 2


This map shows 2000 Census block groups that have greater than 2.5 times the regional average population of Black residents. The Regional Average is 3%; within the highlighted block groups 7% or more of the residents identify as Black.
Vancouver, WA
Forest Grove
Hillsboro
Beaverton
Portland
Gresham
Troutdale
Tigard
Lake Oswego
Milwaukie
Clackamas
Damascus
West Linn
Sherwood
Wilsonville
Oregon City
Sandy
Burnside
Stark
Division
Powell
Foster
Cornell
Barnes
Farmington
Murray
Scholls Ferry
Barbur
Terwilliger
McLoughlin
185th
181st
122nd
82nd
Hwy 212
Legend
Significant Black Population
Metro Planning Boundary
Urban Growth Boundary
N
W
E
S
0 1 2 4 6 8
Miles
Source: U.S. Census Bureau, 2000
Regional Land Information System
7/28/06
WARNING: Some maps combine data layers of differing map accuracies, e.g. flood plains can be laid on tax lots. When this occurs, the map is not reliable to correctly show data at the tax lot level.
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METRO
Black Population in 2000 by Block Group

Figure 3

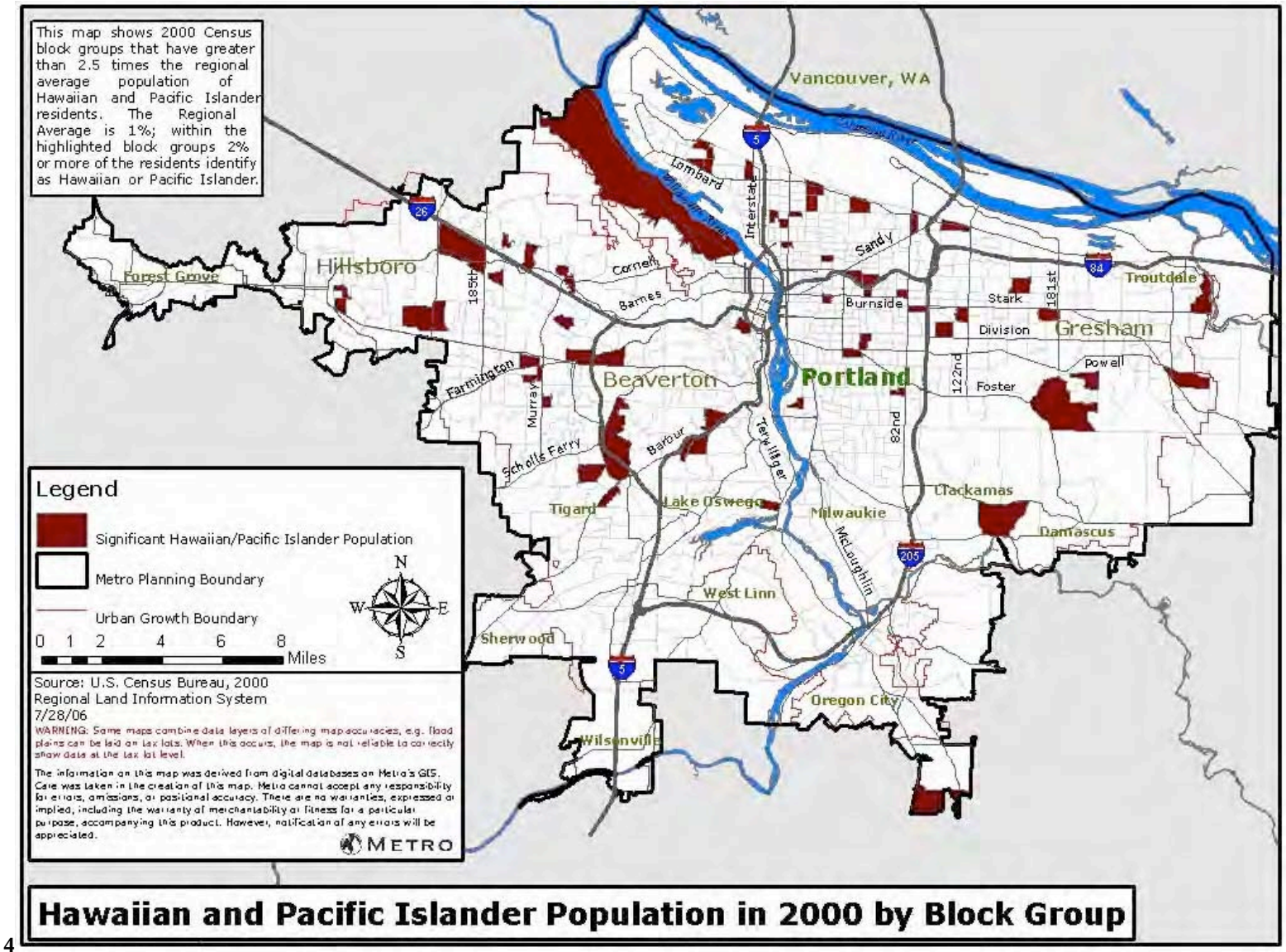
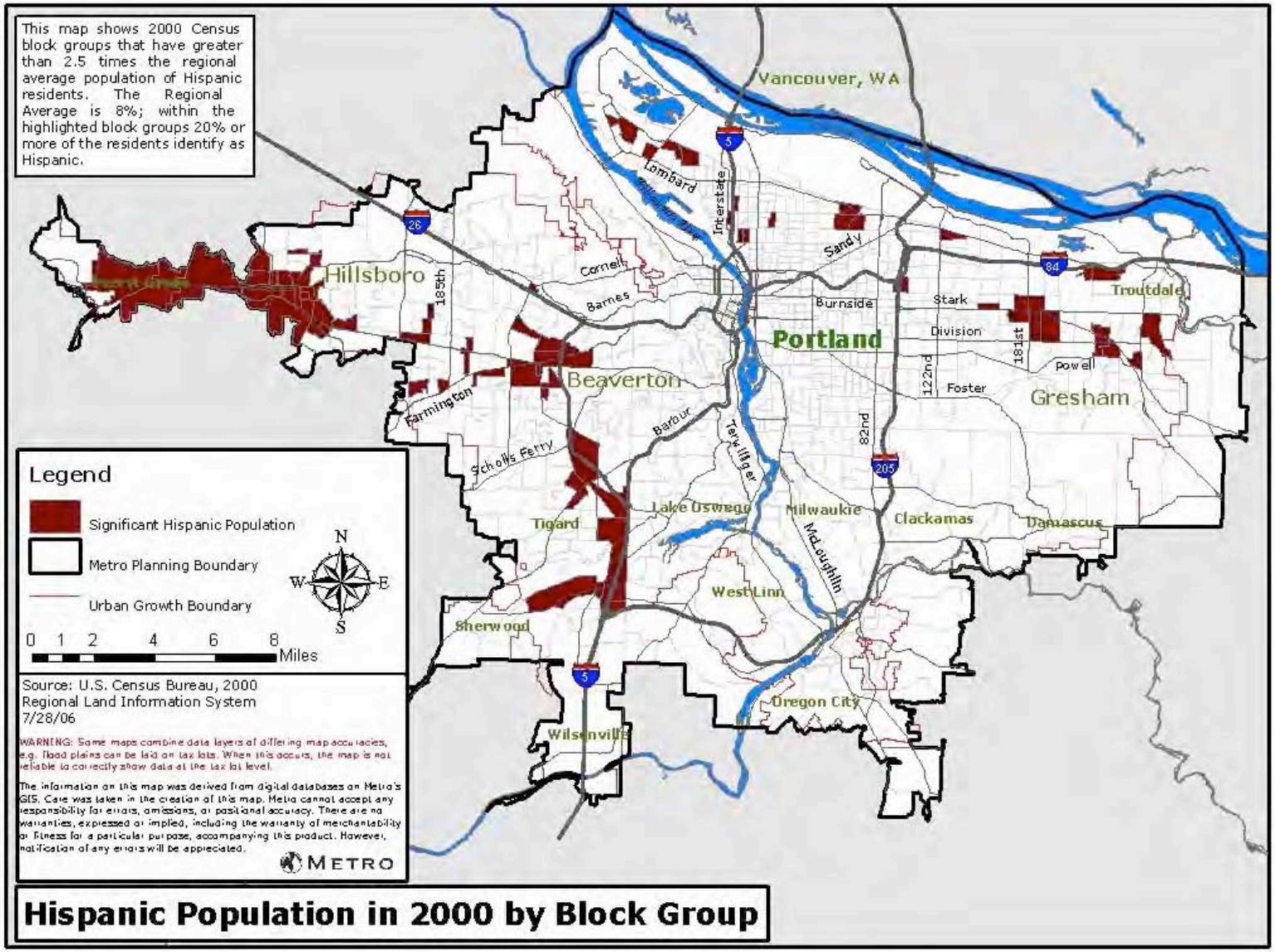

This map shows 2000 Census block groups that have greater than 2.5 times the regional average population of Hawaiian and Pacific Islander residents. The Regional Average is 1%; within the highlighted block groups 2% or more of the residents identify as Hawaiian or Pacific Islander.
Vancouver, WA
Hillsboro
Forest Grove
Beaverton
Portland
Gresham
Troutdale
Tigard
Lake Oswego
Milwaukie
Clackamas
Damascus
West Linn
Sherwood
Oregon City
Wilsonville
Interstate
Lombard
Sandy
Burnside
Stark
Division
Powell
Foster
Barnes
Cornell
Farmington
Murray
Scholls Ferry
Barbur
Terwilliger
McLoughlin
82nd
122nd
181st
185th
Legend
Significant Hawaiian/Pacific Islander Population
Metro Planning Boundary
Urban Growth Boundary
0 1 2 4 6 8 Miles
N
W
E
S
Source: U.S. Census Bureau, 2000
Regional Land Information System
7/28/06
WARNING: Some maps combine data layers of differing map accuracies, e.g. flood plains can be laid on tax lots. When this occurs, the map is not reliable to correctly show data at the tax lot level.
The information on this map was derived from digital databases on Metro's GIS. Care was taken in the creation of this map. Metro cannot accept any responsibility for errors, omissions, or positional accuracy. There are no warranties, expressed or implied, including the warranty of merchantability or fitness for a particular purpose, accompanying this product. However, notification of any errors will be appreciated.
METRO
Hawaiian and Pacific Islander Population in 2000 by Block Group

Figure 4


This map shows 2000 Census block groups that have greater than 2.5 times the regional average population of Hispanic residents. The Regional Average is 8%; within the highlighted block groups 20% or more of the residents identify as Hispanic.
Vancouver, WA
Lombard
Interstate
Sandy
Hillsboro
185th
Cornell
Barnes
Burnside
Stark
Division
Portland
181st
122nd
Foster
Powell
Troutdale
Gresham
Beaverton
Farmington
Barbur
Terwilliger
82nd
Scholls Ferry
Tigard
Lake Oswego
Milwaukie
Clackamas
Damascus
McLoughlin
West Linn
Sherwood
Oregon City
Wilsonville
Legend
Significant Hispanic Population
Metro Planning Boundary
Urban Growth Boundary
N
W
E
S
0 1 2 4 6 8
Miles
Source: U.S. Census Bureau, 2000
Regional Land Information System
7/28/06
WARNING: Some maps combine data layers of differing map accuracies, e.g. flood plains can be laid on tax lots. When this occurs, the map is not reliable to correctly show data at the tax lot level.
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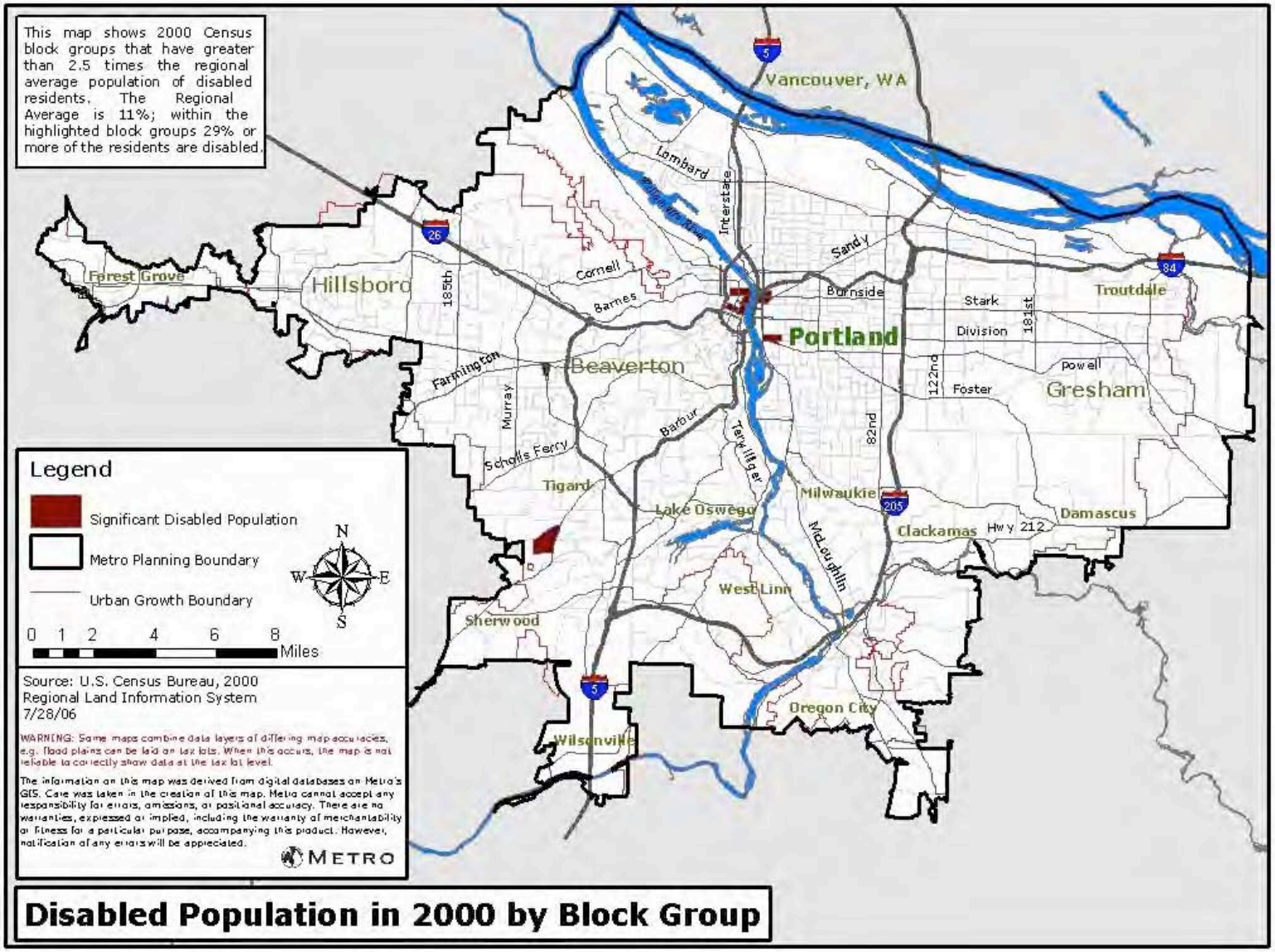
METRO
Hispanic Population in 2000 by Block Group

Figure 5


This map shows 2000 Census block groups that have greater than 2.5 times the regional average population of disabled residents. The Regional Average is 11%; within the highlighted block groups 29% or more of the residents are disabled.
Legend
Significant Disabled Population
Metro Planning Boundary
Urban Growth Boundary
0 1 2 4 6 8 Miles
N
W
E
S
Source: U.S. Census Bureau, 2000
Regional Land Information System
7/28/06
WARNING: Some maps combine data layers of differing map accuracies, e.g. flood plains can be laid on tax lots. When this occurs, the map is not reliable to correctly show data at the tax lot level.
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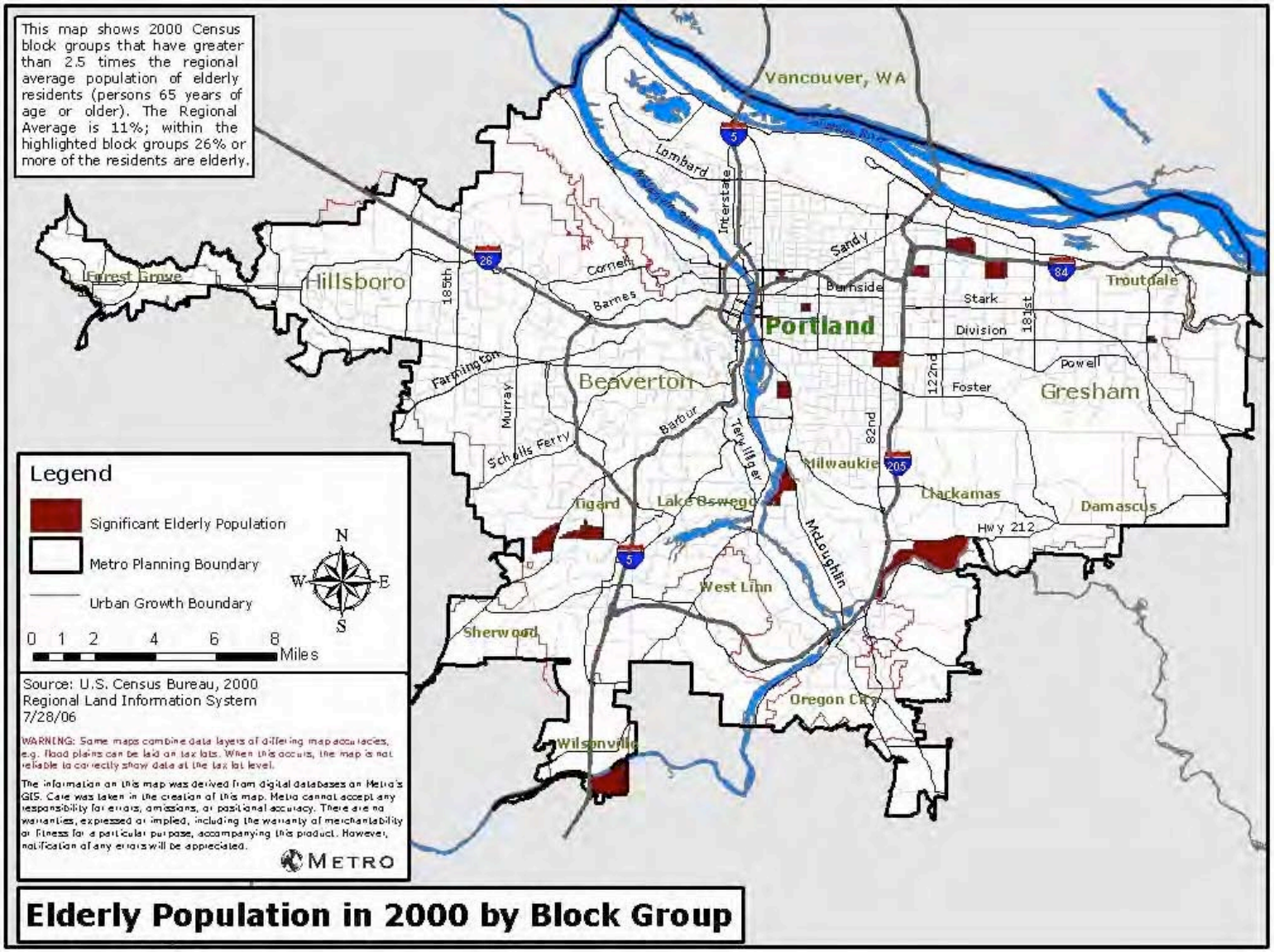
METRO
Vancouver, WA
Lambard
Columbia River
Interstate
Sandy
Cornell
Barnes
Burnside
Stark
Division
181st
Troutdale
Forest Grove
Hillsboro
185th
Portland
Beaverton
Farmington
Murray
Barbur
Terwilliger
82nd
122nd
Foster
Powell
Gresham
Scholls Ferry
Tigard
Milwaukie
Lake Oswego
Damascus
Clackamas
Hwy 212
McLoughlin
West Linn
Sherwood
Oregon City
Wilsonville
Disabled Population in 2000 by Block Group

Figure 6


This map shows 2000 Census block groups that have greater than 2.5 times the regional average population of elderly residents (persons 65 years of age or older). The Regional Average is 11%; within the highlighted block groups 26% or more of the residents are elderly.
Legend
Significant Elderly Population
Metro Planning Boundary
Urban Growth Boundary
0 1 2 4 6 8 Miles
N
W
E
S
Source: U.S. Census Bureau, 2000
Regional Land Information System
7/28/06
WARNING: Some maps combine data layers of differing map accuracies, e.g. flood plains can be laid on tax lots. When this occurs, the map is not reliable to correctly show data at the tax lot level.
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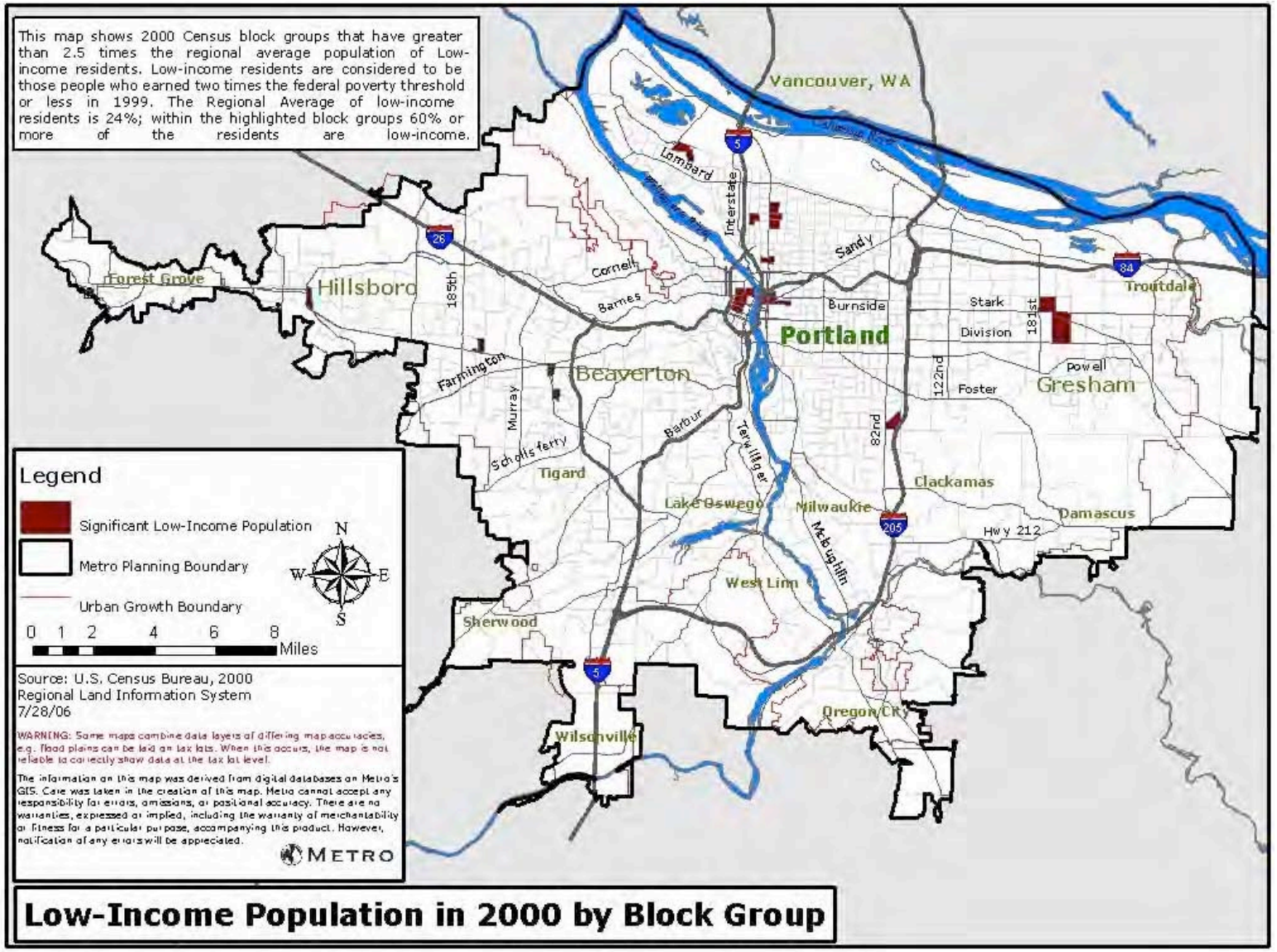
METRO
Elderly Population in 2000 by Block Group
Vancouver, WA
Lombard
Interstate
Sandy
Burnside
Stark
Division
Powell
Foster
Troutdale
Gresham
Portland
Beaverton
Hillsboro
Forest Grove
Cornell
Barnes
Farmington
Murray
Scholls Ferry
Barbur
Terwilliger
82nd
122nd
181st
185th
Milwaukie
Clackamas
Damascus
Hwy 212
Tigard
Lake Oswego
West Linn
Sherwood
McLoughlin
Oregon City
Wilsonville

Figure 7


This map shows 2000 Census block groups that have greater than 2.5 times the regional average population of Low-income residents. Low-income residents are considered to be those people who earned two times the federal poverty threshold or less in 1999. The Regional Average of low-income residents is 24%; within the highlighted block groups 60% or more of the residents are low-income.
Legend
Significant Low-Income Population
Metro Planning Boundary
Urban Growth Boundary
0 1 2 4 6 8 Miles
N
W
E
S
Source: U.S. Census Bureau, 2000
Regional Land Information System
7/28/06
WARNING: Some maps combine data layers of differing map accuracies, e.g. flood plains can be laid on tax lots. When this occurs, the map is not reliable to correctly show data at the tax lot level.
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METRO
Low-Income Population in 2000 by Block Group
Vancouver, WA
Lombard
Interstate
Sandy
Cornell
Barnes
Burnside
Stark
Division
181st
Portland
Troutdale
Gresham
Powell
Foster
122nd
82nd
Hillsboro
Forest Grove
185th
Farmington
Beaverton
Murray
Barbur
Terwilliger
Scholls ferry
Tigard
Lake Oswego
Milwaukie
Clackamas
Damascus
Hwy 212
McLoughlin
West Linn
Sherwood
Oregon City
Wilsonville
5
26
84
205

Figure 8

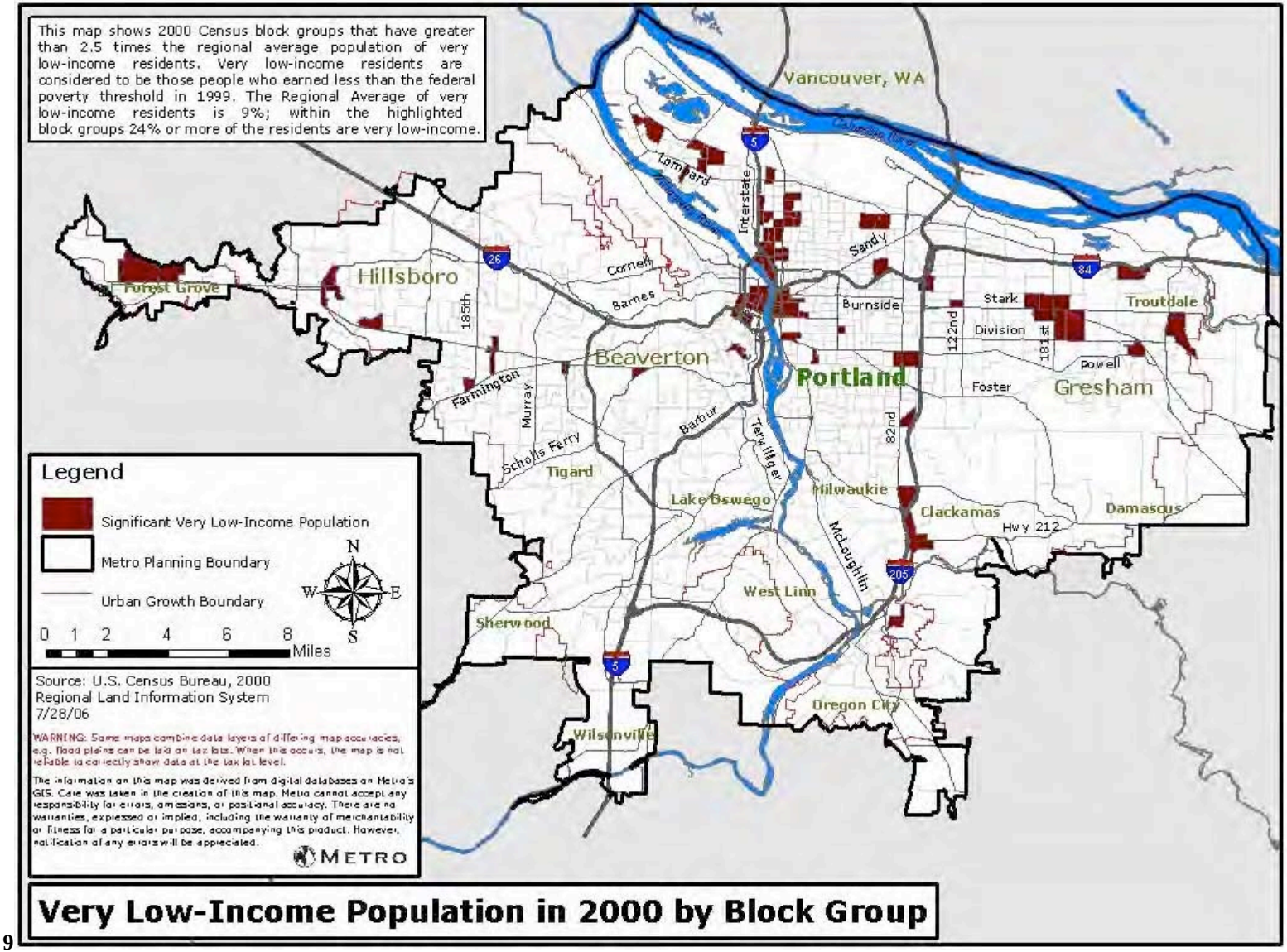
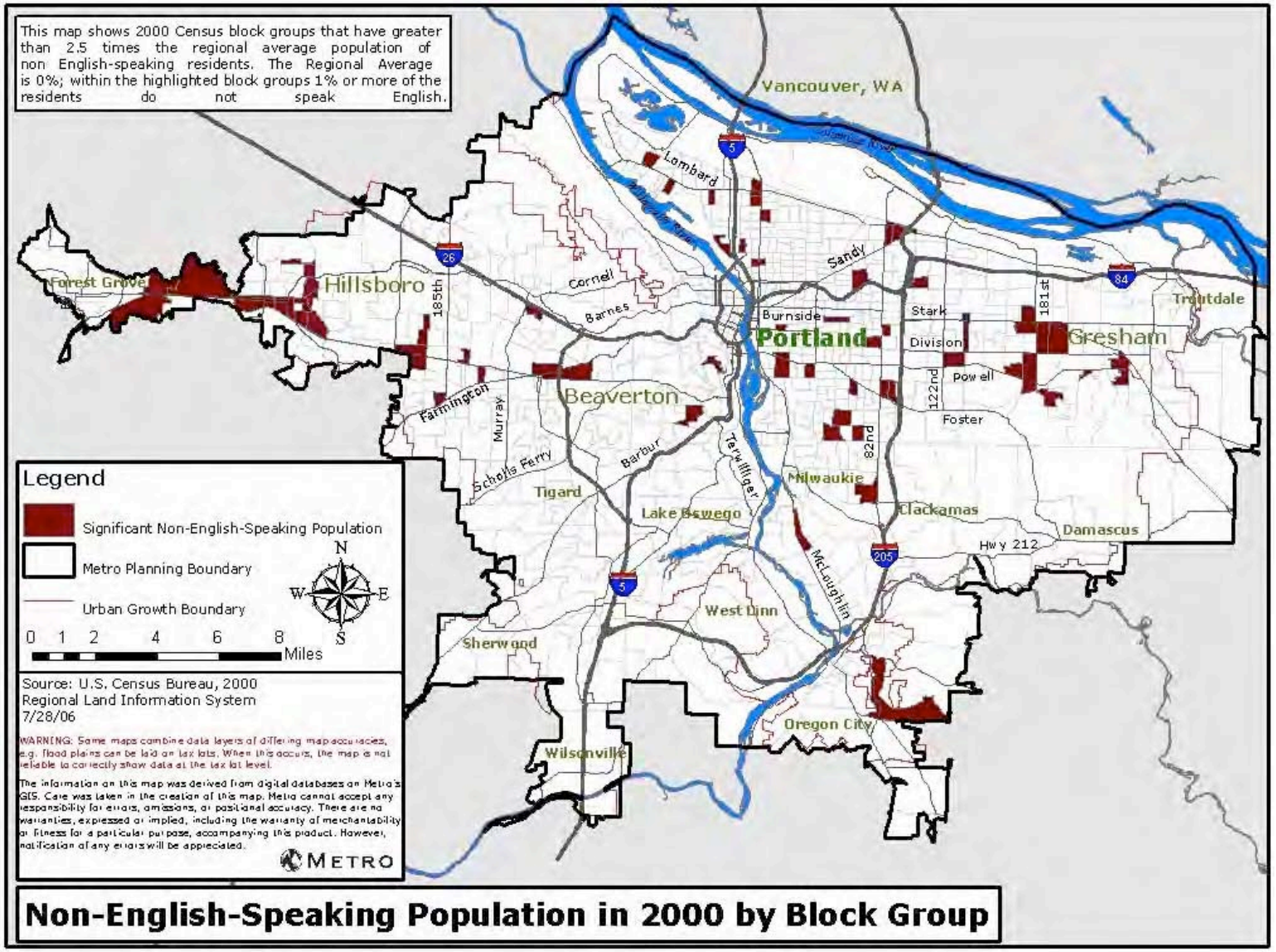

This map shows 2000 Census block groups that have greater than 2.5 times the regional average population of very low-income residents. Very low-income residents are considered to be those people who earned less than the federal poverty threshold in 1999. The Regional Average of very low-income residents is 9%; within the highlighted block groups 24% or more of the residents are very low-income.
Legend
Significant Very Low-Income Population
Metro Planning Boundary
Urban Growth Boundary
0 1 2 4 6 8 Miles
N
W E
S
Source: U.S. Census Bureau, 2000
Regional Land Information System
7/28/06
WARNING: Some maps combine data layers of differing map accuracies, e.g. flood plains can be laid on tax lots. When this occurs, the map is not reliable to correctly show data at the tax lot level.
The information on this map was derived from digital databases on Metro's GIS. Care was taken in the creation of this map. Metro cannot accept any responsibility for errors, omissions, or positional accuracy. There are no warranties, expressed or implied, including the warranty of merchantability or fitness for a particular purpose, accompanying this product. However, notification of any errors will be appreciated.
METRO
Vancouver, WA
Hillsboro
Forest Grove
Beaverton
Portland
Gresham
Troutdale
Tigard
Lake Oswego
Milwaukie
Clackamas
Damascus
West Linn
Sherwood
Wilsonville
Oregon City
Lombard
Interstate
Sandy
Cornell
Barnes
Burnside
Stark
Division
Powell
Foster
122nd
181st
185th
Farmington
Murray
Scholls Ferry
Barbur
Terwilliger
82nd
McLoughlin
Hwy 212
5
26
84
205
Very Low-Income Population in 2000 by Block Group

Figure 9


This map shows 2000 Census block groups that have greater than 2.5 times the regional average population of non English-speaking residents. The Regional Average is 0%; within the highlighted block groups 1% or more of the residents do not speak English.
Vancouver, WA
Lombard
Sandy
Burnside
Portland
Stark
Division
Powell
Foster
Gresham
Troutdale
181st
122nd
82nd
Cornell
Barnes
Hillsboro
Forest Grove
185th
Farmington
Murray
Beaverton
Scholls Ferry
Tigard
Barbur
Terwilliger
Milwaukie
Clackamas
Lake Oswego
Damascus
Hwy 212
McLoughlin
West Linn
Sherwood
Oregon City
Wilsonville
Legend
Significant Non-English-Speaking Population
Metro Planning Boundary
Urban Growth Boundary
N
W
E
S
0 1 2 4 6 8 Miles
Source: U.S. Census Bureau, 2000
Regional Land Information System
7/28/06
WARNING: Some maps combine data layers of differing map accuracies, e.g. flood plains can be laid on tax lots. When this occurs, the map is not reliable to correctly show data at the tax lot level.
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METRO
Non-English-Speaking Population in 2000 by Block Group

Figure 10

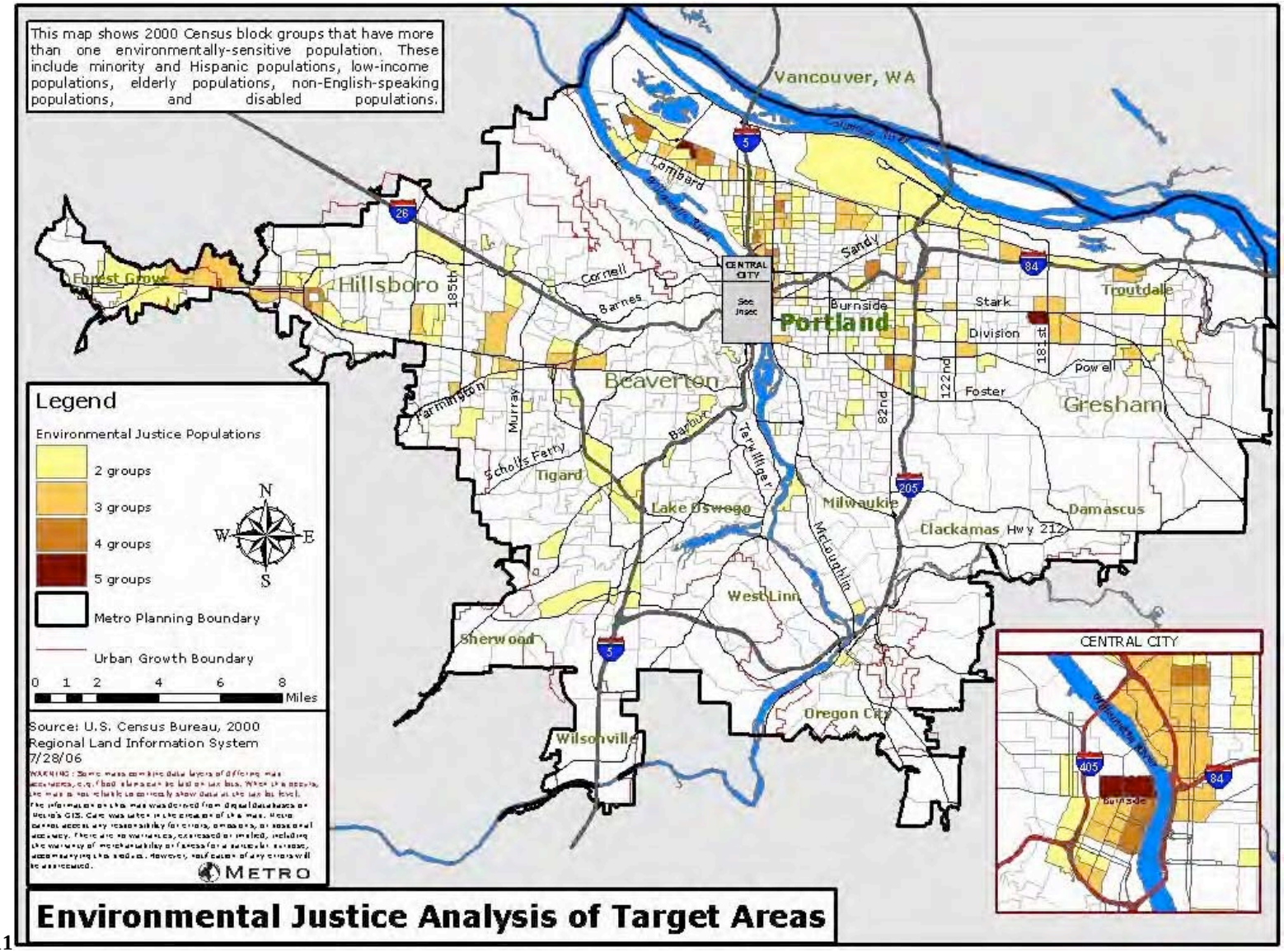
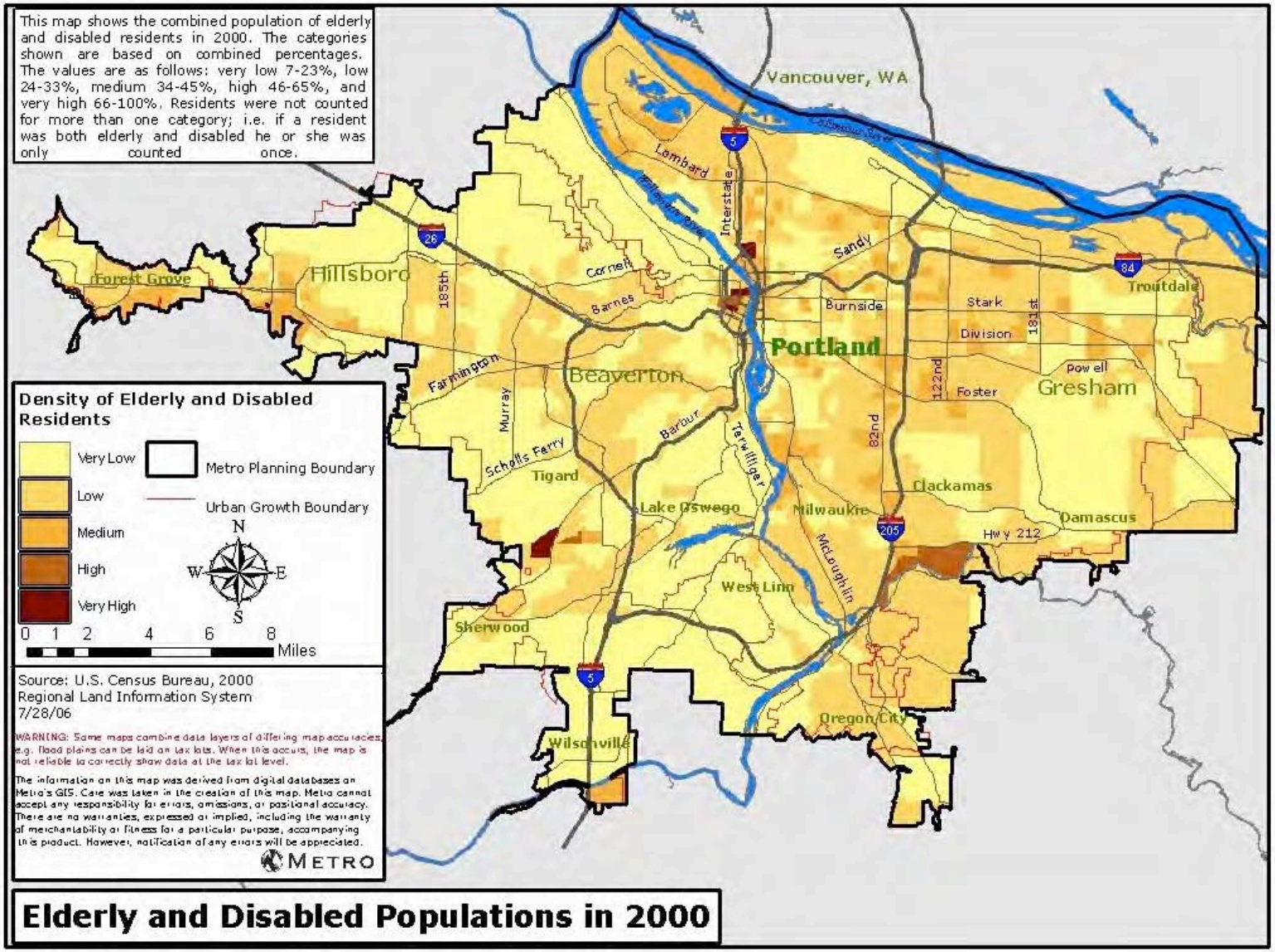

This map shows 2000 Census block groups that have more than one environmentally-sensitive population. These include minority and Hispanic populations, low-income populations, elderly populations, non-English-speaking populations, and disabled populations.
Legend
Environmental Justice Populations
2 groups
3 groups
4 groups
5 groups
Metro Planning Boundary
Urban Growth Boundary
0 1 2 4 6 8 Miles
Source: U.S. Census Bureau, 2000
Regional Land Information System
7/28/06
METRO
Vancouver, WA
Hillsboro
Forest Grove
Beaverton
Portland
Gresham
Troutdale
Tigard
Lake Oswego
Milwaukie
Damascus
West Linn
Sherwood
Wilsonville
Oregon City
Clackamas Hwy 212
CENTRAL CITY
Burnside
Sandy
Stark
Division
Powell
Foster
Barnes
Cornell
Barbur
Scholls Ferry
Farmington
Murray
185th
122nd
82nd
181st
Terwilliger
McLoughlin
Lombard
CENTRAL CITY
See Inset
Environmental Justice Analysis of Targets Areas

Figure 11


This map shows the combined population of elderly and disabled residents in 2000. The categories shown are based on combined percentages. The values are as follows: very low 7-23%, low 24-33%, medium 34-45%, high 46-65%, and very high 66-100%. Residents were not counted for more than one category; i.e. if a resident was both elderly and disabled he or she was only counted once.
Density of Elderly and Disabled Residents
Very Low
Low
Medium
High
Very High
Metro Planning Boundary
Urban Growth Boundary
N
W
E
S
0 1 2 4 6 8
Miles
Source: U.S. Census Bureau, 2000
Regional Land Information System
7/28/06
WARNING: Some maps combine data layers of differing map accuracies, e.g. flood plains can be laid on tax lots. When this occurs, the map is not reliable to correctly show data at the tax lot level.
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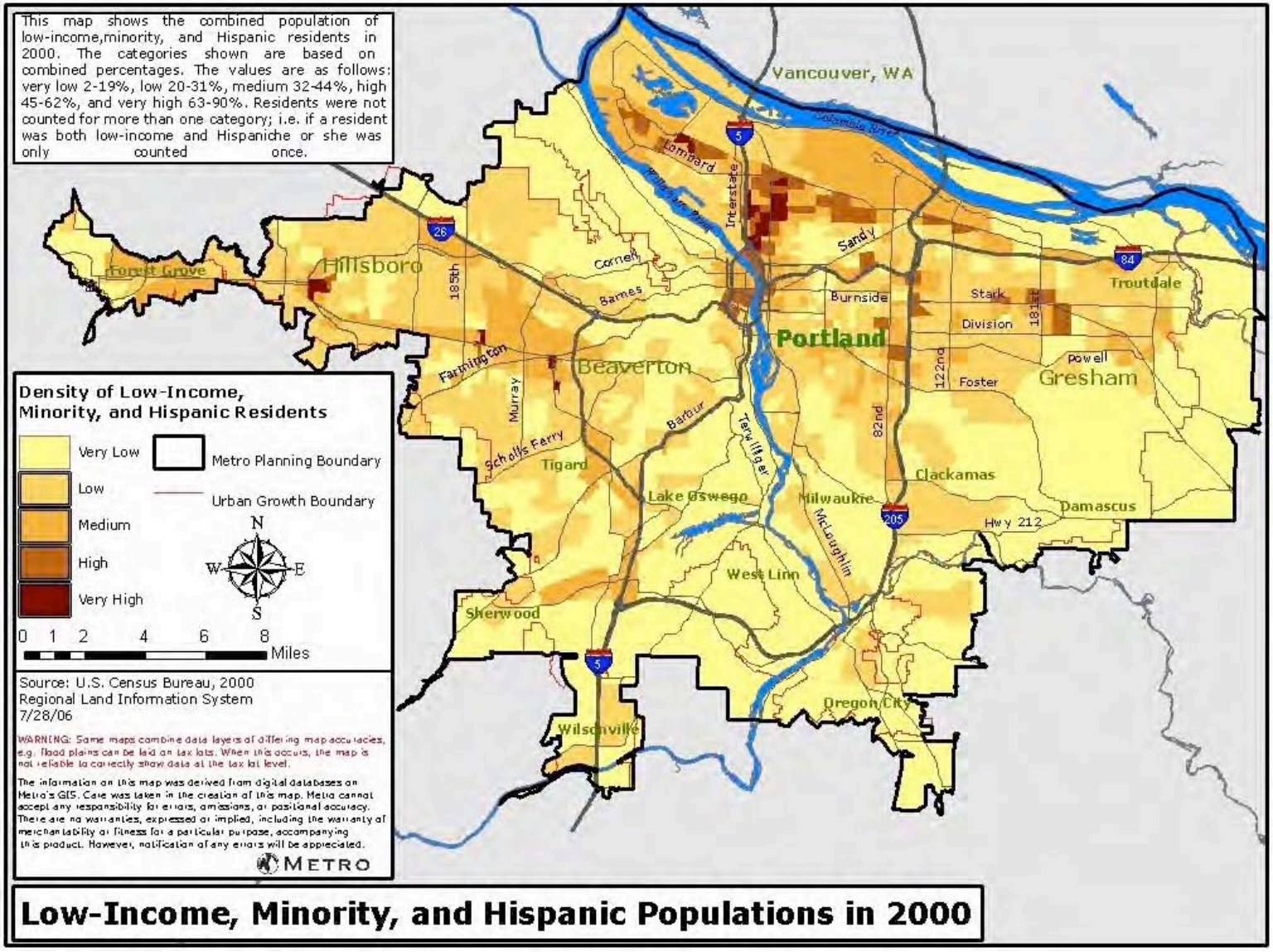
METRO
Vancouver, WA
Lombard
Interstate
Sandy
Forest Grove
Hillsboro
185th
Cornell
Barnes
Burnside
Stark
Division
181st
Troutdale
Portland
Farmington
Beaverton
Murray
Barbur
Terwilliger
82nd
122nd
Foster
Powell
Gresham
Scholls Ferry
Tigard
Lake Oswego
Milwaukie
Clackamas
Damascus
Hwy 212
McLoughlin
West Linn
Sherwood
Oregon City
Wilsonville
Elderly and Disabled Populations in 2000

Figure 12


This map shows the combined population of low-income,minority, and Hispanic residents in 2000. The categories shown are based on combined percentages. The values are as follows: very low 2-19%, low 20-31%, medium 32-44%, high 45-62%, and very high 63-90%. Residents were not counted for more than one category; i.e. if a resident was both low-income and Hispaniche or she was only counted once.
Density of Low-Income, Minority, and Hispanic Residents
Very Low
Low
Medium
High
Very High
Metro Planning Boundary
Urban Growth Boundary
N
W
E
S
0 1 2 4 6 8
Miles
Source: U.S. Census Bureau, 2000
Regional Land Information System
7/28/06
WARNING: Some maps combine data layers of differing map accuracies, e.g. flood plains can be laid on tax lots. When this occurs, the map is not reliable to correctly show data at the tax lot level.
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METRO
Vancouver, WA
Columbia River
Lombard
Willamette River
Interstate
Sandy
Forest Grove
Hillsboro
185th
Cornell
Barnes
Burnside
Stark
Division
181st
Troutdale
Portland
Farmington
Beaverton
Murray
122nd
Foster
Powell
Gresham
Barbur
Terwilliger
82nd
Scholls Ferry
Tigard
Clackamas
Lake Oswego
Milwaukie
205
Damascus
Hwy 212
McLoughlin
West Linn
Sherwood
Oregon City
Wilsonville
Low-Income, Minority, and Hispanic Populations in 2000

Figure 13

TRANSPORTATION NEEDS ASSESSMENT

Metro will conduct a needs assessment for target environmental justice populations as a part of the 2035 Regional Transportation Plan update. This will utilize several existing studies, including the 2003 OHSU Elder Study, the Tri-Met Elderly and Disabled Land Use Plan, the 2006 Jobs Access Reverse Commute Plan, and the Pew Research Center study of Cornelius.

Metro will also conduct its own outreach to environmental justice populations in the course of the RTP update. Several stakeholder workshops and focus groups will be conducted in 2006-2007 to help inform Metro's understanding of transportation needs of target populations. These outreach processes will be discussed in greater detail in chapter 5.

The information gleaned from the RTP update regarding transportation needs of target populations will be used to inform and prioritize future MTIP applications.

DISTRIBUTION OF BENEFITS AND BURDENS ON TARGET POPULATIONS

As part of the RTP update, Metro will determine how to define transportation benefits and burdens, and will subsequently assess proposed 2035 RTP update projects as to their distribution of benefits and burdens on environmental justice populations. Metro will also assess benefits and burdens in the context of identified transportation needs of environmental justice populations.

PUBLIC INVOLVEMENT STRATEGY

Metro will conduct a comprehensive public involvement process to ensure that the needs of all target populations are understood within the context of the RTP. This will include:

- A scientific public opinion research poll in both English and Spanish.
- A workshop to be held in the far Western edge of the region to identify transportation issues and needs among the largest concentration of Hispanic residents in the region; Metro will partner with El Centro Cultural to conduct this workshop in Spanish.
- A workshop to be held with the Environmental Justice Action Group composed of minority and low-income populations that are concentrated in North Portland.
- A workshop to be held with elderly and disabled individuals and advocacy groups from across the region.
- A workshop to be held with Active Living advocacy groups, which address the need to integrate transportation planning with physical and social health in all communities and across economic classes.
- A targeted workshop with community based organizations.
- Focus groups with selected populations.
- Information on the Metro website written for the lay public utilizing visuals to communicate technical information wherever possible.

- A transportation “hotline” for voice and TDD.
- Responses to requests from neighborhood groups to present information.
- Participation in all events will be tracked by race and gender (by self-identification when possible; visual when self-identification not possible).
- Ensure that all public events are held in location accessible by wheelchair and close to public transportation

This process will be carried out to ensure that the needs and concerns of all citizens within the Portland metropolitan region are incorporated into the RTP and MTIP.

IMPLICATIONS AND CONCLUSIONS

The MTIP currently has a procedure for ensuring that its funded projects meet environmental justice requirements. The process involves screening each project for an appropriate public involvement component in the initial phase. Then, an environmental justice analysis is done to determine the proximity of project applications to high concentrations of environmental justice populations. Metro then sets a condition of approval for each project that it meets requirements for outreach specific to the identified environmental justice population. This process is adequate for meeting environmental justice regulations and will continue to be the process by which the MTIP ensures that local jurisdictions meet federal requirements.

The 2035 RTP update will set a new standard for environmental justice considerations in transportation planning within the Portland metropolitan region. By creating a demographic profile, conducting a needs assessment, and assessing the distribution of benefits and burdens from proposed transportation system investments on environmental justice populations, Metro will be able to create a plan that meets the transportation needs of all citizens within the region.

APPENDIX 1: Review of Environmental Justice Practices in Other Selected Agencies

The Southern California Association of Governments (SCAG) was under threat of lawsuit after adoption of its 1997 RTP because it didn't fully comply with Title VI requirements. To address this issue, SCAG developed a systematic procedure for evaluating environmental justice and incorporating federal requirements within future transportation planning processes. This procedure included the development of performance indicators to gauge the social and economic effects of transportation investment decisions on minority and low-income populations, an examination of the equity of the tax structure that supported transportation financing, and profiling travel behavior and modes of transportation by race and income group. SCAG assessed transportation "benefits" as improved accessibility to jobs and other opportunities and calculated these as time saving and the value of time by income group.[xi]

The Mid-Ohio Regional Planning Council (MORPC) identified four key steps to their environmental justice analysis: (1) identify and map locations of low-income and minority populations, (2) identify transportation needs of target populations, (3) document and evaluate the relevant public involvement process, and (4) quantitatively assess benefits and burdens of transportation plans with respect to target populations. MORPC mapped demographic data at the block group level that roughly corresponded with their traffic analysis zones. MORPC used a travel forecasting model to estimate existing and future regional traffic patterns and volumes. They used the model as a measure of both accessibility and mobility of target populations. MORPC convened a task force advisory group to oversee implementation of its environmental justice program.[xii]

The Oregon Department of Transportation recently completed an Environmental Assessment for the I-5: Delta Park (Victory Boulevard to Lombard Section) Project. This involved a systematic environmental justice evaluation process, including targeted public outreach. It also included mapping minority, low-income, and linguistically isolated populations within the study area, and creating a set of six qualitative questions to evaluate "adverse effects" upon an environmental justice population.[xiii]

The Colorado Department of Transportation developed an environmental justice guidebook for internal use by transportation professionals. The guidebook suggested that environmental justice be analyzed at the traffic analysis zone within MPOs. The guidebook also suggested that all planners be given specific training in environmental justice regulations and effective practices.[xiv]

---

[i] FHWA and FTA. (1999). Action: Implementing Title VI Requirements in Metropolitan and Statewide Planning. Accessed July 12, 2006 from http://www.fhwa.dot.gov/environment/ejustice/ej-10-7.htm

[ii] United States Department of Justice. (1964). Title VI of the 1964 Civil Rights Act. Retrieved July 12, 2006 from http://www.usdoj.gov/crt/cor/coord/titlevistat.htm.

[iii] Clinton, William J. (1994). Executive Order 12898: Federal Actions to Address Environmental Justice in Minority and Low-Income Communities. Retrieved July 12, 2006 from http://www.fs.fed.us/land/envjust.html.
[iv] Americans with Disabilities Act, http://www.usdoj.gov/crt/ada/pubs/ada.txt.
[v] National Cooperative Highway Research Program. (2002). Technical Methods to Support Analysis of Environmental Justice Issues.
[vi] Metro. (2004a). Transportation Planning Public Involvement Policy, pg 2.
[vii] Metro. (2004b). 2004 Regional Transportation Plan. Pg. 1-12.
[viii] Metro. (2004b). 2004 Regional Transportation Plan. Pg. 1-14.
[ix] Metro. (2004b). 2004 Regional Transportation Plan. Pg. 1-15.
[x] Metro. (2005). Metropolitan Transportation Improvement Program: Portland Metro Area Federal Fiscal Years 2006 through 2009.
[xi] FHWA. Community Link 21, Regional Transportation Plan: Equity and Accessibility Performance Indicators, Southern California Association of Governments. Accessed July 6, 2006 from http://www.fhwa.dot.gov/environment/ejustice/case/case4.htm
[xii] FHWA. MPO Environmental Justice Report, Mid-Ohio Regional Planning Commission. Accessed July 6, 2006 from http://www.fhwa.dot.gov/environment/ejustice/case/case7.htm
[xiii] Oregon Department of Transportation. (2005). I-5: Delta Park (Victory Boulevard to Lombard Section), Multnomah County, Oregon, Environmental Justice Report.
[xiv] Van Orden, D. and C. Grauberger. (2002). Environmental Justice Research Study. Colorado Department of Transportation. CDOT-DTD-R-2002-7.

New Look
The Regional Transportation Plan

2035 Regional Transportation Plan Update

Background Paper:

A Profile of the Regional Pedestrian System in the Portland Metropolitan Region

Prepared by:

METRO
PEOPLE PLACES • OPEN SPACES

DISCUSSION DRAFT
November 27, 2006

Metro
People places • open spaces

Clean air and clean water do not stop at city limits or county lines. Neither does the need for jobs, a thriving economy and good transportation choices for people and businesses in our region. Voters have asked Metro to help with the challenges that cross those lines and affect the 25 cities and three counties in the Portland metropolitan area.

A regional approach simply makes sense when it comes to protecting open space, caring for parks, planning for the best use of land, managing garbage disposal and increasing recycling. Metro oversees world-class facilities such as the Oregon Zoo, which contributes to conservation and education, and the Oregon Convention Center, which benefits the region's economy.

Your Metro representatives

Metro Council President – David Bragdon
Metro Councilors – Rod Park, District 1; Brian Newman, District 2; Carl Hosticka, deputy council president, District 3; Susan McLain, District 4; Rex Burkholder, District 5; Robert Liberty, District 6.
Auditor – Alexis Dow, CPA

Metro's web site: www.metro-region.org

2035 Regional Transportation Plan Update

A Profile of the Regional Pedestrian System in the Portland Metropolitan Region

TABLE OF CONTENTS

I. Introduction

This paper is one of a series of papers that provide background research and analysis to guide Regional Transportation Plan (RTP) update policy discussions. The papers describe trends and research affecting the regional transportation system, current regional transportation planning policies and regulatory requirements, a profile of the existing transportation system and policy implications to be addressed in the RTP to respond to identified policy gaps and key findings of the background research. Collectively, the background papers will inform future policy discussions by Metro Policy Advisory Committee (MPAC), Joint Policy Advisory Committee on Transportation (JPACT) and the Metro Council and lead to an updated RTP.

This paper provides a profile of the regional pedestrian system in the Portland metropolitan region. It identifies trends and research on pedestrian travel and reports on the existing regional pedestrian system. The trends shaping future pedestrian travel and performance of the current regional pedestrian system are essential considerations for the development of effective goals and strategies to address pedestrian travel needs in the Portland metropolitan region. The paper concludes with a list of key findings and policy recommendations to be considered during the RTP update process.

II. Background

Walking is an activity that supports all other modes of travel. Whether it is accessing a parked car or transit, people walk places to get around even in combination another mode. The supportive role that walking plays to other modes is one reason the pedestrian system needs to be complete, safe and enjoyable to use. The pedestrian system also has to be accessible to everyone regardless of one's ability to walk unassisted.

Pedestrian activities also play a role in economic development by supporting places where people like to visit and live. Neighborhoods and centers that encourage walking thrive from foot traffic and the walking public supports a rich commercial and residential environment. The pedestrian system when fully developed helps people get around by providing links between destinations, to employment sites, offers opportunities for active living, helps contribute to environmental health, supports other modes like transit, makes communities more inviting and provides a travel option that is inexpensive and accessible to most people.

Currently the regional pedestrian system is incomplete and the sidewalk network in particular has gaps in continuity and quality. This is not only a barrier to people accessing the system as pedestrians to meet their transportation needs, it is a barrier to creating economic vitality. A complete pedestrian system provides a basic building block for commercial viability, but when incomplete fails to maximize the connection between transportation and land use in creating vibrant communities and making the region competitive. The fact that the sidewalk network is incomplete makes expenditures on pedestrian system management a secondary concern to completing gaps in the system. The existence of gaps prevents the basic system from functioning uniformly throughout the region by inhibiting access to transit, limiting access to centers and other destinations and reducing the potential for economic development.

The term "walking" as used in this context includes traveling on foot as well as those pedestrians using mobility aids, such as wheelchairs. It is important to remember that sidewalks and pedestrian crossings must serve the needs of all mobility levels and must include design elements

that help make travel as easy as possible, particularly given that many people with mobility challenges rely on transit and the pedestrian network.

Metro's 2040 Growth Concept emphasizes the development of a multi-modal transportation system, which includes "walkability" as something to strive for throughout the region. This concept is expressed through the 2040 Fundamentals that help guide the region toward the vision for 2040.

Walking is a key component of the 2040 Growth Concept and addresses the six key fundamentals:

- *Healthy Economy*
- *Vibrant Communities*
- *Environment Health*
- *Transportation Choices*
- *Equity*
- *Fiscal Stewardship*

Walking supports a *healthy economy* by increasing commercial viability in places that have lots of foot traffic. Places like NW 23rd Avenue in Portland and Downtown Lake Oswego demonstrate the economic vitality of places that accommodate and encourage walking and benefit from increasing local economic activity. Walking also offers workers a choice of mode for getting to and from work and increases employers' access to labor markets.

More and more people are recognizing the benefits of walking in creating *vibrant communities*. Communities that have good access to services and transit by way of walking offer people a way to be more active, socialize with other people, be safe, and reduce their dependence on the automobile. A pedestrian system that supports these activities helps contribute to the vibrancy of an area. The pedestrian system is particularly effective in contributing to the vibrancy of communities when coupled with compact development.

Reducing auto dependence has the major benefit of improving air quality and thus contributes to *environmental health*. When people are able to make more of their trips by foot or in combination with transit they are able to reduce their vehicle miles traveled and reduce the amount of pollution released into the atmosphere. Walking and bicycling are the "cleanest" modes of travel and it is important that the regional system provides opportunities for walking as one of many *transportation choices*. The pedestrian system provides an important transportation option and one of the necessary elements of an integrated transportation system. A good pedestrian system enables and encourages people to choose walking.

The pedestrian system addresses *equity* by providing one of the most affordable ways to travel – walking. When the pedestrian system is safe, attractive and well connected to destinations and transit, it can be an inexpensive way for people of all means and abilities to get around. A good pedestrian system can serve as the backbone of the transportation system for serving all people's transportation needs and by supporting all other modes helps contribute to *fiscal stewardship*. The pedestrian system is an element of the public infrastructure that should be considered when making decisions about investing in future growth and demand. It is fiscally responsible to invest in facilities that are available to all people.

III. Trends and Recent Research

Growing aging public

America is aging and the Portland metropolitan region is no exception. It is expected that over the next 30 years, the Portland-Vancouver metropolitan area will experience growth in the proportion of the population aged 65 and older. This amounts to growth over 137 percent and comprising 17 percent of the population in 2030 as compared to 10.5 percent in 2000.[1] These changing demographics could mean that larger numbers of elderly people will seek alternatives to driving as it becomes more difficult to drive safely. According to a recent Portland State University (PSU) study, the share of trips by older people made on foot increases with age, however, older adults still make most trips by private vehicle.[2] While older people still rely on cars for a good portion of their transportation needs it will be crucial that the pedestrian system can meet the needs of the aging public as they transition from cars to walking and transit. The PSU study also pointed out that the elderly population is not a homogenous group. Actions must be taken to assist seniors in good health remain active, while providing additional support to frail seniors.

Universal design

The concept of universal design (also known as *Accessible Design*) has emerged in response to the growing numbers of mobility challenged people in our communities, including mobility limitations arising from age. Universal design refers to facility designs that accommodate the widest range of potential users, including people with mobility and visual impairments and other special needs.[3] Universal design is intended to be comprehensive, meaning that it results in mobility options for the greatest possible range of potential users and considers all possible obstacles in buildings, transportation facilities, sidewalks, paths, roads and vehicles.[4] Universal design can help ensure that facilities are designed to meet the needs of all users by shifting the focus from designing facilities for the "average" person and instead focusing on designing for entire communities.

Increasing awareness of pedestrian safety

Awareness of the need for increased pedestrian safety has grown in recent years as walking in most communities has become difficult and unsafe and citizens and governments alike have determined that this is not acceptable. According to the Federal Highway administration a pedestrian is killed or injured every seven minutes in the U.S.[5] The safety of children, the elderly and for people with disabilities as well as safe access to transit for everyone is a growing area of concern throughout the nation.

Safety for the non-driving public

Danger to children and seniors has been a contributing factor to the growing awareness about pedestrian safety, as these two groups are disproportionately involved in crashes. Many people with disabilities are also subject to unsafe sidewalk conditions as transit is a common mode for people with disabilities that don't drive automobiles. These groups are particularly vulnerable either due to limited physical abilities or the inability to drive automobiles. Awareness about the needs of the transportation disadvantaged is growing as we recognize the limitations of our systems for meeting the needs of all people.

[1] Portland State University, "Age-Related Shifts in Housing and Transportation Demand" p. 8
[2] Portland State University, "Age-Related Shifts in Housing and Transportation Demand" p. 6
[3] Victoria Transport Policy Institute "Universal Design" http://www.vtpi.org/tdm/tdm69.htm
[4] Victoria Transport Policy Institute "Universal Design" http://www.vtpi.org/tdm/tdm69.htm
[5] FHWA, "Pedestrian Safety Campaign" http://safety.fhwa.dot.gov/local_program/pedcampaign/index.htm

Children

According to the National Highway Transportation Safety Administration (NHTSA), "every day in the United States, an average of 5 children age 14 and younger were killed and 640 were injured every day in motor vehicle crashes during 2005."[6] Also, one fifth (18%) of all children between the ages of 5 to 9 who were killed in crashes where pedestrians and children aged 15 and younger accounted for 8 percent of the pedestrian fatalities in 2005.[7] Improving safety for children has become a priority at all levels of government. The latest federal transportation legislation emphasizes safety through the Safe Routes to Schools program. The new legislation reflects increasing concern for safety and calls for more integration of safety considerations in all levels of transportation planning. Funds through this program are available at the State level for local projects. Safe Routes to Schools and other programs addressing children's safety have been developed in response to the startling numbers of children killed each year in the U.S.

Elderly and people with disabilities

The occurrence of disabilities increases as people age, as does the risk of dying in a pedestrian crash. People ages 65 and older are two to eight times more likely to die than younger people when struck by motor vehicles according to the U.S. Department of Transportation.[8] According to the NHTSA, people aged 70 and over accounted for 16% of all pedestrian fatalities (5% of the total).[9] While these numbers do not identify specific causes of why these crashes occurred, they do suggest that more should be done to reduce factors that may contribute to older pedestrians being killed in crashes.

Increasing awareness about issues relating to mobility have influenced recent changes in federal transportation legislation (SAFETEA-LU) for elderly and disabled people and now requires that designated recipients of funds that support elderly transportation services must coordinate planning for human and transit services. At the regional level the *Coordinated Human Services Transportation Plan* has been completed to satisfy these federal requirements. This plan highlights walking as a basic option for elderly people and encourages local jurisdictions to make their communities more pedestrian friendly as well as advocate for locating housing for seniors within walking distance of services.[10] TriMet has done additional work on linking land use and transportation options for seniors and the disabled.[11] TriMet's recent release of the *Elderly and Disabled Land Use Study* identifies barriers and opportunities in the region for developing accessible housing for seniors and people with disabilities. Considerations about aging in place, how people get around and what types of facilities best meet the needs of seniors are important for improving safety for the growing elderly population as well as housing options for people with disabilities.

[6] NHTSA, "Traffic Safety Facts-Pedestrians"
http://www-nrd.nhtsa.dot.gov/pdf/nrd-30/NCSA/TSF2005/PedestriansTSF05.pdf
[7] NHTSA, "Traffic Safety Facts –Pedestrians"
http://www-nrd.nhtsa.dot.gov/pdf/nrd-30/NCSA/TSF2005/PedestriansTSF05.pdf
[8] US Department of Transportation "Focusing on the Senior Pedestrian"
http://www.tfhrc.gov/safety/pedbike/facts/oldped.htm
[9] NHTSA "Traffic Safety Facts – Pedestrians"
http://www-nrd.nhtsa.dot.gov/pdf/nrd-30/NCSA/TSF2005/PedestriansTSF05.pdf
[10] TriMet "Coordinated Human Services Transportation Plan"
[11] TriMet "Elderly and Disabled Transportation and Land-Use Study"

Safe access to transit for all mobility levels and incomes
Transit riders begin and end each trip as a pedestrian,[12] however, there are many places in our cities that do not make it easy to be a pedestrian due to a lack of facilities that accommodate people living with disabilities or lower income areas that have fewer developed sidewalks and safe crossings at major roadways. TriMet research indicates that the majority of riders access transit by walking. Roughly ninety percent of the Metro region's population lives within half-mile of a bust stop or light rail station. However, sidewalks connect only 69 percent of the stops.[13] The pedestrian system can often be a barrier to accessing transit and getting around because gaps in the system, such as missing sidewalks, missing ramps and unsafe crossings, are particularly difficult for the elderly and disabled to manage. According to the coalition of walking advocates *America Walks*, "there is a particular need for pedestrian facilities to connect transit stops to employment centers and the lack of pedestrian facilities reduces use of the transit system and increases costs for parking and road improvements."[14]

People are beginning to recognize the importance of fully developing a safe pedestrian system that accommodates everyone regardless of physical ability, age or income to access transit. Improving the pedestrian system to benefit transit services has become a focus of many transit agencies, cities and pedestrian advocacy groups, with particular emphasis on system improvements to make pedestrian facilities and transit accessible to people with mobility challenges and all income levels and ages. The transit and pedestrian needs of the transportation disadvantaged and highly transit dependent populations are important to consider when prioritizing improvements. Additional focus and coordination are needed for improving transportation conditions for underserved populations. Resources for improving access to transit through sidewalk improvements are however scarce. Feedback from local jurisdictions indicates that keeping up with sidewalk and ramp improvements is difficult and expensive. Many places have ramps that do not meet ADA standards.

Increasing Emphasis on the Link Between Public Health, Transportation and Land Use in the Active Living Movement

The active living movement has been largely influenced by the national health crisis that obesity has become in the United States. Organizations such as *Active Living by Design* are conducting research on the connections between the transportation system, land use, urban form and activity levels. Walking has become a key focus in the discussion of active living and the improvements to public health that occur when people walk more. It is one of the easiest and safest ways to improve health for people of all ages and the active living community has realized that the transportation system, particularly sidewalks and trails are essential for providing opportunities for people to walk.

The Regional Travel Options program, and others like it, have been working on informing people about alternative modes of travel and promote walking and its benefits to health among other things. The body of work in this area is growing rapidly as is people's awareness of the benefits of living more actively. Materials are being developed to help encourage walking as an option. A recent partnership between Kaiser Permanente and Clark County Washington produced the *Walkaround Guide* that includes 10 walks around Clark County and includes walks that are accessible to seniors and people with disabilities. The National Highway Transportation Safety Administration developed the *Stepping Out: Mature Adults: Be healthy, Walk Safely* program to

[12] TriMet, "Portland Access to Transit Project"
[13] TriMet "2007 Transportation Improvement Program." p. 10
[14] America Walks: http://www.americawalks.org/pedagenda/index.htman

encourage older adults to walk and provides information about how to walk safely.[15] Efforts to increase the activity level of people, including all age groups, is important for improving quality of life and has public health benefits as well.

Increasing Awareness of and Advocacy for Pedestrian Issues

In recent years the number of groups and organizations dedicated to pedestrian advocacy and activities has grown throughout the nation. The recognition of the enjoyment of walking and its associated health benefits as well as concerns over pedestrian safety and rights have contributed to the development of these groups. The work being done by groups such as the Willamette Pedestrian Coalition in the Portland Metropolitan region and Feet First in Seattle, WA are helping to shape laws, policies and perceptions about walking. Many advocacy groups have developed pedestrian tools designed to help people assess the walkability of their communities and how to address problems. One such resource is the *Walkability Checklist* available at www.walkinginfo.org, a website with information for citizens and pedestrian professionals. Other groups such as Elders in Action and AARP have also developed tools for assessing walkability for seniors and people with disabilities and determining solutions that fit their needs. Pedestrian advocacy is a trend that helps support the work of transportation professionals as they work on creating better environments for walking by raising awareness and generating support for walking.

Shifting Emphasis on Context Sensitive Design Solutions

In the last several years' ideas about how to design transportation solutions have begun to shift. The emergence of context sensitive design provides a viable alternative to the top-down, road centric perspective that has dominated transportation planning. One definition of context sensitive design is **"**the art of creating public works projects that meet the needs of the users, the neighboring communities, and the environment. It integrates projects into the context or setting in a sensitive manner through careful planning, consideration of different perspectives, and tailoring designs to particular project circumstances."[16] Context sensitive design is supportive of policies that encourage transportation demand management practices and new urbanism by promoting the following six principles:

1. Balance safety, mobility, community, and environmental goals in all projects.
2. Involve the public and affected agencies early and continuously.
3. Use an interdisciplinary team tailored to project needs.
4. Address all modes of travel.
5. Apply flexibility inherent in design standards.
6. Incorporate aesthetics as an integral part of good design.[17]

This new focus is influencing the planning and engineering fields to take new approaches to meeting transportation needs and is gaining momentum as more professionals and governments embrace these practices.

Growth in New Urbanism Practices and Neighborhood Revitalization

The movement to return to urban forms that were popular in previous eras for land use and transportation has taken root on a national scale. Developing new communities reminiscent of the early part of the 20th century and revitalizing neighborhoods have been identified as ways to

[15] NHTSA "Stepping Out" http://www.nhtsa.dot.gov/people/injury/olddrive/SteppingOut/index.html

[16] Minnesota Department of Transportation "What is Context Sensitive Design?" www.cts.umn.edu/education/csd/index.html

[17] Minnesota Department of Transportation "What is Context Sensitive Design?" www.cts.umn.edu/education/csd/index.html

increase economic vitality, improve safety in communities and encourage more active living. Street design and compact urban form encourage walking and are sustained by pedestrian activities. Walking is a central component to the success of neighborhoods and commercial areas be it a new development such Gresham's Civic neighborhood or older areas bouncing back from disinvestment like the Alberta Arts District in Portland. The report *Ten Principles for Achieving Region 2040 Centers* suggests that being able to walk easily and safely is key to helping the success of centers and reinforces the notion that centers thrive when pedestrian traffic is encouraged and made easy.[18] The ten principles in the report are intended to help Metro understand and develop actions for making centers work and are as follows:

1. All centers are not created equal
2. Understanding market impact
3. Private investment follows public commitment
4. Reward leadership
5. Build communities, not projects
6. Remove barriers
7. Metro as coach
8. Balance the automobile
9. Celebrate success
10. Take the long view

More and more people are choosing to live in areas where they can walk to services and employment. The real estate market, developers, and local governments are responding to this trend. A 2004 study by the National Association of Realtors and Smart Growth America, revealed that six out of ten prospective homebuyers, when asked to choose between two types of communities, chose the area with shorter commutes, sidewalks, and amenities.[19]

Main Streets

The main street concept is a core piece of revitalization and new urbanism strategies. Efforts to develop streets that have commercial opportunities and are multi-modal can spur redevelopment in adjacent areas. The main street concept is being used in large and small cities nationally to create vibrant communities. The main street concept is built on the notion that developing a sense of place that is friendly to pedestrians has benefits beyond just encouraging walking. Walking is a key component place making efforts.

Green Streets

Green Streets are another example of how thinking about urban form has changed. Green streets are innovative stormwater disposal techniques such as street trees, swales, pervious paving and rain gardens among others. Dealing with stormwater this way has become more and more common, particularly in conjunction with main street area planning and improvements. Adding green street elements to a streetscape can have positive impacts on the pedestrian environment by making it more attractive and creating a buffer from the street with street trees and swales. In some cases green streets and pedestrian needs may compete for space and resources, particularly if there is limited right-of-way for green streets facilities and sidewalk improvements. It has also been mentioned through the stakeholder workshops that pedestrian projects are often saddled with the cost of providing storm water facilities, which can result in sidewalk projects becoming very expensive.

[18] Metro, Leland Consulting Group, and Parsons Brinckerhoff, "Ten Principles for Achieving Region 2040 Centers
[19] Urban Land Institute, "Higher Density Development: Myth and Fact"

Increasing Emphasis on Managing the Existing System and Intelligent Transportation Systems (ITS)

In part due to funding constraints, transportation planners have begun to focus on using resources more efficiently by maintaining the existing transportation system and devising ways to increase efficiency instead of building new infrastructure. This trend has been marked by the emergence of intelligent transportation systems (ITS) and a greater focus on management and operations. Efforts to improve the efficiency of the pedestrian system rely on completing gaps in the sidewalk network, extending sidewalks to pedestrian destinations such as schools, parks, centers and transit and improving the safety of the sidewalk network for the mobility challenged. Feedback from local jurisdictions indicates the difficulty in finding resources for completing gaps in the sidewalk network and replacing outdated facilities such as curb ramps.

Completing the sidewalk network would make it possible to focus on higher-level improvements to make the system function better overall. Efforts to improve the quality and safety of the existing system is important to keep it functioning properly, which includes keeping sidewalks and crossings clear of debris, pooling water and ice and snow and fixing areas where tree roots have breached the surface, as well as maintaining striping at crossings. Deteriorating sidewalks can discourage walking, prevent use by people with mobility challenges, and reduce the attractiveness of the sidewalk environment overall.

Technology

Technological improvements can improve the functioning of the existing system for pedestrians including count down signals and improved signal timing for pedestrians. The City of Portland among others has installed some count down signals to accompany audible signals at intersections. The countdown signal helps people know much time they have to cross the street and help prevent pedestrians being in crosswalks when autos are signaled to proceed, thus reducing conflicts between cars and pedestrians, minimizing delays for automobiles, and increasing safety for pedestrians. Pedestrian actuated signals are also helpful for improving the usability of crosswalks for pedestrians by giving them more control over when they cross streets. Another safety related improvement is pedestrian signal timing that provides additional lead-time for pedestrians at crosswalks, particularly when there are double right turn lanes. Appropriate lighting can also help improve pedestrian environments and make them more attractive and safe for walkers.

IV. Policy and Regulatory Framework

Federal Context

Intermodal Surface Transportation Efficiency Act (ISTEA)

Congress enacted the Intermodal Surface Transportation Efficiency Act (ISTEA) in 1991. ISTEA gave Metropolitan Planning Organizations (MPOs) increased funding, expanded authority to select projects and mandates for new planning initiatives in their regions. The purpose of federal transportation policy is to increase nonmotorized transportation to at least 15 percent of all trips and to simultaneously reduce the number of nonmotorized users killed or injured in traffic crashes by at least 10 percent. This policy, which was adopted in 1994 as part of the National Bicycling and Walking Study, remains a high priority for the U.S. Department of Transportation. The act emphasizes to a greater degree than previous legislation the need to provide safe accommodation on non-motorized users and that they be considered throughout the planning, design and construction phases of transportation projects. Bicyclists and pedestrians were to be considered in comprehensive transportation plans developed by each metropolitan planning organization and the State.

The legislation also focused on improving transportation not as end in itself but as the means to achieve important national goals including economic progress, cleaner air, energy conservation and social equity. ISTEA promoted a transportation system in which all modes and facilities were integrated to allow a "seamless" movement of both goods and people. New funding programs provided greater flexibility in the use of funds, supported improved "intermodal" connections and emphasized upgrades to existing facilities over building new capacity – particularly roadway capacity.

To accomplish these goals, ISTEA doubled funding for MPO operations and required the agencies to evaluate a variety of multimodal solutions to roadway congestion and other transportation problems. MPOs were also required to broaden public participation in the planning process and see that investment decisions contributed to meeting the air quality standards of the federal Clean Air Act Amendments.

Transportation Equity Act for the 21st Century (TEA-21)
The next two reauthorizations of Federal Transportation legislation, TEA-21 and SAFETEA-LU continued the multi-modal emphasis of ISTEA. Congress passed the Transportation Equity Act for the 21st Century (TEA-21) in 1998. It reduced the 15 planning factors from ISTEA to seven and continued the majority of its predecessor's programs. TEA-21 recognized that transportation investments impact the economy, environment, and community quality of life.

Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU)
In 2005, Congress built on both ISTEA and TEA-21 with the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). SAFETEA-LU addresses the many challenges facing our transportation system today, such as improving safety, reducing traffic congestion, improving efficiency in freight movement, increasing intermodal connectivity, and protecting the environment. SAFETEA-LU promotes more efficient and effective Federal surface transportation programs by focusing on transportation issues of national significance, while giving State and local transportation decision makers more flexibility for solving transportation problems in their communities.

New transportation legislation SAFETEA LU passed in 2005 includes minimal changes for pedestrian planning from ISTEA and TEA 21. New pedestrian activities are focused on safety for workers/pedestrians in highway work zones, additional emphasis on pedestrian representation in transportation planning and environmental stewardship through trail development. There is also more emphasis on mobility for elderly and disabled people through the coordinated planning requirement and child pedestrian safety through Safe Routes to Schools.

Americans with Disabilities Act (ADA)
The Americans with Disabilities Act of 1990 (ADA) is legislation, which prohibits discrimination on the basis of disability. Other Federal laws, which affect the design, construction, alteration, and operation of facilities, include the Architectural Barriers Act of 1968 (ABA), and the Rehabilitation Act of 1973. In July 1999, the U.S. Department of Transportation issued an Accessibility Policy Statement pledging a fully accessible multimodal transportation system.

State Context

Executive Order (EO) on Sustainability
Governors Kitzhaber and Kulongoski both issued EO's on sustainability that support increasing sustainable modes of transportation in Oregon, such as walking and bicycling. The legislature codified much of Governor Kitzhaber's EO into statue in 2001 known as the Sustainability Act. Under the EO, ODOT has developed a Sustainability Plan, renewing the agency's vision of a balanced, multimodal transportation system.

Transportation Planning Rule (TPR)
In 1991, the Land Conservation and Development Commission adopted the Oregon Transportation Planning Rule (TPR). The TPR implements State Land Use Planning Goal 12, Transportation[20], which was adopted by the Oregon Legislature in 1974. The TPR requires most cities and counties and the state's MPOs, such as Metro, to adopt transportation system plans that consider all modes of transportation, energy conservation and avoid principal reliance on any one mode to meet transportation needs. By state law, local plans in MPO areas must be consistent with the regional transportation system plan (TSP). In the Portland metropolitan region, the Regional Transportation Plan serves as the regional TSP. Likewise, the regional TSP must be consistent with the OTP.

A major goal of the TPR is reducing reliance on the automobile and encouraging pedestrian, bicycle, and transit facilities as part of a multi-modal transportation system. The state TPR also requires that transportation system plans provide an adequate system of improvements that meet adopted performance measures. These objectives are to be achieved by increasing the share of non-automobile trips (pedestrian, bicycle or transit), reducing the number of single occupant vehicle trips, increasing average vehicle occupancy, or reducing the number of trips and/or length of trips required through more intensive land use and/or a better mix of land uses. TPR requirements for pedestrian planning include:

- Mandates that transportation planning in Oregon reduce reliance on any one mode of transportation.
- Requires vehicle miles traveled (VMT) per capita reduction targets for local jurisdictions. The RTP identifies 2040 Non-SOV modal targets in place of and consistent with the requirement to reduce VMT per capita. As required by the TPR, jurisdictions within the Metro region must adopt policies and actions that support an increase in the share of trips by walking, bicycling, transit and shared ride.
- Requires a region wide network of pedestrian facilities.

Recent updates to the TPR do not affect the requirements for pedestrian planning.

Oregon Transportation Plan (OTP)
Amended in September 2006 by the Oregon Transportation Commission, the OTP includes several policies that address pedestrian travel:

- Policy 1.1 – Development of an Integrated Multimodal System
- Policy 1.2 – Equity, Efficiency, and Travel Choices
- Policy 1.3 – Relationship of Interurban and Urban Mobility
- Policy 3.2 – Moving People to Support Economic Vitality
- Policy 3.4 – Development of the Transportation Industry
- Policy 4.3 – Creating Communities

[20] Goal 12 states, "To provide and encourage a safe, convenient, and economic transportation system."

- Policy 5.1 – Safety
- Policy 5.2 – Security

OTP Strategy 1.2.2
Support local government efforts to plan and provide an adequate system of arterial and collector roadways and bicycle and pedestrian facilities to serve planned land uses and connect communities.

In addition, federal and state highway funds and local revenues help fund local government bikeways and walkways. Bicycle and pedestrian facilities within a street, road or highway right-of way are eligible for funding from the Oregon Highway Trust Fund. ODOT and local governments must spend a minimum one percent of the state Highway Fund they receive on walkways or bikeways. Bicycle and pedestrian facilities are also eligible for federal Transportation Enhancement and Congestion Mitigation and Air Quality funds. The state develops the statewide bicycle and pedestrian plan and constructs and maintains state highway bicycle and pedestrian facilities, focusing on urban highways. Roughly 272 miles of the sidewalks and bikeways are in place, which is approximately half of the State planned network.

Most requirements will be included in specific modal plans. Oregon Bicycle & Pedestrian Plan update is underway. Future RTP updates will be developed to be consistent with the updated state plan.

Oregon State Senate Bill 315 – "Stop and Stay Stopped" Law
Passed in 2003 this bill modifies the Oregon Vehicle Code to stipulate the conditions when a driver is considered to have committed the offense of failure to stop and remain stopped. If a *pedestrian* is proceeding in accordance with a traffic control device or crossing the roadway in a *crosswalk (marked or unmarked)* and is in any of the following locations, the driver must stop and remain stopped:

- In the lane in which the driver's vehicle is traveling
- In the lane next to the lane in which the driver's vehicle is traveling
- In the lane into which the driver's vehicle is turning
- In the lane adjacent to the lane into which the driver's vehicle is turning if the driver is making a turn at an intersection that does not have a traffic control device
- Within six feet from the lane into which the driver's vehicle is turning if the driver is making a turn at an intersection with a traffic control device.
- In a school crosswalk where there is a traffic patrol member and the traffic patrol member signals you to stop.

Generally, pedestrians have the right of way at all intersections. There is a crosswalk at every intersection, even if it is not marked by painted lines.

Regional Context

Metro Charter
In 1979, the voters in this region created Metro, the only directly elected regional government in the nation. In 1991, Metro adopted Regional Urban Growth Goals and Objectives (RUGGOs) in response to state planning requirements. In 1992, the voters of the Portland metropolitan area approved a home-rule charter for Metro. The charter identifies specific responsibilities of Metro and gives the agency broad powers to regulate land-use planning throughout the three-county region and to address what the charter identifies as "issues of regional concern." Among these responsibilities, the charter directs Metro to provide transportation and land-use planning

services. The charter also directed Metro to develop the 1997 Regional Framework Plan that integrates land-use, transportation and other regional planning mandates.

Regional Framework Plan
Updated in 1995 and acknowledged by the Land Conservation Development Commission in 1996, the RUGGOs establish a process for coordinating planning in the metropolitan region in an effort to preserve regional livability. The 1995 RUGGOs, including the 2040 Growth Concept, were incorporated into the 1997 Regional Framework Plan to provide the policy framework for guiding Metro's regional planning program, including development of functional plans and management of the region's urban growth boundary. The Regional Framework Plan is a comprehensive set of policies that integrate land-use, transportation, water, parks and open spaces and other important regional issues consistent with the 2040 Growth Concept. The Framework Plan is the regional policy basis for Metro's planning to accommodate future population and employment growth and achieve the 2040 Growth Concept.

2040 Growth Concept
The 2040 Growth Concept text and map identify the desired outcome for the compact urban form to be achieved in 2040. It envisions more efficient land use and a diverse and balanced transportation system closely coordinate with land use plans. Pedestrian facilities are an important element of the transportation concept envisioned in Region 2040. The 2040 Growth Concept has been acknowledged to comply with statewide land use goals by the Land Conservation and Development Commission (LCDC). It is the foundation of Metro's 1997 Regional Framework Plan.

2004 Regional Transportation Plan
The RTP implements the goals and policies in 1995 RUGGOs and the 1997 Regional Framework Plan, including the 2040 Growth Concept. The region's planning and investment in the regional pedestrian system are directed by current RTP policies and objectives for the regional pedestrian system as shown in Table 1.

An integrated pedestrian system supports and links every other element of the regional transportation system and complements the region's land-use goals. The RTP currently has three policies that specifically address the pedestrian system and three functional classifications for the regional pedestrian system. The policies cover the development of a safe, attractive and accessible pedestrian system, increasing the number of pedestrian trips and improving access to transit, and providing pedestrian access and connectivity in all transportation projects. The functional classifications are pedestrian districts, which correspond with the 2040 centers, transit/mixed use corridors and multi-use paths with a pedestrian transportation function.

Table 1. 2004 Regional Transportation Plan Pedestrian Policies

Policy 17.0. Regional Pedestrian System
Design the pedestrian environment to be safe, direct, convenient, attractive and accessible for all users.

a. Objective: Work with local, regional and state jurisdictions to complete pedestrian facilities (i.e., sidewalks, street crossings, curb ramps) needed to provide safe, direct and convenient pedestrian access to and within the central city, regional centers, town centers, main streets, corridors and to the region's public transportation system.
b. Objective: Work with local, regional and state jurisdictions to provide landscaping, pedestrian-scale street lighting, benches and shelters affecting the pedestrian and transit user near and within the central city, regional centers, town centers, main streets, corridors and along the regional transit network.

Policy 17.1. Regional Pedestrian Mode Share
Increase walking for short trips and improve pedestrian access to the region's public transportation system through pedestrian improvements and changes in land use patterns, designs and densities.

a. Objective: Increase the walk mode share for short trips, including walking to public transportation, near and within the central city, regional centers, town centers, main streets, corridors and LRT station communities.
b. Objective: Work with local, regional and state jurisdictions to improve walkway networks serving transit centers, stations and stops.

Policy 17.2. Regional Pedestrian Access and Connectivity
Provide direct pedestrian access, appropriate to existing and planned land uses, street design classification and public transportation, as a part of all transportation projects.

a. Objective: Among regional pedestrian projects, give funding priority to those projects which are most likely to increase pedestrian travel, improve the quality of the pedestrian system and help complete pedestrian networks near and within the central city, regional centers, town centers, main streets, corridors and LRT station communities.
b. Objective: Integrate pedestrian access needs into planning, programming, design and construction of all transportation projects.

Regional Pedestrian System Functional Classifications

Pedestrian district: Pedestrian districts are areas of high, or potentially high, pedestrian activity where the region places priority on creating a walkable environment. Specifically, the central city, regional and town centers and light rail station communities are areas planned for the levels of compact mixed-use development served by transit needed to generate substantial walking. These areas are defined as pedestrian districts. Pedestrian districts should be designed to reflect an urban development and design pattern where walking is a safe, convenient and interesting travel mode. These areas will be characterized by buildings oriented to the street and boulevard-type street design features such as wide sidewalks with buffering from adjacent motor vehicle traffic, marked street crossings at all intersections with special crossing amenities at some locations, special lighting, benches, bus shelters, awnings and street trees. All streets within pedestrian districts are important pedestrian connections.

Transit/mixed-use corridor: Transit/mixed-use corridors (referred to only as corridors in the 2040 Growth Concept) are also priority areas for pedestrian improvements. They are located along good-quality transit lines and will be redeveloped at densities that are somewhat more than today. These corridors will generate substantial pedestrian traffic near neighborhood-oriented retail development, schools, parks and bus stops. These corridors should be designed to promote pedestrian travel with such features as wide sidewalks with buffering from adjacent motor vehicle traffic, street crossings at least every 530 feet (unless there are no intersections, bus stops or other

pedestrian attractions), special crossing amenities at some locations, special lighting, benches, bus shelters, awnings and street trees. This designation includes multi-modal bridges.

Multi-use path with pedestrian transportation function: These paths are paved off-street regional facilities that accommodate pedestrian and bicycle travel and meet the requirements of the Americans with Disabilities Act. Multi-use paths with a pedestrian transportation function are connections that are likely to be used by people walking to work or school, to access transit or to travel to a store or library. These paths are generally located near or in residential areas or near mixed-use centers. Paths that support purely recreational uses are not considered part of this transportation network, although they are important components of the regional parks and greenspaces map. Pedestrian/bicycle-only bridges also are included in this designation.

V. Pedestrian System Profile

Introduction

The pedestrian system at the regional level is made up of transit mixed-use corridors, pedestrian districts, and multi-use facilities that have a pedestrian transportation function. Currently there are many gaps in this regional system with regard to sidewalk continuity and connectivity. Generally, areas with denser development patterns, like Portland's central city, tend to have a more developed sidewalk network as well as an urban form that supports safe and enjoyable pedestrian facilities. However, areas with a largely suburban or rural character tend to have gaps in sidewalk continuity, connectivity, and accessibility for all mobility levels. Designated centers/pedestrian districts and new urbanist developments are a general exception and have greater connectivity and more sidewalks. Despite this overall pattern, there are problems with the pedestrian system in largely urban areas as well. Many of the outer areas within cities throughout the region are without sidewalks or improved streets. Large streets throughout the region are unsafe for pedestrian travel, particularly at crossings. The existence and condition of ramps at intersections are also lacking in many places. Jurisdictions often lack the resources to construct or replace ADA compliant ramps.

82nd Avenue is just one example of a street that has many challenges for pedestrians, including high traffic volumes, large number of lanes, lack of medians, long blocks with few crossings, wide intersections and fast moving traffic. 82nd Avenue is also the busiest transit corridor in the region. Dangerous conditions coupled with a large number of people walking have led to many unfortunate crashes resulting in injuries and fatalities. 82nd is however only one of many large streets in the region that have characteristics that make them unsafe for pedestrians.

The regional pedestrian system needs to be completed in areas that have gaps, safety improvements need to be made to developed areas and accessibility for elderly and disabled people needs to be addressed to a greater extent throughout the region.

Existing pedestrian system map

The existing pedestrian system map was developed using data collected in a joint effort between TriMet and Metro in 2001. The existing pedestrian system map shows sidewalk gaps on regional facilities. There have been no updates to this data to date. Some jurisdictions collect data about sidewalk completion, but the data is not complete on a regional level to do a systematic review and update to the map and Metro is not currently collecting in house data on the sidewalk network. One of the reasons for the differences in data collection efforts at the local level may be that Metro does not require or recommend that data be collected on the system and provides no

guidelines for doing so. Despite this data limitation, the existing pedestrian system map is still an adequate representation of the regional pedestrian system over all.

The existing system map can be improved by simplifying the representation of the data. Efforts to simplify the map by removing peripheral streets are being considered. Sidewalk gaps will be shown as complete or incomplete as well as considering the addition of destinations or trip generators. Currently, the map shows sidewalk conditions for regional bus routes, however many of these fall outside of the transit/mixed use corridors defined as the regional system. This issue needs to be addressed by either by removing the streets that don't correspond or extending a regional pedestrian system designation to these streets. It is also recommended that time be allotted for local review of the map to make sure that large changes to the system can be reflected on the map. The next update should include a revised map based on updated data either collected in house at Metro or provide direction to local governments on collecting data.

Sidewalk network completeness
Based on the existing data, the number of miles in the regional pedestrian system in transit/mixed use corridors and pedestrian districts is 1,230 miles. 821 of those miles have sidewalks or 66 percent indicating that there are many areas in the system that are incomplete.

Future map updates
The Data Resource Center at Metro will have tools coming online soon that could potentially be used to create a new regional sidewalk inventory. More information about the timeframe for starting this work will be known later, but it is likely that within the next year work can begin to start the analysis. A description of the tool is provided below.

- The Feature Analyst software provides the GIS community with a paradigm shift in feature extraction technology using spatial context and spectral signature to automatically extract user-defined objects from aerial and satellite imagery. Geographic features, such as streets, buildings, vegetation, etc. are used in a GIS to produce maps and perform spatial analyses for planning, transportation analyses, defense, telecommunications, and many other applications. The Feature Analyst is built on advanced machine learning technology capable of extracting features at a fraction of the labor cost of hand-classifying images.

Existing RTP pedestrian projects from Financially Constrained list

A list of pedestrian projects and projects with pedestrian elements was created from the larger 2004 RTP project list. It does not include every project that may have pedestrian elements such as boulevard or road capacity projects. It has projects specifically designated to be pedestrian or bicycle/pedestrian. The list is available upon request.

Local Outreach on the Regional Pedestrian System

Citizen Pedestrian Advisory Committees Discussions
During the months of September and October Metro staff met with various citizen groups involved in pedestrian committees in the region. Each group was asked what changes have occurred since the last RTP update, what are the barriers to walking in their communities, what types of solutions would be most helpful, and what locations feel unsafe for walking. The following themes emerged from conversations with the Clackamas County Bike/ Pedestrian Advisory Committee, Multnomah County Bike/Pedestrian Advisory Committee, City of Portland Pedestrian Advisory Committee and discussions with the Washington County bike/pedestrian coordinator (they don't have a bike/pedestrian committee). Here is what was heard:

Changes since last RTP

- There is increasing congestion on roadways
- The region is getting bigger – UGB expansions and population growth
- More people are walking and biking
- There has been an increase in negative driver behavior increasing (distracted, aggressive etc.)
- There is more awareness about the need for increasing pedestrian safety

Barriers

- Many places lack connectivity
- The auto dominated culture persists
- Large facilities such as rail yards & freeways are barriers
- Obstructions in sidewalks can serve as barriers
- Lack of driver education for understanding pedestrian issues and safety
- Large intersections are often difficult to get through
- Busy streets with high traffic volumes
- Infrastructure development does not keep pace with population growth
- Safety is an issue that can discourage walking

Solutions

- Traffic calming to reduce speed and complexity of traffic
- More flexible funding to help construct pedestrian facilities in needed areas
- Better design: curb cuts/extensions, medians, safer crossings, signage
- Tie sidewalk (etc) improvements to development
- Increase education for drivers and pedestrians
- Increase maintenance of existing facilities

Places that feel unsafe

Specific locations:

- 82nd Avenue
- Powell Boulevard
- Division
- Sunnyside Road
- McLoughlin Boulevard
- 122nd
- Sandy Boulevard
- Barbur/Capital
- Burnside
- Scholls/Oleson/Beaverton-Hillsdale Highway

Types of places that feel unsafe:

- Unlit areas/trails
- Areas without sidewalks
- On-ramps to freeways
- Overpasses
- Intersections

Pedestrian Technical Workshop Discussions

In October, Metro held a bike and pedestrian workshop with local pedestrian and bike planners from local and state government, advocacy groups and the private sector. The workshop revealed information about the challenges of developing the pedestrian network to be safe and enjoyable to

use and policy gaps at the regional level for doing sidewalk projects at the local level. The major themes of the discussion follow:

- There is a lack of direction from Metro on data collection needs/requirements.
- Recommend focus on short trips in current policy be eliminated.
- Recommend that trip generators or destinations be added to pedestrian system maps.
- There is difficulty to applying general planning policies to all modes.
- Emphasized the importance of adding pedestrian connections in areas with transit dependant populations.
- Transportation Priorities funding is inflexible for supporting needed projects to fill gaps in sidewalks and other safety projects that fall outside of 2040 priority land use areas.

Pedestrian Safety

There are certain elements in the pedestrian environment that the presence of which can determine how safe or unsafe a pedestrian will be in a given environment. Pedestrian risk increases as traffic volumes increase, roadway width increases and the number of travel lanes increases.[21] Further, land use, street connectivity, access management, site design and overall street design affect walkability.[22]

Another indicator of whether a pedestrian environment is safe or unsafe is the number of people walking in a given area. A study by Jacobsen indicates that motorists are less likely to collide with a walker if more people overall are walking.[23] Collisions appear to be reduced in areas where drivers expect pedestrians. Since there is evidence to support the "safety in numbers" concept, efforts should be taken to increase the numbers of people walking as a way to increase safety.

The pedestrian system can also be improved by designing facilities to be safer to use. Good design can provide a more pedestrian friendly environment and thus encourages more people to walk. One study conducted in Eugene, OR found that curb extensions contributed to a significant reduction in the average number of vehicles passing a waiting pedestrian before yielding. The result is due to increased visibility of pedestrians at crossings with the presence of curb extensions.[24] The result of this study on one pedestrian friendly design element demonstrates how design can improve safety for pedestrians and may increase pedestrian activity in an area.

Work has also been done to assess the walkability of sidewalks for elderly and disabled people. The Elders in Action Commission, *Walkable Neighborhoods for Seniors* report revealed a number of ideas that if implemented could make walking safer for seniors and assist seniors in staying active in their communities. Physical factors identified include, wide sidewalks, completing sidewalk gaps, buffers from streets, curb cuts and benches for resting. Other elements that enhance the pedestrian environment for seniors are, easy access to transit, improving safety of crosswalks by increasing the number of crosswalks on major streets, lengthening signals and adding pedestrian controls, enforcing pedestrian right of way laws, adding audible signals and increasing education, especially for bicyclists. The report also identifies the need for accessible and affordable senior housing close to services.

[21] Ronkin, Michael "What do Crashes on OR Highways Tell us About Roadway Design" PowerPoint presentation
[22] Ronkin, Michael "What do Crashes on OR Highways Tell us About Roadway Design" PowerPoint presentation
[23] Jacobsen, PL "Safety in numbers: more walkers and bicyclists, safer walking and bicycling "
[24] Johnson, Randal S., "Pedestrian safety impacts of curb extensions"

Pedestrian Crash Locations
There is information available that can help determine the problem areas in the region for pedestrian crashes, however the data does not indicate what the underlying causes are. Additional analysis is needed to map these locations and identify whether high crash locations are due to poor design, high frequency of pedestrian use or other causes. The analysis could come in the form of detail corridor analyses in areas identified to have high occurrences of pedestrian crashes.

Regional Studies and Reports

There are two documents that provide direction/information to consider during the RTP update. Following are summaries of the relevant material from Metro's 2005 Modal Targets project and Metro's 2004 Performance Measures report

Metro 2005 Modal Targets Project
This study identifies ways Metro can develop procedures and strategies for implementation by local jurisdictions in complying with RTP targets to reduce drive along trips in the region. The report makes specific recommendations for the RTP update. First, it is recommended that the RTP continue to require transportation–efficient development, including higher density and mixed-use development. It also recommends bicycle and pedestrian improvements by increasing connectivity and access to transit. There are also recommendations for maintaining a region-wide database of pedestrian data and monitoring progress in planning for and constructing pedestrian improvements. The project also discusses good pedestrian design in the form of sidewalks, crossing and bridge improvements and curb installations. These elements are important for increasing pedestrian trips.

Metro 2004 Performance Measures report
The performance measures report provides quantitative data needed to assess the implementation of the 2040 Growth Concept goals and helps determine areas that need additional work and policy development. For transportation the fourth fundamental to provide a balanced transportation system is the most relevant for the pedestrian system. The report presents findings from the review of data collected for analysis. The findings indicate that there was an increase in pedestrian projects during the period reviewed. The number of bicycle and pedestrian projects (1/3 of all projects) demonstrates the region's commitment to non-motorized transportation. Also non-SOV performance in centers showed a positive trend and overall daily VMT per capita declined by 11% between 1996 and 2002, while increasing by 6% nationally. The report also indicated increases in the percentage of people riding transit.

IV. Policy Assessment

This section identifies the implications of the existing policy and regulatory framework for doing pedestrian system planning and identifies the policy implications of the key trends/research findings.

Implications of Federal Policy

Existing federal regulations overseeing pedestrian planning were set by ISTEA/TEA 21 and the ADA. SAFETEA LU does not provide many additional requirements for pedestrian planning that were not already addressed in previous iterations of the RTP. The new components of SAFETEA LU that pertain to pedestrian planning are largely carried out by the State, including the Safe Routes to Schools program. The coordinated planning requirement for elderly and disabled and low income transportation does not add specific requirements for pedestrian planning, however pedestrian issues are integrated into this planning and there is a MPO coordination role for

creating this plan. Metro has participated in the coordinated planning for the Portland Metropolitan region. Additional policies pertaining to elderly and disabled mobility should be considered for the pedestrian system update in the RTP, including the integration of policies in the coordinated plan.

Implications of State Policy

State policies focus on increasing the number of people walking as an element in reducing VMT in the region and increasing the physical infrastructure to serve land uses and encourage walking. State law focuses on the safety of pedestrians and consequences for drivers that don't observe the "stop law." The RTP should continue to implement state required VMT reduction efforts by continuing to increase pedestrian mode share. The Modal Targets project identifies ways to improve these efforts at the regional level and should be used as a basis for developing policies that increase pedestrian travel. Additional policies should be considered that address pedestrian safety to help reinforce safety laws.

Implications of Regional Policy

Currently the functional classifications for the pedestrian system identify areas in the region to focus efforts to create a fully developed system. New facilities for inclusion in the pedestrian system will however need to be given classifications, specifically in areas newly added to the urban growth boundary. Feedback from stakeholders on the RTP classifications indicated that some members of local government find the current classifications limited in their effectiveness for completing gaps in the sidewalk network. In particular, the feedback indicated that the focus on centers often makes completing gaps in needed areas difficult. Most felt that the current classifications provided a good basic foundation, but could be enhanced.

The current transit/mixed-use corridor designation does not include all regional transit routes. Additional consideration is needed to determine whether the pedestrian system designations should be extended to these transit routes or an additional designation be developed to add them to the pedestrian system. Also, RTP policies have helped focus investments to enhance transit, however more emphasis is needed to make sure the pedestrian environment is complete and safe in these areas to complement transit investments. Policies should be developed that help complete the system where transit improvements are being made and where they are needed.

Summary of Key Findings and Implications

Key Finding	RTP Implication
1. Accessibility Increasing emphasis on needs of the elderly and disabled at federal level Increasing public awareness of safety issues related to increasing aging population Sidewalk network is incomplete Increasing demand for safe access to transit for all mobility and income levels Increasing focus on managing existing system	• Increased pedestrian system improvements to new and existing facilities needed for the elderly and disabled; emphasize Universal Design throughout planning process • Complete gaps in the pedestrian system, sidewalks, ADA compliant facilities, safe crossings; gaps that inhibit access to transit on new and existing facilities • Emphasize design for whole communities • Encourage enforcement of "stop laws" • Prioritize pedestrian connections in areas with transit dependant populations and the transportation disadvantaged. • Emphasize management of the existing system and integrate technology to improve functioning of the system.
2. Safety Increasing public awareness and demand for safety Pedestrian advocacy focused on increasing safety for pedestrians	• Enhance pedestrian safety policy: education for walkers and drivers, physical improvements based on elements that make the pedestrian environment safer (traffic calming, medians etc). • Build on existing RTP safety policy.
3. Local needs Local jurisdictions have priorities for completing the pedestrian system in areas with heavy pedestrian use that may not be in a center	• Define priority for adding pedestrian access to regional bus stops as part of the regional system.
4. Data needs Desire from locals for more direction from Metro on data collection Modal Targets Project encourages joint data collection efforts Refinements to pedestrian maps needed Better pedestrian access near transit is needed	• Increase data collection efforts: update system data, pedestrian counts - pedestrian use surveys, safety. • Partner with other agencies/universities to collect and track data on pedestrian system; before /after counts for facility improvements. • Add destinations or trip generators to pedestrian maps, consider refinements to transit/mixed use corridor designations along regional transit routes.

5. New urban areas RTP policies don't currently cover new UGB areas	• Identify pedestrian facilities and designations in planning for new UGB areas.
6. Active living Active living movement gaining momentum	• Develop a policy that supports active living/public heath/transportation/land use connection.
7. Transportation/land use connection Emergence of context sensitive design Increasing new urbanism and neighborhood revitalization activities Acknowledgement of benefits of compact development on demand management, safety, economic vitality, and active living	• Encourage holistic approach to designing transportation and land use system. • Support concept of *Complete Streets*: roadways that are designed to accommodate all modes, including walking. • Acknowledge the importance of compact development in supporting pedestrian activities.

VII. Conclusion

The pedestrian system in the Portland Metropolitan region is still being completed. It is important that greater efforts be taken to address completing system gaps because the pedestrian system supports all other modes, provides a building block for successful economic development, and must be done to maximize investments in management and operations. The previous RTP set a basic framework for improving the pedestrian system, but can be developed further to include a greater focus on meeting the needs of a greater number of people. It is clear that walking is becoming more widely recognized as important for health, creating vibrant places and providing equitable access to transportation. There are a number of opportunities to support the further development of the pedestrian system including enhancing policies for supporting elderly and disabled pedestrians and transit dependent populations, completing the sidewalk network, improving the quality of existing pedestrian environments through better street design, and focusing on an integrated transportation system that meets the needs of all modes as well as all mobility levels.

New Look
The Regional Transportation Plan

2035 Regional Transportation Plan Update

Background Paper:

A Profile of Regional Security in the Portland Metropolitan Region

Prepared by:

METRO
PEOPLE PLACES • OPEN SPACES

DISCUSSION DRAFT
November 27, 2006

Metro
People places • open spaces

Clean air and clean water do not stop at city limits or county lines. Neither does the need for jobs, a thriving economy and good transportation choices for people and businesses in our region. Voters have asked Metro to help with the challenges that cross those lines and affect the 25 cities and three counties in the Portland metropolitan area.

A regional approach simply makes sense when it comes to protecting open space, caring for parks, planning for the best use of land, managing garbage disposal and increasing recycling. Metro oversees world-class facilities such as the Oregon Zoo, which contributes to conservation and education, and the Oregon Convention Center, which benefits the region's economy.

Your Metro representatives

Metro Council President – David Bragdon
Metro Councilors – Rod Park, District 1; Brian Newman, District 2; Carl Hosticka, deputy council president, District 3; Susan McLain, District 4; Rex Burkholder, District 5; Robert Liberty, District 6.
Auditor – Alexis Dow, CPA

Metro's web site: www.metro-region.org

2035 Regional Transportation Plan Update

A Profile of Regional Security in the Portland Metropolitan Region

TABLE OF CONTENTS

I. INTRODUCTION

This paper is one of a series of papers that provide background research and analysis to guide Regional Transportation Plan (RTP) update policy discussions. The papers describe trends affecting the regional transportation system, current regional transportation planning policies and regulatory requirements, a profile of performance of the existing transportation system and policy implications to be addressed in the RTP to respond to identified policy gaps and key findings of the background research.

The purpose of this memo is to provide background information regarding transportation security in the Portland metropolitan region. It includes a description of federal legislation that is relevant to transportation security as well as current and ongoing major security planning initiatives in the Portland metropolitan region.

II. FEDERAL LEGISLATION AND PROGRAMS RELATED TO TRANSPORTATION SECURITY

Several major pieces of legislation have passed into law since the events of September 11, 2001. These include provisions for all modes of transportation, and have emphasized security for both passengers and operators on the transportation system. The Transportation Security Administration (TSA) was created in 2001 within the U.S. Department of Transportation, under the Aviation and Transportation Security Act of 2001, and now oversees transportation security across all modes of transportation nationwide. TSA was incorporated into the Department of Homeland Security in 2003.

Aviation and Transportation Security Act of 2001

This act created the Transportation Security Administration and established the Transportation Security Oversight Board. It also established the position of Under Secretary of Transportation for Security, an appointment made by the President. Among other improvements, it required the deployment of federal air marshals and improved airport perimeter access security. Other important sections of the act include increased penalties for interference with security personnel, chemical and biological weapon detection, airport improvement programs, flight deck security, mail and freight waivers, land acquisition costs, and air transportation safety and system stabilization.

National Maritime Transportation Security Act of 2002

This act was passed to implement measures that would protect ports and waterways from a terrorist attack. It requires area maritime security committees and security plans for facilities and vessels that may be involved in a transportation security incident. It required the Transportation Security Administration to create a National Maritime Security Plan as well as Security Incident Response Plans.

The Urban Area Security Initiative (UASI) is a program of the Department of Homeland Security that provides funding to urban areas that are under potential threat from terrorism. UASI funding is allocated based on the presence of international borders, population and population density, the location of critical infrastructure, and other

factors. In the Portland metropolitan region, a local group of interested parties meets to discuss emergency preparedness within the context of this program; it is organized by the state Department of Homeland Security. This group is called the Urban Area Working Group.

TSA administers several layers of security procedures including air cargo screening, canine detection teams, and security training for crewmembers and flight deck officers. Other programs from TSA include the Hazmat Threat Assessment Program, requiring commercial drivers to pass additional screening to be allowed to transport hazardous materials. TSA also has a Port Security Training Exercise Program (PortSTEP) to help port facilities train employees for best practices during emergency situations. The Transportation Worker Identification Credential Program (TWIC) is a new identification system that will be used to identify employees in all modes of transportation.[1]

Safe, Accountable, Flexible, Efficient Transportation Equity Act—A Legacy for Users (SAFETEA-LU) of 2005

Title VI of SAFETEA directs Metropolitan Planning Organizations (MPOs) to specifically consider transportation security as a separate consideration for planning transportation system improvements. It states: "The metropolitan planning process for a metropolitan planning area under this section shall provide for consideration of projects and strategies that will…increase the security of the transportation system for motorized and nonmotorized users."[2] The Federal Highway Administration and Federal Transit Administration have not provided specific guidance on ways in which MPOs are to implement this provision.

According to Michael Meyer from the Georgia Institute of Technology, MPOs can play a critical role in transportation security planning. Meyer states, "Effective coordination and communication among the many different operating agencies in a region and across the nation is absolutely essential."[3] He argues that an MPO can serve as a forum for cooperative decision-making about security on a regional level, and that an MPO can function in the following roles: *traditional* (incorporates system management and operations in ongoing transportation planning activities), *convener* (acts as a forum for plans to be discussed and coordinated with other plans)**,** *champion* (works aggressively to develop a regional consensus on operations planning)**,** *developer* (develops operations plans in addition to incorporating operations into transportation plans)**,** *operator* (responsible for implementing operations strategies). Meyer suggests that the MPO would be most effective in the role of convener or champion, and that reasonable actions for an MPO would include conducting vulnerability analyses on regional transportation facilities and services, analyzing the transportation network for redundancies in moving

[1] (http://www.tsa.gov/what_we_do/layers/index.shtm).
[2] Public Law 109-50, 23 U.S.C.134(h)(1)(C). http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=109_cong_public_laws&docid=f:publ059.109.pdf
[3] Meyer, M.D. (2006). The Role of the Metropolitan Planning Organization (MPO) In Preparing for Security Incidents and Transportation System Response. Georgia Institute of Technology. http://www.planning.dot.gov/Documents/SecurityPaper.htm

large numbers of people and strategies for dealing with choke points, and analyzing the transportation network for emergency route planning or strategic gaps in the network.

III. EXISTING PLANS, MANUALS, PROCEDURES AND POLICIES RELATED TO TRANSPORTATION SECURITY

Regional Emergency Management Group (REMG)

The Regional Emergency Management Group (REMG) is an association of emergency management professionals and elected officials within the Portland metropolitan region. The group has two sub-committees: REMTEC (technical group) and REMPAC (policy advisory group composed of elected officials). Since its inception in 1993, REMG has created Emergency Transportation Routes for the region and a Regional Emergency Management Plan. The Emergency Transportation Routes were created as a part of earthquake emergency procedures, but can be used for other scenarios as well, and their purpose is to focus on moving people and goods into and out of the region as efficiently as possible given potential gaps in the existing system. Another purpose of the routes is to move response resources to heavily damaged areas in a disaster situation. REMG is also currently undertaking a Critical Infrastructure Analysis of the Portland metropolitan region. This will assess the ability of the region's infrastructure (including, but not limited to, transportation) to withstand several emergency scenarios. This study is scheduled to be completed in 2007.

Between 2003 and 2005, the Portland metropolitan region received $25,270,137 of Urban Area Security Initiative funds. Roughly $10 million was received in 2005, $8 million was received in 2004, and $7 million was received in 2003. Distribution of these funds was coordinated by the local Urban Area Working Group. In 2003, UASI funds were distributed to Tri-Met, the Portland Police Bureau, Bureau of Fire and Rescue, Bureau of Emergency Communications, the Regional Chemical/Biological/Radiological-Nuclear/Explosive (CBRNE) Plan, and Portland Office of Emergency Management, among others. In 2004, UASI funds were distributed to Clackamas County, Clark County, Multnomah County, Washington County, the city of Portland, the CBRNE Plan, and for regional medical supplies. 2005's UASI grant went to TriMet and to first responder agencies in the region.

Aviation and Marine Security Plans

In response to federal legislation, the Port of Portland has created and implemented an Aviation Security Plan and a Marine Security Plan. These plans direct all security activities at Port facilities.

The Aviation Security Plan is in compliance with the Code of Federal Regulations (CFR), Title 49 Transportation, Part 1542—Airport Security. One of the major requirements of Part 1542 is that the Port have an Airport Security Program, requiring it to provide for "the safety and security of persons and property on an aircraft operating in air transportation or intrastate air transportation against an act of criminal violence, aircraft

piracy, and the introduction of an unauthorized weapon, explosive, or incendiary onto an aircraft."[4] The Port is also required to have an Airport Security Coordinator.

CFR Title 33 Navigation and Navigable Waters, Part 105—Facility Security directs the Port of Portland's Marine Security Plan. This code requires that the plan provide for security training for personnel, include security regulations for public access areas, and include measures for security systems and equipment maintenance, access control, restricted areas, cargo, deliveries and monitoring.[5]

Regional Alliances for Infrastructure and Network Security (RAINS)

The Regional Alliances for Infrastructure and Network Security (RAINS) is a software tool that can be used to rapidly gather and distribute sensitive information and incident alerts among public safety agencies, hospitals, schools, critical infrastructure owners and operators, and other homeland security stakeholders. It was created in Oregon as a not-for-profit/public alliance. Users of RAINS include Portland State University, Intel Corporation, and Hewlett-Packard.[6]

State of Oregon

The Oregon Department of Transportation adopted the Oregon Transportation Plan with stated transportation security goals. These goals fed into the Emergency Highway Traffic Regulation Plan and the Emergency Operations Plan. The state of Oregon also has an Oregon Emergency Management Plan. Security-related policies and actions within the Oregon Transportation Plan include:

- Action 1D.6: "Assure the safe, efficient transport of hazardous materials within Oregon."
- Policy IG-Safety: "It is the policy of the State of Oregon to improve continually the safety of all facets of statewide transportation for system users including operators, passengers, pedestrians, recipients of goods and services, and property owners."
- Action IG.9: "Build, operate and regulate the transportation system so that users feel safe and secure as they travel."[7]

These policies and action items help to ensure that the statewide transportation network is secure.

TriMet

Tri-Met has instituted new security procedures since 2001 including more transit police and security personnel patrols, random sweeps on vehicles and facilities, fare inspectors, security cameras, and GPS tracking of buses and trains. Tri-Met also coordinates emergency response with the police department, fire department, and ambulance

[4] CFR 49, Part 1542.
http://www.washingtonwatchdog.org/documents/cfr/title49/part1542.html
[5] CFR 33, Part 105: http://www.access.gpo.gov/nara/cfr/waisidx_03/33cfr105_03.html
[6] http://www.rainsnet.org/members/sponsor_profile.asp
[7] Oregon Transportation Plan Update; Transportation Security.
http://www.oregon.gov/ODOT/TD/TP/docs/otpSafety/Security.pdf

services.[8] Tri-Met works closely with the Urban Area Working Group, and coordinates the Regional Transit Security Working Group and the Regional Transit Security Strategy. Tri-Met has used its UASI funds to replaced obsolete CCTV recorders, install yard security gates, provide increased staff training, to create a communications system plan.

IV. CONCLUSIONS AND IMPLICATIONS FOR TRANSPORTATION SECURITY

Many agencies throughout the Portland metropolitan region are concerned with, and are planning for, transportation security. The Regional Emergency Management Group has done the most work in coordinating regional agencies to prepare for emergencies, but has not focused specifically on transportation security. TriMet, the Port of Portland, and ODOT all have security measures each agency implements for their respective facilities. It is difficult to determine what role Metro and the Regional Transportation Plan should play in transportation security planning efforts without more specific federal guidance on how best to implement this element of the SAFETEA-LU provisions. At a minimum, the RTP process will update current policies to address security issues and continue to require consideration of system management and operations elements during transportation planning activities. Perhaps the role of Metro could be expanded in the future to be a convener or champion for the existing regional stakeholders to discuss and facilitate decisions regarding transportation security in the Portland metropolitan region.

[8] See http://www.trimet.org/howtoride/security.htm.

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People places • open spaces

Clean air and clean water do not stop at city limits or county lines. Neither does the need for jobs, a thriving economy and good transportation choices for people and businesses in our region. Voters have asked Metro to help with the challenges that cross those lines and affect the 25 cities and three counties in the Portland metropolitan area.

A regional approach simply makes sense when it comes to protecting open space, caring for parks, planning for the best use of land, managing garbage disposal and increasing recycling. Metro oversees world-class facilities such as the Oregon Zoo, which contributes to conservation and education, and the Oregon Convention Center, which benefits the region's economy.

Your Metro representatives

Metro Council President – David Bragdon
Metro Councilors – Rod Park, District 1; Brian Newman, District 2; Carl Hosticka, deputy council president, District 3; Susan McLain, District 4; Rex Burkholder, District 5; Robert Liberty, District 6.
Auditor – Alexis Dow, CPA

Metro's web site: www.metro-region.org

2035 Regional Transportation Plan Update

Travel Characteristics in the Portland Metropolitan Region

TABLE OF CONTENTS

INTRODUCTION

This paper is one of a series of papers that provide background research and analysis to guide Regional Transportation Plan (RTP) update policy discussions. The papers describe trends affecting the regional transportation system, current regional transportation planning policies and regulatory requirements, a profile of performance of the existing transportation system and policy implications to be addressed in the RTP to respond to identified policy gaps and key findings of the background research.

It provides an overview of important transportation trends and travel characteristics within the Portland metropolitan region. It is important to note that "metropolitan region" is defined differently within different statistics; in some places the region is defined as the Portland-Vancouver Metropolitan Statistical Area, and in others it is defined by county (Clackamas, Multnomah, Washington, and Clark counties).

EMPLOYMENT AND POPULATION TRENDS

Growth in Population and Households

Table 1 shows the population and households, respectively, for the four counties in the region in 1990 and 2000. All counties gained population between 1990 and 2000. Multnomah remains the most populous county, followed by Washington. Clark County replaced Clackamas County as the third-most populous county between 1990 and 2000. Multnomah County lost its relative share of the regional population between 1990 and 2000, from 41 percent to 37 percent; Clackamas County also lost some of its relative share of the regional population, from 20 percent to 19 percent. Both Washington and Clark counties gained several percentage points in their relative share of the regional population. Similar trends exist for households.

TABLE 1: Population and Households by County in 1990 and 2000

	1990 Population	1990 Households	2000 Population	2000 Households	Percent Increase Population	Percent Increase Households
Multnomah	583,887 (41%)	242,140 (44%)	660,486 (37%)	272,098 (39%)	13.1%	12.4%
Clackamas	278,850 (20%)	103,530 (18%)	338,391 (19%)	128,201 (18%)	21.4%	23.8%
Washington	311,554 (22%)	118,997 (22%)	445,342 (25%)	169,162 (24%)	42.9%	42.2%
Clark	238,053 (17%)	88,440 (16%)	345,238 (19%)	127,208 (18%)	45.0%	43.8%
Total	1,412,344	553,107	1,789,457	696,669	26.7%	26.0%

Source: Census 2000, SF1, P1, P15; Census 1990, SF1, P001, P003

Table 2 shows the population and total household change from 1990 to 2000 for cities within the urban growth boundary. Sherwood, Fairview, Happy Valley, and Clackamas all had population increases of greater than 100 percent. Portland had one of the lowest percent increases, but remains the most populous city in the region. Other major cities in 2000 in terms of population

included (in order of population): Gresham, Beaverton, and Hillsboro. Both Raleigh Hills and Cedar Mill lost population between 1990 and 2000. All of this suggests that the inner cities in the region are not likely to lose much population, but that the greatest population increases can be expected towards the edges of the region.

TABLE 2: Population and Households in Cities within the UGB in 1990 and 2000

	1990 Population	1990 Households	2000 Population	2000 Households	Percent Change Population	Percent Change Households
Sherwood	3,093	1,198	11,791	4,253	281%	255%
Fairview	2,391	893	7,561	2,831	216%	217%
Happy Valley	1,519	500	4,519	1,431	197%	186%
Clackamas	2,578	1,041	5,177	2,000	101%	92%
Hillsboro	37,520	12,849	70,186	25,079	87%	95%
Troutdale	7,852	2,443	13,777	4,671	75%	91%
Oregon City	14,698	5,479	25,754	9,471	75%	73%
Cornelius	6,148	2,089	9,652	2,880	57%	38%
Tualatin	15,013	5,703	22,791	8,651	52%	52%
McMinnville	17,894	6,607	26,499	9,367	48%	42%
Beaverton	53,310	22,100	76,129	30,821	43%	39%
Tigard	29,344	12,055	41,223	16,507	40%	37%
West Linn	16,367	5,820	22,261	8,161	36%	40%
Gresham	68,235	25,705	90,205	33,327	32%	30%
Forest Grove	13,559	4,946	17,708	6,336	31%	28%
Cedar Mill	9,697	3,772	12,597	4,723	30%	25%
Aloha	34,284	11,473	41,741	14,228	22%	24%
Portland	437,319	187,268	529,121	223,737	21%	19%
Lake Oswego	30,576	12,487	35,278	14,769	15%	18%
Milwaukie	18,692	7,900	20,490	8,561	10%	8%
Raleigh Hills	6,066	2,633	5,865	2,586	-3%	-2%
Cedar Hills	9,294	3,976	8,949	3,749	-4%	-6%

Source: Census 2000, SF1, P1, P15; Census 1990, SF1, P001, P003

Table 3 shows the population and households for cities adjacent to the Portland metropolitan region. All cities listed experienced growth in population and households between 1990 and 2000. Banks, North Plains, and Canby experienced a greater percent increase in the total number of households than in population; all others saw a greater percent increase in population than in households.

TABLE 3: Population and Households in Outlying Cities in 1990 and 2000

	1990 Population	1990 Households	2000 Population	2000 Households	Percent Increase Population	Percent Increase Households
Vancouver (WA)	46,380	20,138	143,560	56,628	210%	181%
Banks	563	186	1,286	440	128%	137%
Camas (WA)	6,442	2,415	12,534	4,480	95%	86%
Washougal (WA)	4,764	1,904	8,595	3,294	80%	73%
North Plains	972	294	1,605	594	65%	102%
Woodburn	13,404	4,787	20,100	6,274	50%	31%
Canby	8,983	3,198	12,790	4,489	42%	40%
Newberg	13,086	4,542	18,064	6,099	38%	34%
Sandy	4,152	1,491	5,385	1,956	30%	31%
Estacada	2,016	762	2,371	850	18%	12%

Source: Census 2000, SF1, P15; Census 1990, SF1, P003

Growth in Aging Population

Another important population characteristic of the region is the significant increase and projected future increase in elderly adults. According to the Elderly and Disabled Land Use Study conducted by TriMet, "Seniors as a percentage of population is increasing, especially at the edges of the Portland region."[1] Ten percent of the region's population was elderly in 2000. Elderly adults tend to have different travel patterns than adults of other age groups, because they are less likely to drive themselves and more likely to ride in cars as passengers, walk, and use transit.[2] Lower-income elderly adults take fewer trips than higher-income elderly adults, perhaps due to limited access to travel options. It is important to plan for the increase in elderly population, particularly in access to transit and pedestrian facilities.

Growth in Employment

There has been a 7.4 percent increase overall in the number of jobs within the region between 1990 and 2000. Table 4 shows the number of employees in each county between 1996 and 2005. Every county has experienced an increase, although Clark County saw the largest percent increase. The largest total number of jobs continues to be in Multnomah County, although Multnomah has seen a decrease in its percent share of the region's total jobs. Washington County holds the second-largest share of the region's jobs, followed by Clark County and Clackamas County.

[1] Tri-Met Elderly and Disabled Land Use Study, Page 1.
[2] Tri-Met Elderly and Disabled Land Use Study, Page 8.

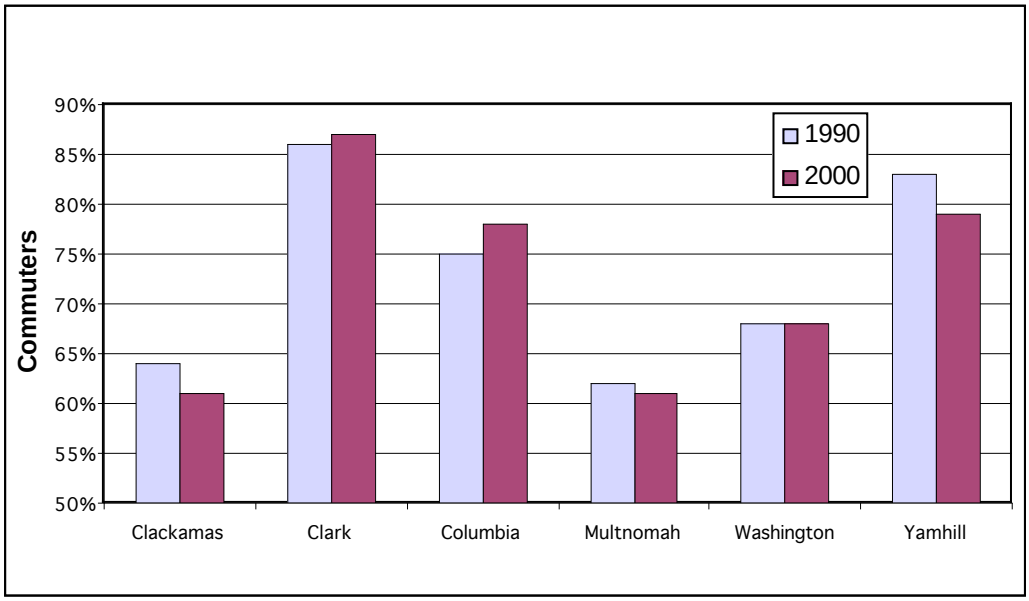
TABLE 4: Total Employees by County, 1996-2005

	Clackamas	Multnomah	Washington	Clark	Total
1996	179,987	341,948	221,982	157,703	901,620
	20.0%	37.9%	24.6%	17.5%	
1997	186,079	350,591	230,198	169,667	936,535
	19.9%	37.4%	24.6%	18.1%	
1998	188,646	352,197	236,045	176,949	953,837
	19.8%	36.9%	24.7%	18.6%	
1999	190,116	352,769	240,486	180,640	964,011
	19.7%	36.6%	24.9%	18.7%	
2000	179,697	360,961	247,738	170,848	959,244
	18.7%	37.6%	25.8%	17.8%	
2001	178,698	356,757	249,854	168,866	954,175
	18.7%	37.4%	26.2%	17.7%	
2002	175,869	347,469	245,989	170,914	940,241
	18.7%	37.0%	26.2%	18.2%	
2003	174,694	341,737	245,039	172,480	933,950
	18.7%	36.6%	26.2%	18.5%	
2004	177,156	338,079	248,580	183,340	947,155
	18.7%	35.7%	26.2%	19.4%	
2005	180,561	344,576	253,358	189,824	968,319
	18.6%	35.6%	26.2%	19.6%	
Change 1996-2005	574	2,628	31,376	32,121	66,699
	0.3%	0.8%	14.1%	20.4%	7.4%

Source: Bureau of Labor Statistics, data.bls.gov

Figure 1 and Table 5 show the percentage of workers who work within each county and elsewhere within the Metro area for 1990 and 2000. Washington, Clark, and Clackamas Counties have seen an increase in the percentage of workers that work inside the county; Multnomah has seen a decrease. However, Multnomah continues to have the highest proportion of workers that work inside the county. Clackamas County continues to have the highest proportion of workers that commute to another county for work, followed by Washington and Clark Counties.

FIGURE 1: Share of Residents Commuting to Another County for Work



Source: 1990 and 2000 Census, Metro DRC

TABLE 5: Employment Within and Outside Counties

County		1990	2000
Yamhill	Total	28,413	38,447
	Elsewhere in region	24%	28%
	In Yamhill	68%	64%
Washington	Total	161,994	228,923
	Elsewhere in region	37%	31%
	In Washington	61%	68%
Multnomah	Total	286,600	334,262
	Elsewhere in region	18%	20%
	In Multnomah	81%	79%
Columbia	Total	16,002	19,561
	Elsewhere in region	29%	40%
	In Columbia	59%	50%
Clackamas	Total	138,580	166,141
	Elsewhere in region	49%	47%
	In Clackamas	47%	49%
Clark	Total	108,926	160,793
	Elsewhere in region	30%	29%
	In Clark	64%	65%

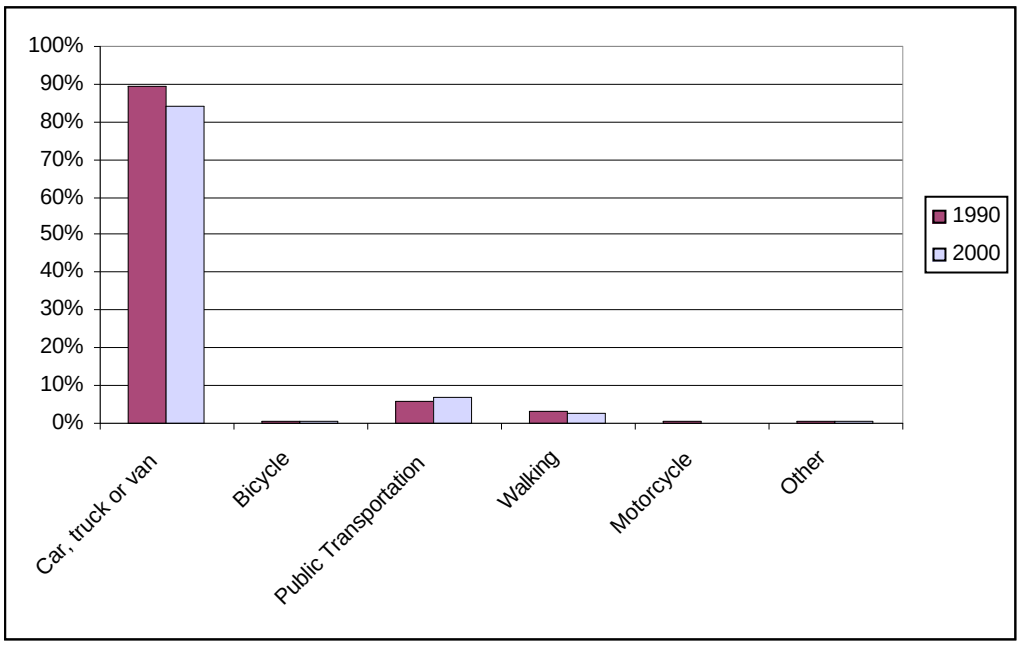
Source: 1990 and 2000 Census, Metro DRC

TRAVEL CHARACTERISTICS

Shifting Commuting Patterns by Mode

Figure 2 displays the changes in mode percentages between 1990 and 2000 within Clackamas, Multnomah, Washington, and Clark Counties. Table 6 shows the numbers and percentages of commuting trips by mode in 1990 and 2000. All counties experienced similar trends.

FIGURE 2: Percent Change in Commuting Modes from 1990 to 2000 (4 Counties)



Source: Census 2000: SF3, P30 and Census 1990: SF3, P049

Clackamas County saw a decrease in the percentages of commuters by car, truck or van, and an increase in the percentages of commuters using public transportation. Clackamas saw a decrease in the percentages of commuters commuting by bicycle or walking.

Multnomah County had the lowest share of commuting trips taken by car, truck or van in both 1990 and 2000, and had a significant decrease in percentages between the two years (83 percent to 78 percent). Multnomah saw a percent increase in bicycle, public transportation, and other commuting trips. It saw a decrease in the percentages of commuters walking, although it saw an increase in the total number of pedestrian commuters.

Washington County also saw a decrease in the percentage of commuters using cars, trucks, or vans, and an increase in the percentage of commuters using public transportation. Washington had a decrease in the percentages of commuters traveling by bicycle and walking.

Clark County had the highest percentage of commuters using cars, trucks or vans in both 1990 and 2000, although there was a decrease between the two years (from 95 percent to 90 percent). Clark County had an increase in the percentage of commuters traveling by bicycle and public transportation.

TABLE 6: Number of Commuters by Mode in 1990 and 2000

		Clackamas	Multnomah	Washington	Clark	Total
Car, truck or van	1990	124,784 *94.39%*	230,695 *83.33%*	143,838 *92.24%*	99,765 *94.69%*	599,082 *89.37%*
	2000	147,847 *88.59%*	260,288 *77.66%*	198,145 *86.29%*	146,103 *90.48%*	752,383 *84.24%*
Bicycle	1990	414 *0.31%*	2638 *0.95%*	837 *0.54%*	282 *0.27%*	4,171 *0.62%*
	2000	477 *0.29%*	5,013 *1.50%*	935 *0.41%*	527 *0.33%*	6,952 *0.78%*
Public Transportation	1990	3,015 *2.28%*	27,601 *9.97%*	6,206 *3.98%*	2,275 *2.16%*	39,097 *5.83%*
	2000	5,098 *3.05%*	37,300 *11.13%*	13,433 *5.85%*	4,228 *2.62%*	60,059 *6.72%*
Walking	1990	2,953 *2.23%*	13,261 *4.79%*	3,639 *2.33%*	2,091 *1.98%*	21,944 *3.27%*
	2000	3,456 *2.07%*	15,284 *4.56%*	5,021 *2.19%*	2,211 *1.37%*	25,972 *2.91%*
Motorcycle	1990	329 *0.25%*	1,201 *0.43%*	496 *0.32%*	249 *0.24%*	2,275 *0.34%*
	2000	133 *0.08%*	585 *0.17%*	321 *0.14%*	132 *0.08%*	1,171 *0.13%*
Other	1990	711 *0.54%*	1,463 *0.53%*	920 *0.59%*	693 *0.66%*	3,787 *0.56%*
	2000	817 *0.49%*	2,237 *0.67%*	1,413 *0.62%*	1,129 *0.70%*	5,596 *0.63%*
Total	1990	132,206	276,859	155,936	105,355	670,356
	2000	166,890	335,182	229,632	161,471	893,175

Source: Census 1990: SF3, P049 and Census 2000: SF3, P30

Between 1990 and 2000, there was a decrease in the percent of commuting trips taken by car, truck or van, and an increase in the percent of trips taken by public transportation. There was a slight decrease in the percent of trips taken by walking. Other modes (bicycle, motorcycle, other) remained relatively constant. Overall, there was an increase in total numbers of commuters in all counties between 1990 and 2000; this corresponds with the overall increase in population.

Growth in Travel Times By County

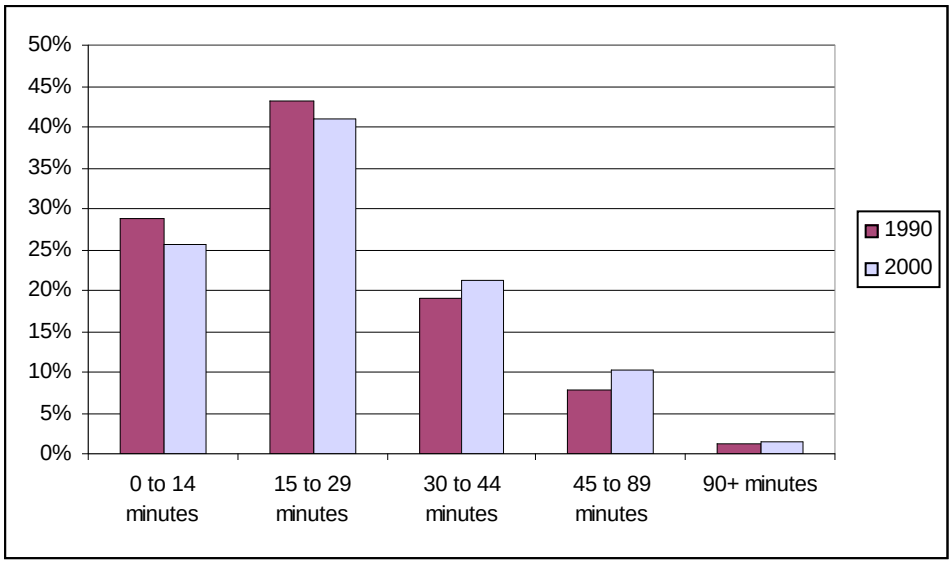
Table 7 shows the commuting times in ranges for the four counties in 1990 and 2000. In general, there was an increase the percentage of commuters who commute for more than 30 minutes, and there was a decrease in the percentage of commuters that commute between 0 and 29 minutes. Figure 3 graphically represents these changes.

TABLE 7: Travel Times for Commuters in 1990 and 2000 by County

		Clackamas	Multnomah	Washington	Clark	Total
0 to 14 minutes	1990	34,418 *26%*	80,715 *29%*	45,719 *29%*	32,486 *31%*	193,338 *29%*
	2000	38,139 *24%*	81,661 *25%*	59,768 *27%*	39,166 *25%*	218,734 *26%*
15 to 29 minutes	1990	53,416 *40%*	125,718 *45%*	65,640 *42%*	44,616 *42%*	289,390 *43%*
	2000	57,671 *37%*	139,435 *43%*	87,387 *40%*	65,429 *42%*	349,922 *41%*
30 to 44 minutes	1990	28,957 *22%*	48,269 *17%*	31,010 *20%*	18,887 *18%*	127,123 *19%*
	2000	38,382 *24%*	64,940 *20%*	47,349 *22%*	30,820 *20%*	181,491 *21%*
45 to 89 minutes	1990	13,521 *10%*	18,435 *7%*	11,541 *7%*	8,296 *8%*	51,793 *8%*
	2000	20,791 *13%*	29,042 *9%*	21,850 *10%*	15,841 *10%*	87,524 *10%*
90+ minutes	1990	1,894 *1%*	3,722 *1%*	2,026 *1%*	1,070 *1%*	8,712 *1%*
	2000	2,845 *2%*	5,629 *2%*	2,914 *1%*	3,074 *2%*	11,617 *1%*
Total	1990	132,206	276,859	155,936	105,355	670,356
	2000	157,828	320,707	219,268	154,330	852,133

Source: Census 1990: SF3, P050 and Census 2000, SF3, P31

FIGURE 3: Changes in Travel Times for Commuters from 1990 to 2000 (4 Counties)



Source: Census 2000, SF3, P31; Census 1990: SF3, P050

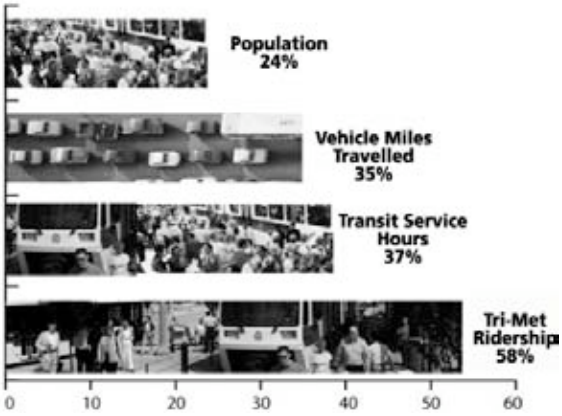
The largest share of commuters has a commute time of 15 to 29 minutes, followed by those with a commute time of 0 to 14 minutes. However, there has been an increase in the number of commuters who commute more than 30 minutes.

Growing Transit Ridership

Between 1990 and 2000, transit ridership increased faster than population growth and overall growth in vehicle miles traveled in the region.

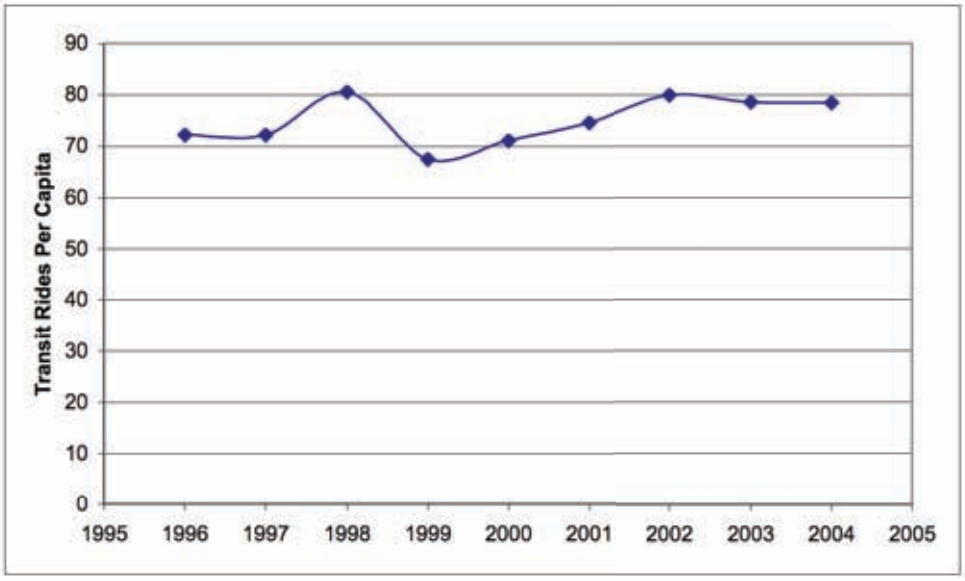
As shown in Figure 5, the number of annual transit rides per capita in the Portland-Vancouver Metropolitan Statistical Area has risen between 1996 and 2004, from 72.2 to 78.5. It reached a high in 2002 of 80.0 before decreasing in 2004 to 78.5. This is consistent with the increase in commuters that commute by public transportation. In a comparison of 26 similarly sized American cities, the Portland-Vancouver metropolitan region ranked second in the number of transit rides per capita, second only to New Orleans.[3]

Figure 4. 1990- 2000 Trends



Source: TriMet

FIGURE 5: Annual Transit Rides Per Capita, 1996-2004



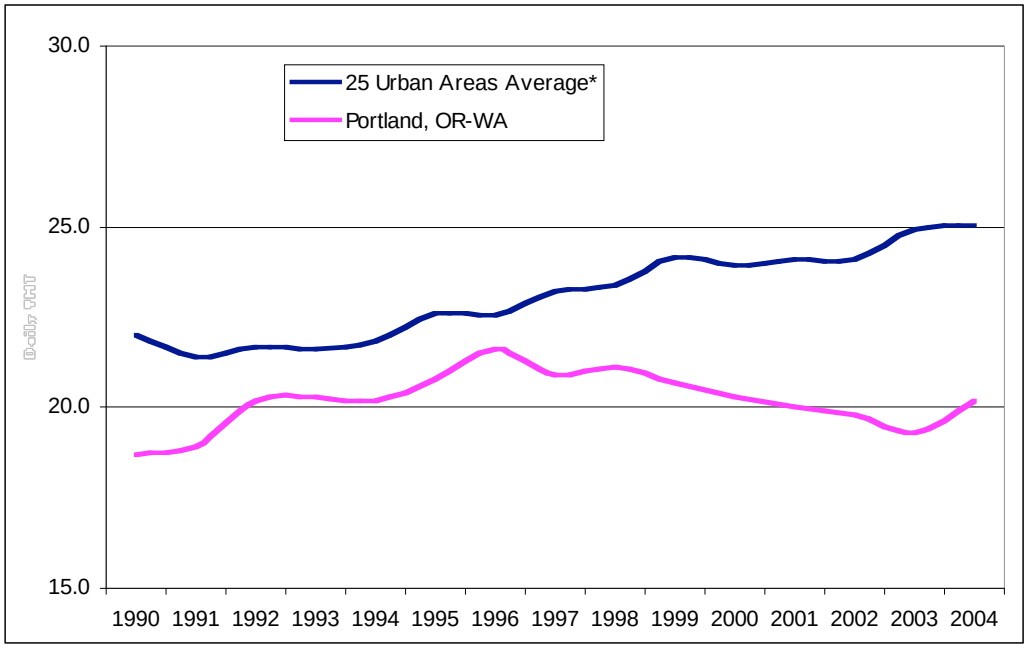
Source: FTA National Transit Database

[3] Cities compared included (in order of rank by annual transit rides per capita in 2004): New Orleans, Portland-Vancouver, Seattle, Milwaukee, Baltimore, Pittsburgh, Cleveland, San Diego, Denver-Aurora, Minneapolis-St. Paul, St. Louis, Las Vegas, Sacramento, San Antonio, Cincinnati, San Jose, Providence, Buffalo, Tampa-St. Petersburg, Kansas City, Virginia Beach, Orlando, Columbus, Indianapolis, Oklahoma City, and Riverside-San Bernardino.

Steadying of Average Daily Vehicle Miles of Travel Per Person

Daily Vehicle Miles of Travel (VMT) per capita in the Portland-Vancouver Metropolitan Statistical Area increased between 1990 and 2004, from 18.7 to 20.2, representing an 8 percent increase. Daily VMT has fluctuated by year, reaching a low of 19.3 daily VMT per capita in 2003 before rising to 20.2 in 2004. When compared with the same other 25 cities, Portland continues to have both a lower daily VMT per capita, and a lower rate of growth in daily VMT per capita, as shown in Figure 6.

FIGURE 6: Daily VMT Per Capita for Portland and an Average of 25 other Large Urban Areas, 1990-2004

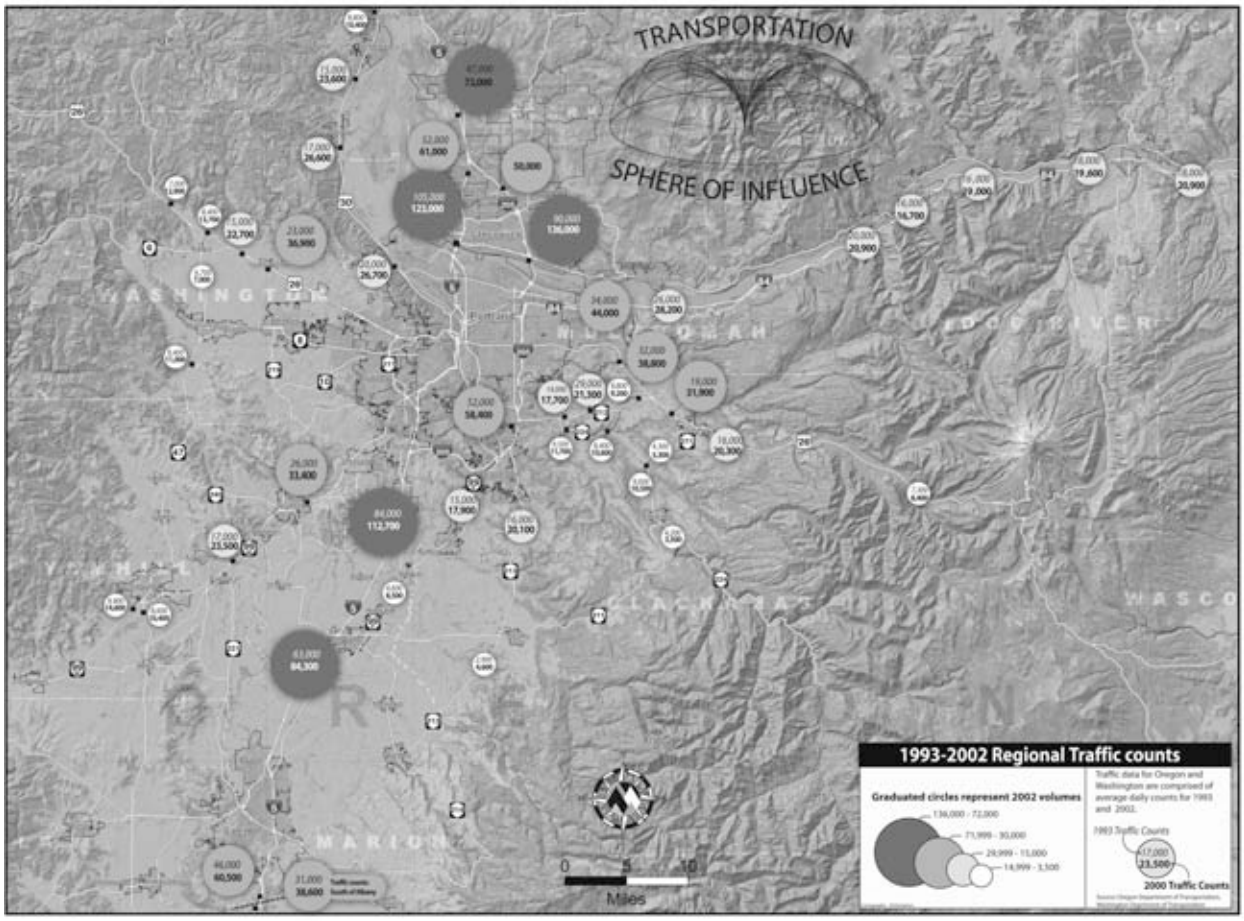


Source: FHWA "Highway Statistics," Table HM-72

Growing Traffic Volumes in Key Corridors

Traffic volumes in the Portland-Vancouver region increased between 1993 and 2002 in several key transportation corridors shown in Figure 7. This is consistent with the rise in average daily VMT and growth in population and jobs. Traffic volumes did not just increase within the metropolitan region, however, but in outlying areas as well.

FIGURE 7: 1993 – 2002 Regional Traffic Counts



Areas outside of the urban growth boundary with high traffic volumes in 2002 included:

- I-5 Corridor North of Vancouver (near La Center, Ridgefield, Battleground): increase from 47,000 ADT (Average Daily Traffic) to 72,000 ADT between 1993 and 2002. This represents a 53 percent increase in daily traffic volumes.
- Vancouver area West of I-5: increase from 105,000 ADT to 123,000 ADT between 1993 and 2002. This represents a 17 percent increase in daily traffic volumes.
- Vancouver area East of I-205: increase from 90,000 ADT to 136,000 ADT between 1993 and 2002. This represents a 51 percent increase in daily traffic volumes.
- I-5 Corridor near Wilsonville: increase from 84,000 ADT to 112,700 ADT between 1993 and 2002. This represents a 34 percent increase in daily traffic volumes.
- I-5 Corridor South of Woodburn: increase from 63,000 ADT to 84,000 ADT between 1993 and 2002. This represents a 33 percent increase in daily traffic volumes.

All freeways within the Metro region experienced growth in average daily traffic volumes (ADT) between the years of 1998 and 2004.[4]

[4] See "1998 to 2004 Transportation Volume Tables in Excel Format." http://www.oregon.gov/ODOT/TD/TDATA/tsm/tvt.shtml#Traffic_Volume_Tables.

Table 8 shows the increases for each freeway. The data are from ODOT and were averaged for all collection points on each roadway (collecting one-way traffic volumes) within the UGB for the years between 1998 and 2004, inclusive.

TABLE 8: Average Daily Traffic for Major Roadways in the Portland Metropolitan Region, 1998-2004

	Average Increase in Average ADT from 1998-2004	
I-5	1,582	1.39%
I-84	1,345	2.62%
I-405	3,138	3.02%
I-205	3,545	3.24%
OR217	10,430	9.02%

Source: ODOT Transportation Volumes Tables (shown in Appendix 1)

TRANSPORTATION COSTS AND INVESTMENT

Rising Transportation Costs

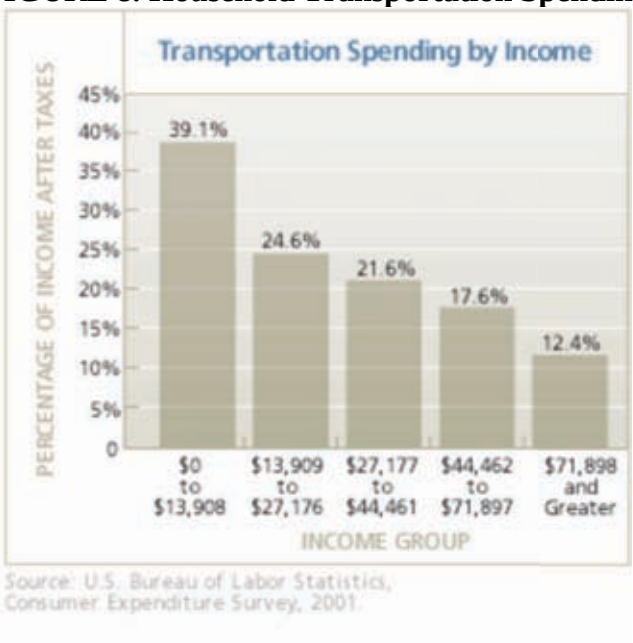
Rising housing costs have received national headlines in recent years. An often-overlooked trend is the increasing cost of transportation. Recent research shows that transportation is the second expense only to housing for American families[5]. In the Portland-Salem Metropolitan Area, average annual household spending on transportation is $6,848 or 16.8% portion of the family budget[6]. Transportation related costs include vehicle purchases, other vehicle expenses, gasoline and motor oil and public transportation costs. This is the second highest expense only to shelter/housing.

Figure 8 shows the percentage of income spent on transportation broken down by income level across the U.S. This table is based on information provided by the Bureau of Labor Statistics' Consumer Expenditure Survey.

[5] See "Driven to Spend: Executive Summary." Surface Transportation Policy Project. <http://www.transact.org/report.asp?id=39>

[6] See "Driven to Spend: Portland-Salem Fact Sheet." Surface Transportation Policy Project. < http://www.transact.org/states/metro.asp?s=oregon>

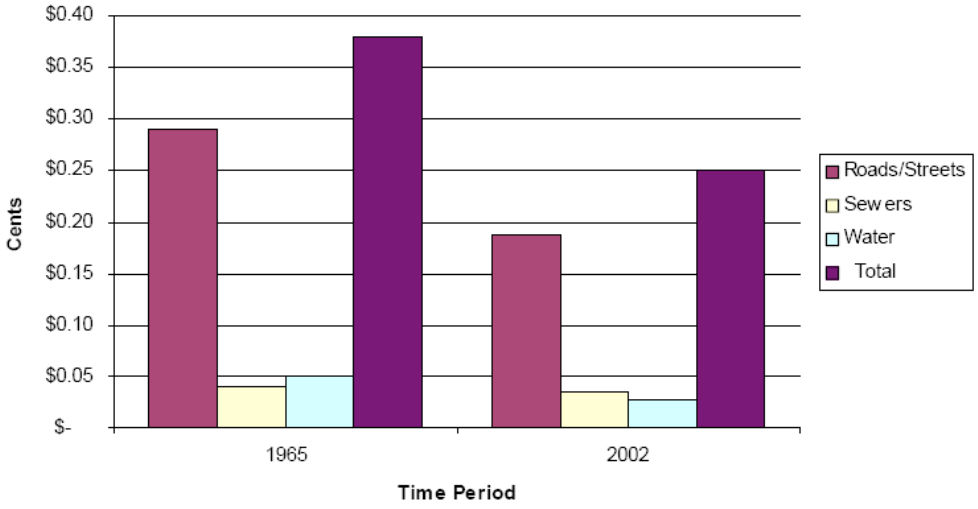
FIGURE 8. Household Transportation Spending by Income



Declining Public Investment in Transportation

For every dollar of new, private residential expenditure in 1965 the public spent a total of 38 cents: 29 cents on highways and streets, 4 cents for sewers and 5 cents for water. The public expenditure dwindled to 25 cents total: 18.7 cents on streets and highways, 3.5 cents for sewers, and 2.7 cents for water[7]. From 1965 to 2002 there was a 13 cent overall drop in public investment and almost an 11 cent drop in highways and streets. Figure 9 below depicts public capital spending for each one dollar of private residential investment from 1965 to 2002.

FIGURE 9. Public Investment In Infrastructure (1965 and 2002)



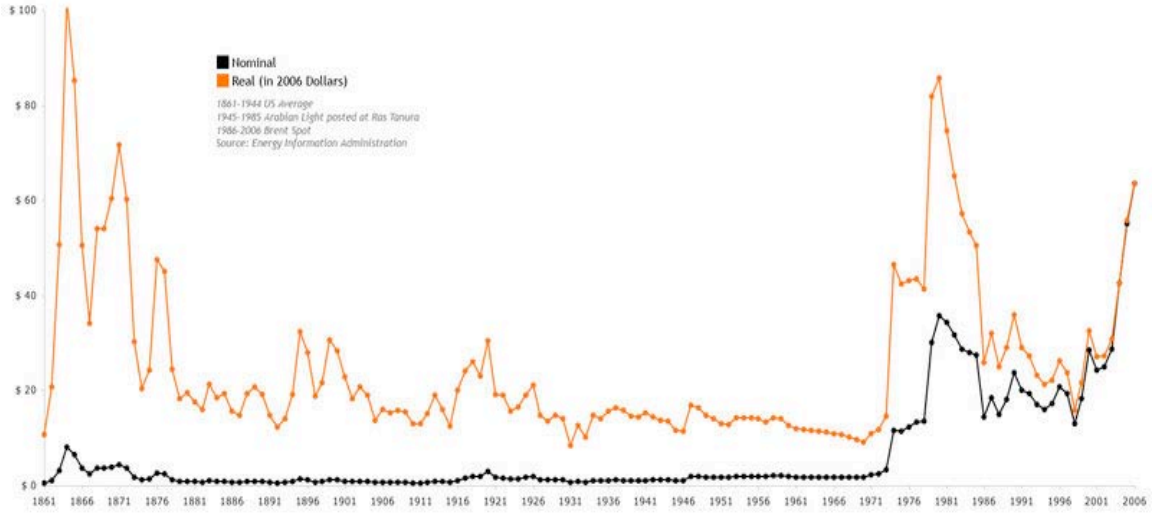
Source: Metro

[7] U.S. Bureau of Census, Table 1. Annual Value of Construction Put in Place in the United States 1965 – 2002. <www.census.gov/pub/const/C30/tabl68.txt>.

Increasing Uncertainty of Oil Supply and Price

The uncertainty surrounding the supply and price of oil plays a significant role in long range transportation planning. Uncertainty is defined as a measure of the decreasing confidence that supply and price of oil will not be much different next year compared to today's figures[8]. Figure 10 displays the fluctuations in oil prices over the last 150 years.

FIGURE 8. Crude-Oil Price History from 1861 to 2006



Source: Michael Strock[9]

The uncertainty of oil prices should be considered as transportation investments are being developed as part of the RTP update. The RTP should continue to emphasize land use and transportation planning to reduce mean travel distances and enable greater use of public transit, walking and bicycling as viable transportation options and modes that are less susceptible to oil price fluctuations than private automobiles.

Key findings

- Population and jobs in all 4 counties of the metro region increased between 1990 and 2000.
- The cities at the edges of the region have grown in population at a faster rate than the cities near the center of the region.
- The population of Multnomah County as a share of the region's total population is decreasing, although Multnomah continues to be the region's most populous county.
- Multnomah County has the highest proportion of residents that work inside the county, although the other three counties have gained in proportions of workers who work inside the county.

[8] Lerch, Daniel. "White Paper: Future Oil Supply Uncertainty and Metro." April 2006. < http://www.metro-region.org/article.cfm?ArticleID=18951>

[9]Strock, Michael. "Oil Prices: 1861 – 2006." Based on Crude oil price history from 1861-2006. Data: [http://www.eia.doe.gov/pub/international/iealf/BPCrudeOilPrices.xls]. < http://en.wikipedia.org/wiki/Image:Oil_Prices_1861_2006.jpg>

- Elderly residents are a growing segment of the population and have special transportation needs, particularly in access to transit and pedestrian facilities.
- There has been an overall decrease in the percentage of commuters that commute by car, truck or van; this is true in the region generally and within each county.
- Multnomah County has the lowest percentage of commuters that commute by car, truck, or van.
- The percentage of commuters that commute by bicycle or walking constituted a lower percentage in 2000 than in 1990. However, the percentage of commuters that travel to work using public transportation increased.
- There was an increase in the region-wide percentage of commuters that commute for more than 30 minutes a day between 1990 and 2000.
- Transit rides per capita in the Portland-Vancouver metropolitan region increased between 1996 and 2004, and Portland ranks higher than most similarly sized American cities in this measure.
- Daily vehicle miles traveled per person rose from 1996 to 2004 from 18.7 to 20.2. This is lower than other similarly sized cities, and represents a modest overall increase.
- Major transportation routes located at the edge of the Portland metropolitan region have experienced the largest increases in traffic volumes, particularly in Vancouver, Wilsonville, and Woodburn, placing additional burdens in the state highway corridors connecting into the region.
- Traffic volumes have increased on all freeways within the metro region, though not as significantly as the major transportation routes that connect the Metro region to communities located outside Metro's urban growth boundary.
- Transportation costs are growing and are now the second highest family budget expense next to housing.
- Public investment in transportation has decreased by 13 cents per dollar from 1965 – 2002.
- Oil price uncertainty can potentially affect the cost of future transportation investments.

APPENDIX 1: ODOT Transportation Volumes Tables for points within Metro UGB, 1998-2004

Highway	Route Number	Milepost	Location Description	Begin Milepost	End Milepost	2004 AADT	2003 AADT	2002 AADT	2001 AADT	2000 AADT	1999 AADT	1998 AADT	Diff ADT 98-2004
001	I-5	282.24	Wilsonville Automatic Traffic Recorder, Sta. 03-011, 0.41 mile south of Wilsonville-Hubbard Highway	278.67	282.65	86700	86400	85200	82600	81300	78900	75400	113
001	I-5	283.58	0.30 mile south of Wilsonville Interchange	282.65	283.88	114200	114400	112700	110300	108700	106700	103400	108
001	I-5	285.88	0.30 mile south of Stafford Road	283.88	286.18	117700	118500	116400	114000	113300	111700	109200	85
001	I-5	287.91	0.60 mile south of East Portland Freeway (I-205)	286.18	288.51	130400	130000	129600	127300	126800	125600	123100	73
001	I-5	289.20	0.30 mile south of Nyberg Road Interchange	288.51	289.50	140100	139300	139100	136400	136200	134800	134900	52
001	I-5	290.08	0.40 mile south of Lower Boones Ferry Road Interchange	289.50	290.48	154500	153100	153000	150400	149700	149100	151300	32
001	I-5	290.99	0.30 mile south of Upper Boones Ferry Road Interchange	290.48	291.27	151600	151500	151500	148900	150000	149900	153500	-19
001	I-5	291.80	0.40 mile south of Beaverton-Tigard Highway (OR 217)	291.27	292.20	150500	151600	150400	147900	150200	150400	155600	-51
001	I-5	293.00	0.30 mile south of Haines Road	292.20	293.32	106400	108600	106900	104500	105700	107000	114700	-83
001	I-5	293.51	0.30 mile south of Pacific Highway West (OR 99W), at Tigard Junction	293.32	293.82	102500	104700	103200	100900	102200	103600	111500	-90
001	I-5	294.74	0.30 mile south of Capitol Highway	293.82	295.04	116900	119700	117400	115200	116200	118000	127000	-101
001	I-5	295.43	0.10 mile south of Taylors Ferry Road connection	295.04	295.53	117600	120000	118500	116300	117900	119900	129000	-114
001	I-5	296.24	0.10 mile south of Spring Garden Road Undercrossing	295.53	296.34	115200	117800	116100	113900	115500	117500	127000	-118
001	I-5	296.45	0.10 mile south of Multnomah Boulevard Undercrossing	296.34	296.55	118200	122200	116100	119000	120800	122900	116600	16
001	I-5	297.08	0.10 mile south of Terwilliger Boulevard Undercrossing	296.55	297.31	127200	129400	128000	125800	127500	129800	128000	-8
001	I-5	298.24	Iowa Street Automatic Traffic Recorder, Sta. 26-016, 0.69 mile south of Corbett Avenue Undercrossing	297.31	298.93	142100	144200	142900	140700	141500	144000	142000	1
001	I-5	299.13	0.10 mile south of Macadam and Hood Avenue connections	298.93	299.23	138300	140600	140000	138500	139300	141200	138900	-6
001	I-5	299.87	0.10 mile south of Stadium Freeway (I-405)	299.23	300.11	123100	125200	130600	125500	125600	126000	123100	
001	I-5	300.37	Marquam Bridge Automatic Traffic Recorder, Sta. 26-026	300.11	300.93	135600	137500	136600	140500	139100	134700	132300	33
001	I-5	301.09	Undercrossing, S.E. Morrison Street Bridge	300.93	301.37	85400	87300	84800	88000	91000	87400	86000	-6

Highway	Route Number	Milepost	Location Description	Begin Milepost	End Milepost	2004 AADT	2003 AADT	2002 AADT	2001 AADT	2000 AADT	1999 AADT	1998 AADT	Diff ADT 98-2004
001	I-5	301.50	Undercrossing, Burnside Bridge	301.37	301.70	70400	72000	67800	71300	72700	70200	69100	13
001	I-5	301.70	Undercrossing, eastbound connection to Columbia River Highway (I-84)	301.70	301.92	88300	89800	86400	89600	90800	88300	87000	13
001	I-5	301.99	Overcrossing, N.E. Holladay Street	301.92	302.68	131200	132700	133200	134000	134400	131200	129300	19
001	I-5	302.70	0.40 mile south of Stadium Freeway (I-405)	302.68	303.47	125700	130500	132000	132200	132100	129900	127800	-21
001	I-5	303.68	0.30 mile south of N. Going Street Interchange	303.47	303.88	143000	144800	144800	144300	146600	144600	142500	5
001	I-5	304.23	0.20 mile south of N. Killingsworth Street Overcrossing	303.88	304.43	125600	131500	127800	125800	122200	120900	118900	67
001	I-5	304.66	Minnesota Freeway Automatic Traffic Recorder, Sta. 26-019, 0.23 mile north of N. Killingsworth Street Overcrossing	304.43	304.93	136000	137400	133800	131700	132000	130800	128500	75
001	I-5	305.14	0.30 mile south of Northeast Portland Highway (US 30 Bypass)	304.93	305.44	128900	129900	127600	125400	125100	124000	121400	75
001	I-5	305.64	0.20 mile north of Northeast Portland Highway (US 30 Bypass)	305.44	305.98	114900	115700	111500	109100	108900	107900	105300	96
001	I-5	306.36	0.50 mile south of Overcrossing Pacific Highway West (OR 99W)	305.98	306.68	99400	101000	94900	92400	92700	91800	89600	98
001	I-5	307.08	0.38 mile south of Pacific Highway East (OR 99E)	306.68	307.45	105900	107500	105200	101000	101500	100800	99200	67
001	I-5	307.66	0.20 mile north of Pacific Highway East (OR 99E)	307.45	307.97	129300	130800	129600	126500	126800	126300	124200	51
001	I-5	307.97	Interstate Br. Automatic Traffic Recorder, Sta. 26-004, 0.41 mile south of Oregon-Washington State Line	307.97	308.38	124500	125000	123800	120400	122100	121900	119800	47
002	I-84	0.49	West Banfield Automatic Traffic Recorder, Sta. 26-015, 0.49 mile east of Pacific Highway (I-5)	0.00	0.66	141100	143200	143800	146500	147400	145100	142900	-18
002	I-84	0.76	0.10 mile east of N.E. Grand Avenue ramp connection	0.66	1.21	151000	153400	154700	157300	158500	155800	153200	-22
002	I-84	1.31	0.10 mile east of N.E. Holladay Street ramp connection	1.21	1.33	163500	165700	168700	170700	171800	169300	0	-58
002	I-84	1.43	0.74 mile west of N.E. 33rd Avenue	1.33	2.17	170800	173600	177000	179100	180300	177500	0	-67
002	I-84	2.27	0.10 mile east of N.E. 33rd Avenue	2.17	2.55	146900	160200	162000	163700	165600	162700	160800	-139
002	I-84	3.35	Hoyt Automatic Traffic Recorder, Sta. 26-014, at N.E. 53rd Avenue Undercrossing.	2.55	3.56	161000	163200	165600	166500	168100	164900	163900	-29
002	I-84	3.96	0.15 mile west of N.E. Halsey Street ramp connection	3.56	4.12	154900	155900	158100	158900	160500	153900	152000	29

Highway	Route Number	Milepost	Location Description	Begin Milepost	End Milepost	2004 AADT	2003 AADT	2002 AADT	2001 AADT	2000 AADT	1999 AADT	1998 AADT	Diff ADT 98-2004
002	I-84	4.81	0.20 mile west of 82nd Avenue, Cascade Highway North (OR 213)	4.12	5.03	151200	152200	154400	155400	156800	146200	144100	71
002	I-84	5.07	0.10 mile west of East Portland Freeway (I-205) connection	5.03	5.72	142100	141300	143400	144100	145700	142900	140700	14
002	I-84	5.96	0.01 mile east of N.E. Halsey Street overcrossing	5.72	6.25	68100	67800	69300	69600	70600	68740	0	-6
002	I-84	6.53	0.20 mile west of N.E. 102nd Avenue	6.25	6.73	51600	51200	52500	52700	53700	52200	48600	30
002	I-84	6.93	0.20 mile east of N.E. 102nd Avenue	6.73	7.10	45900	45500	46700	46900	48000	46500	42900	30
002	I-84	7.20	0.09 mile east of East Portland Freeway (I-205) connection	7.10	10.07	102000	101900	102700	102600	101100	100300	95600	64
002	I-84	12.64	0.40 mile west of N.E. 181st Avenue	10.07	13.03	97200	97000	97700	97500	95900	95300	90600	66
002	I-84	13.44	0.40 mile east of N.E. 181st Avenue	13.03	14.42	73400	73400	73700	73400	68900	68700	57800	156
002	I-84	14.67	0.25 mile east of 207th Avenue	14.42	15.97	58100	58200	58400	57900	55000	55100	46600	115
002	I-84	16.47	0.50 mile east of N.E. 238th Dr	15.97	16.69	43800	44000	44000	43400	43500	43900	40700	31
002	I-84	17.32	0.05 mile west of Overcrossing for Troutdale connection	16.69	17.56	17600	17900	17700	17000	18100	18700	19900	-23
002	I-84	17.71	Troutdale Automatic Traffic Recorder, Sta. 26-001, on Sandy River Bridge	17.56	17.89	28200	28500	28200	27400	26900	27700	27000	12
026	US 26	-0.09	0.01 mile north of connection from Arthur Street	-0.10	0.25	26400	9600	0	0	0	0	0	
026	US 26	0.77	0.11 mile east of Pacific Highway West (OR 99W) On Ross Island Bridge	0.25	0.95	58600	59300	58700	58000	57400	56400	55500	31
026	US 26	1.09	0.08 mile east of Pacific Highway East Overcrossing (OR 99E)	0.95	1.15	51200	51800	60800	60100	59400	58500	57500	-63
026	US 26	1.16	0.01 mile east of S.E. 8th Avenue	1.15	1.32	45000	45400	49100	48500	48000	47600	46400	-14
026	US 26	1.33	0.01 mile east of connection to S.E. Milwaukie Avenue	1.32	1.78	48700	49100	51200	50600	50000	49800	48400	3
026	US 26	1.79	0.01 mile east of S.E. 17th Avenue	1.78	1.81	41300	41600	44900	44500	44200	44100	43200	-19
026	US 26	1.82	0.01 mile east of S.E. 21st Avenue	1.81	2.07	42100	42300	43500	43100	42800	42600	41900	2
026	US 26	2.08	0.01 mile east of S.E. 26th Avenue	2.07	2.47	38300	38400	41300	41000	40700	40500	39900	-16
026	US 26	2.90	0.01 mile west of S.E. 39th Avenue	2.47	2.91	38000	38100	46800	46400	46100	45800	45100	-71
026	US 26	2.92	0.01 mile east of S.E. 39th Avenue	2.91	3.26	38900	38900	52300	51300	50400	48600	47800	-89
026	US 26	3.27	0.01 mile east of S.E. 45th Avenue	3.26	3.28	39900	39800	46300	45400	44600	43000	42300	-24

Highway	Route Number	Milepost	Location Description	Begin Milepost	End Milepost	2004 AADT	2003 AADT	2002 AADT	2001 AADT	2000 AADT	1999 AADT	1998 AADT	Diff ADT 98-2004
026	US 26	3.44	0.01 mile west of S.E. Foster Road	3.28	3.45	39700	39600	46800	45900	45100	43600	42800	-31
026	US 26	3.56	0.01 mile west of S.E. 52nd Avenue	3.45	3.57	25200	25100	30000	29400	28900	28100	27400	-22
026	US 26	3.58	0.01 mile east of S.E. 52nd Avenue	3.57	4.04	28300	28100	32700	32200	31800	31300	30500	-22
026	US 26	4.05	0.01 mile east of S.E. 62nd Avenue	4.04	4.54	28000	27800	32000	31500	31100	30800	29900	-19
026	US 26	4.55	0.01 mile east of S.E. 72nd Avenue	4.54	4.79	29000	28700	32100	31600	31200	31000	30000	-10
026	US 26	5.03	0.01 mile west of Cascade Highway North (OR 213)	4.79	5.04	29800	29500	34100	33600	33200	32900	32000	-22
026	US 26	5.05	0.01 mile east of Cascade Highway North (OR 213)	5.04	5.32	31400	31000	32000	31700	31500	31900	30800	6
026	US 26	5.68	0.06 mile west of East Portland Freeway (I-205)	5.32	5.74	41400	40900	39600	39300	39000	39100	38400	30
026	US 26	5.80	0.06 mile east of East Portland Freeway (I-205)	5.74	5.97	22500	22200	21800	21500	21300	20200	20000	25
026	US 26	6.70	0.01 mile west of S.E. 112th Avenue	5.97	6.71	20300	20100	20000	19700	19400	19200	19000	13
026	US 26	6.72	0.01 mile east of S.E. 112th Avenue	6.71	6.83	21200	21100	20800	20600	20400	19600	19300	19
026	US 26	7.20	0.01 mile west of S.E. 122nd Avenue	6.83	7.21	19700	19700	19000	18800	18700	19300	19000	7
026	US 26	7.22	0.01 mile east of S.E. 122nd Avenue	7.21	7.90	21500	21700	23200	22800	22500	20800	20600	9
026	US 26	7.91	0.01 mile east of S.E. 136th Avenue	7.90	8.26	21900	22200	22500	22100	21700	22800	22200	-3
026	US 26	8.35	0.01 mile west of S.E. 144th Avenue	8.26	8.40	21500	21900	22200	21800	21400	22900	22000	-5
026	US 26	8.41	0.01 mile east of S.E. 145th Avenue	8.40	9.35	20100	20600	20600	20200	19900	20400	19900	2
026	US 26	9.36	0.01 mile east of S.E. 164th Avenue	9.35	9.87	21900	22500	23400	22400	21600	22000	21200	7
026	US 26	9.96	West city limits of Gresham, 0.09 mile east of S.E. 174th Avenue	9.87	9.96	22700	23500	24300	23300	22500	23700	23000	-3
026	US 26	14.36	Gresham Automatic Traffic Recorder, Sta. 26-003, 0.18 mile southeast of Powell Boulevard	14.18	14.75	37700	39100	38800	37500	37200	36700	36300	14
026	US 26	14.76	0.01 mile south of S.E. Palmquist Road	14.75	17.55	25700	26700	29500	28600	27800	23700	23300	24
026	US 26	18.35	0.01 mile northwest of S.E. Haley Road, 1.58 miles southeast of Multnomah-Clackamas County Line	17.55	18.36	21900	22800	25600	24500	23600	21000	20600	13
026	US 26	19.24	0.30 mile northwest of Clackamas-Boring Highway (OR 212)	18.36	21.07	23000	23900	23900	22900	22100	21100	20600	24
061	I-405	0.60	Stadium Freeway Automatic Traffic Recorder, Sta. 26-005, 0.60 mile west of Pacific Highway (I-5) (south junction)	-0.04	0.76	96300	98500	100100	103400	99900	96700	95600	7

Highway	Route Number	Milepost	Location Description	Begin Milepost	End Milepost	2004 AADT	2003 AADT	2002 AADT	2001 AADT	2000 AADT	1999 AADT	1998 AADT	Diff ADT 98-2004
061	I-405	0.88	S.W. 4th Avenue Undercrossing	0.76	0.95	88100	90000	91500	94600	92100	89100	87800	3
061	I-405	1.11	S.W. Broadway Undercrossing	0.95	1.17	76300	77800	79100	82000	80500	77600	76200	1
061	I-405	1.18	S.W. Park Avenue Undercrossing	1.17	1.62	124800	125000	125500	127800	125400	123200	121200	36
061	I-405	2.02	S.W. Yamhill Street Undercrossing	1.62	2.20	95300	97300	97700	98900	97800	95300	93600	17
061	I-405	2.45	N.W. Glisan Street Undercrossing	2.20	2.58	92800	93100	92440	93400	91000	89200	86500	63
061	I-405	2.65	N.W. Kearney Street Overcrossing	2.58	2.68	104000	104900	104400	104800	101800	100100	97300	67
061	I-405	3.05	Fremont Bridge Automatic Traffic Recorder, Sta. 26-027, 1.16 miles southwest of Pacific Highway (I-5), (north junction)	2.68	4.21	112600	112300	110600	110700	109200	109000	106900	57
064	I-205	1.27	Stafford Automatic Traffic Recorder, Sta. 03-016, 1.27 miles east of Pacific Highway (I-5)	0.00	3.16	82800	82000	83300	79700	79400	77300	75100	77
064	I-205	3.56	0.40 mile east of Wankers Corner Interchange, (Stafford Road)	3.16	6.40	88300	86300	87600	84000	83800	81700	79400	89
064	I-205	7.00	0.60 mile east of 10th Street, South West Linn Interchange	6.40	8.80	91300	91000	92200	88700	87300	85300	83400	79
064	I-205	9.12	On Willamette River Bridge, 0.30 mile east of Oswego Highway (OR 43), West Linn Interchange	8.80	9.31	102400	100700	102500	99100	98100	96300	94200	82
064	I-205	9.69	0.40 mile east of Pacific Highway East (OR 99E), Oregon City Interchange	9.31	10.24	110700	108600	110100	107000	106300	104600	102400	83
064	I-205	10.75	On Clackamas River Bridge, 0.30 mile south of S.E. 82nd Drive (OR 213 south junction), Gladstone Interchange	10.24	11.05	139900	137200	138400	135500	135100	133700	131700	82
064	I-205	12.27	0.40 mile south of Clackamas Highway (OR 224), South Clackamas Interchange	11.05	12.67	129300	127400	127500	124700	124100	122800	121100	82
064	I-205	12.97	0.30 mile north of Clackamas Highway (OR 224), South Clackamas Interchange	12.67	13.11	139100	135600	138600	136100	135900	134800	133800	53
064	I-205	13.38	0.20 mile north of S.E. 82nd Drive (OR 213 north junction), Lake Road Interchange	13.11	13.58	102500	97500	102600	100200	100500	99500	99600	29
064	I-205	14.18	0.40 mile south of Sunnyside Road Interchange	13.58	14.58	120800	113900	122300	120000	120300	119400	119000	18
064	I-205	15.84	0.40 mile south of Johnson Creek Boulevard Interchange	14.58	16.57	131200	131600	139800	137800	137700	137100	135600	-44

Highway	Route Number	Milepost	Location Description	Begin Milepost	End Milepost	2004 AADT	2003 AADT	2002 AADT	2001 AADT	2000 AADT	1999 AADT	1998 AADT	Diff ADT 98-2004
064	I-205	17.45	0.40 mile south of Foster Road Interchange	16.57	17.79	140300	141800	148700	146800	146200	145600	143800	-35
064	I-205	18.25	Lents Automatic Traffic Recorder, Sta. 26-022, 0.87 mile south of Mt. Hood Highway (US 26) Interchange	17.79	19.01	147700	146400	153200	151600	150700	150400	147900	-2
064	I-205	20.11	0.50 mile north of Division Street Interchange	19.01	20.31	156800	154400	168100	166700	165400	164400	161200	-44
064	I-205	20.35	Yamhill Automatic Traffic Recorder, Sta. 26-018, 0.22 mile south of S.E. Washington Street Undercrossing	20.31	20.63	156800	154300	146800	145300	144500	143400	140100	167
064	I-205	20.87	Burnside Street Undercrossing	20.63	21.48	117200	116300	127300	125700	124100	122800	120600	-34
064	I-205	21.77	0.20 mile north of Columbia River Highway (I-84) Interchange	21.48	22.61	126500	126300	134900	133100	131500	130100	134300	-78
064	I-205	22.99	0.40 mile north of connections to Columbia River Highway (I-84)	22.61	23.63	148300	148100	157000	155000	153500	151900	156300	-80
064	I-205	24.25	0.40 mile south of Airport Way Interchange	23.63	24.63	135600	137100	139500	138500	133200	131100	133500	21
064	I-205	25.50	Glenn Jackson Bridge Automatic Traffic Recorder, Sta. 26-024, 1.07 miles south of Oregon-Washington State Line	24.63	26.56	137000	137000	135900	132100	126500	123700	120600	164
144	OR217	0.50	0.50 mile south of Sunset Highway (US 26)	0.00	0.91	107700	101700	104200	102200	99700	98700	97100	106
144	OR217	1.17	0.30 mile north of Tualatin Valley Highway (OR 8) Overcrossing	0.91	1.76	113500	107600	111500	109500	106800	105900	104600	89
144	OR217	2.16	0.40 mile south of Beaverton-Hillsdale Highway (OR 10) Overcrossing	1.76	2.48	130600	124800	121900	119900	118200	117500	112000	186
144	OR217	2.78	0.30 mile south of S.W. Allen Boulevard Interchange	2.48	3.02	126200	120600	120000	118000	116700	116100	112400	138
144	OR217	3.32	0.30 mile south of S.W. Denney Road Interchange	3.02	3.79	123600	118000	117300	115300	113900	113400	110300	133
144	OR217	4.02	0.20 mile south of Beaverton-Tualatin Highway Interchange	3.79	4.27	101400	95900	96600	94700	93300	93000	91100	103
144	OR217	4.57	0.30 mile south of Scholls Highway (OR 210) Interchange	4.27	4.95	116200	108600	112900	111000	109400	109000	107700	85
144	OR217	5.60	0.30 mile northwest of Pacific Highway West (OR 99W)	4.95	5.90	118300	111500	116000	114100	112800	112600	111100	72
144	OR217	6.20	0.30 mile southeast of Pacific Highway West (OR 99W)	5.90	6.69	99200	92700	96200	94300	94200	94100	94700	45
144	OR217	7.04	0.40 mile northwest of Pacific Highway (I-5)	6.69	7.52	101700	95900	93800	92000	92500	92500	93100	86

Source: ODOT, http://www.oregon.gov/ODOT/TD/TDATA/tsm/tvt.shtml#Traffic_Volume_Tables. See "1998 to 2004 Transportation Volumes Tables in Excel Format."