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Existing Conditions, Findings and Opportunities Report

Regional Active Transportation Plan

August 28, 2012

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ACRONYMS

ATP	Regional Active Transportation Plan
BMI	Body Mass Index
BTA	Bicycle Transportation Alliance
DOT	Department of Transportation
HOV	High Occupancy Vehicle
JPACT	Joint Policy Advisory Committee on Transportation
MPAC	Metro Policy Advisory Committee
MTAC	Metro Technical Advisory Committee
MTIP	Metropolitan Transportation Improvement Program
ODOT	Oregon Department of Transportation
OHAS	Oregon Household Activity Survey, 2011
OTC	Oregon Transportation Commission
OTP	Oregon Transportation Plan
RTFP	Regional Transportation Functional Plan
RTP	2035 Regional Transportation Plan
UGMFP	Urban Growth Management Functional Plan
ROW	Right of Way
SOV	Single Occupancy Vehicle
STIP	State Transportation Improvement Program
TPAC	Transportation Policy Alternatives Committee
TPR	Transportation Planning Rule
TSP	Transportation System Plan
UGB	Urban Growth Boundary
VMT	Vehicle Miles Traveled

EXECUTIVE SUMMARY

Active transportation is increasingly being recognized as a highly desirable and sustainable form of transportation that provides a wide range of economic, social and environmental benefits. A growing number of cities and metropolitan areas, including the Portland region, are seeing more people walking, bicycling and using other forms of active transportation than ever before. This is due in part to sustained investment in active transportation facilities and programs.

Today, nearly 18% of *all* trips in Clackamas, Multnomah and Washington counties are made by walking and bicycling, and the number of bicycle trips has tripled since 1994. People in the region are using active transportation to make all kinds of trips such as run errands, shop, visit friends, go out to eat and get to work and school. People of all income levels, race, ethnicities and age groups are getting around actively. People with lower incomes, people with disabilities, young people and non-white households in the region tend to make more trips by foot, bicycle or transit than other groups. Many of these people are active transportation dependent, raising issues of transportation equity for safety and access.

Active transportation provides many benefits to the region including: healthier people and lower health care costs, fewer emissions from transportation and cleaner air and water, support of local businesses and the economy, tourism and a billion dollar niche industry, business retention and attraction, increased development feasibility and property values, transportation options for those who cannot or choose not to drive, lower crash rates and reduced cost of crashes. All of this is a high return on investment considering that, historically, dedicated funding for bicycling and walking projects has comprised approximately 3% of the total funding the region spends on capital projects.

Increasing the levels of bicycling, walking and transit are essential to reaching the region's transportation goals, such as reduced congestion, clean air and transportation equity. However, the 2035 Regional Transportation Plan project list does not achieve many of the region's adopted transportation targets. Strategically investing in stand-alone, high quality active transportation projects that link together a connected, safe, accessible, direct, intuitive and seamless network will provide more options for the 80-85% of people in the region that say they would like to walk and bicycle more for transportation. Conditions for safe and comfortable walking and bicycling vary widely across the region. Local and regional policies and tools need to be flexible enough to apply to a wide range of situations and rigorous enough to effectively and efficiently prioritize projects that will achieve transportation targets and goals and allow everyone, of all ages and abilities, to use and enjoy the system. The Existing Conditions report provides baseline information to help inform the development for the Regional Active Transportation Plan to help the region achieve its transportation goals and implement the 2035 Regional Transportation Plan.

FINDINGS AND OPPORTUNITIES

Photo: Alliance for Biking and Walking

Findings

A. **Regional levels of active transportation are increasing, especially bicycling.** One in six of all trips in Multnomah, Clackamas and Washington counties are made by active transportation; 84% of all transit trips are accessed by foot or bicycle. The regional active transportation mode share increased 36% between 1994 and 2011, from 13.1% to 17.8% of all trips. The regional bicycle mode share increased by nearly 191%, from 1.1% to 3.2%. Walking increased by over 14%.[1] (Chapter 2)

B. **Lower income households in the region make more of their trips using active travel, especially walking, than do households with higher incomes.** As level of income increases, so does the percentage of trips made by auto. Households with annual incomes of less than $35,000 make up to 25% of their trips walking, bicycling and taking transit.[2] (Chapter 2)

C. **Non-white householders in the region make a greater percentage of their trips by walking, bicycling and transit than white householders.** Non-white householders make 20.5% of all their trips by walking and bicycling and transit, while white householders make 15% of all their trips by walking and bicycling and transit.[3] (Chapter 2)

D. **Younger people in the region are making more trips by active transportation.** For example, children under the age of 14 make over 23% of all walk trips (the highest of any age group) and over 15% of all bicycle trips in the region. [4] (Chapter 2)

E. **People between the ages of 25 and 34 make nearly 25% of their trips using active modes**, the highest level of any age group. [5] (Chapter 2)

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[1] 2011 Oregon Household Activity Survey (OHAS). Active transportation trips: bicycling 3.2%, walking 10.4%, and transit-bicycle and walk access, 4.2% in the 3-county area, Multnomah, Clackamas and Washington counties.
[2] 2011 OHAS.
[3] 2011 OHAS (Only Householders (head of household) were asked race.) and 2010 U.S. Census.
[4] 2011 OHAS

[5] 2011 OHAS.

F. **People with disabilities rely on transit and walking more than people without disabilities.** Nearly 7% of the population reports having a disability that affects their ability to travel. People with disabilities particularly rely on transit, and therefore accessing transit, for travel.[6] (Chapter 2)

G. **People want to make more trips by bicycle and foot.** National, regional and local polls indicate that people support investment in active transportation. In Multnomah, Clackamas and Washington counties 86-91% of respondents in each county were interested in using a bicycle more often for transportation and between 70-79% stated that they were interested in walking more for transportation.[7](Chapter 2)

H. **The majority of all trips made by auto in the region are for short trips.** Over 66% of all trips made by autos within the 4-county area are less than six miles in length, nearly 44% are less than three miles in length, and nearly 15% are less than one mile in length. [8] (Chapter 2)

I. **Current transportation plans do not achieve regional transportation targets.** The 2035 RTP project list does not achieve many of the region's adopted transportation targets; including a decrease in non-drive alone trips and reductions in green house gas emissions, congestion and vehicle miles traveled and travel delay. [9],[10] (Chapter 4)

J. **Levels of investment in active transportation do not match demand or need.** Nearly 18% of all trips in Multnomah, Clackamas and Washington counties are made by walking or bicycle, while stand alone bicycle, pedestrian and trail projects have received approximately 3% of capital transportation funds.[11] (Chapters 5,8)

K. **Many of the region's arterial streets are also regional pedestrian and bicycle routes.** Arterials often provide the most direct and efficient route for travel for all modes, especially in suburban areas where there may not be alternative parallel routes. Many essential destinations and services and transit stops are located on arterials. Regional trails and other pedestrian and bicycle routes intersect with arterials. [12] (Chapter 5)

L. **Most serious pedestrian and bicycle crashes occur on arterials, at intersections and mid-block crossings.** Over 52% of all serious bicycle crashes and 67% of all serious pedestrian crashes occur on arterials. Arterials have the highest crash incident rate of any facility type for all modes. Nearly

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[6] 2011 OHAS
[7] Metro Opt in Poll. http://panel.decipherinc.com/images/uploads/optin/Metro_Active_transportation--Nov1.pdf Opt In is an online survey tool open to all residents in the region.
[8] 2011 OHAS. The 4-county area includes Multnomah, Washington, Clackamas and Clark counties. The analysis includes all trips made by auto less than 30 miles in length (one way).
[9] Some of the projects may be folded into roadway projects which are more expensive, may take longer to be implemented and may not prioritize pedestrian and bicycle travel.
[10] 2035 RTP Performance Evaluation findings.
[11] Metro analysis of transportation funding 200
[12] See the 2035 RTP System Maps for roadway classifications.

80% of serious and fatal pedestrian crashes occur at intersections and mid-block crossings and 52% of serious and fatal bicycle crashes occur at intersections.[13] (Chapter 3)

M. **Women are still making fewer trips by bicycle than men, but that is changing.** Women and girls are often seen as an "indicator species" for comfort of the bicycling environment. As the comfort and safety of the bicycling environment increases, so do the number of women and girls riding bicycles. Women in the region make 1.8% of their trips by bicycle, compared to 4% for men. However, the proportion of women riding bicycles is increasing up 16.5% since 1994.[14] (Chapter 2)

N. **Existing conditions for cycling vary across the region and present different opportunities and challenges to increasing bicycle ridership.** Large differences exist for factors that influence cycling such as road connectivity, road density, topography, permeability, land use mix/density, as well as the existing bikeways in the region in terms of bike network density, bike network connectivity and bikeway comfort.[15] (Chapter 6)

O. **Major regional pedestrian and transit corridors and districts lack sidewalks, have high levels of traffic and high traffic speeds.** These corridors often provide the most efficient and direct routes and access to services and destinations. [16] (Chapter 6)

P. **Lack of data on walking and bicycling, especially accurate counts of pedestrian and bicycle activity, make it difficult to adequately measure demand and performance.** What does not get counted, does not count. Current transportation models do not adequately represent walking and bicycling. Adequate data will make sure that investments in bicycling and walking are cost efficient. (Chapter 10)

Q. **Regional investment in walkable and bikeable communities is a contributing factor to people engaging in more physical activity and lower rates of obesity compared to national and state levels.** Among other factors, the built environment, such as street connectivity/density and density and quality of pedestrian and bicycling infrastructure contribute to how much people, walk, ride bicycles and take transit. [17],[18] (Chapter 3)

R. **Programs and education help reduce the number of trips made by auto in the region.** Nearly 19% of the Portland area population has reduced their car trips as a result of Drive Less Save

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[13] "Metro State of Safety Report: A compilation of information on roadway-related crashes, injuries, and fatalities in the Portland Metro region and beyond", Metro, April 2012 http://library.oregonmetro.gov/files//state_of_safety_report_043012.pdf

[14] 2011 OHAS

[15] Metro 2012 Cycle Zone Analysis

[16] Metro 2012 Analysis of the Regional Pedestrian Network

[17] Oregon BRFSS County Combined Dataset 2006-2009; Oregon Health Authority, Oregon Overweight, Obesity Physical Activity and Nutrition Facts, 2012

[18] Other determinants of health and weight include education level, parent's education level, access to grocery stores, heredity.

More, and a conservative estimate of reduction in vehicle road miles is 21.8 million, which translates into a reduction of about 10,700 tons of CO2.[19] Beaverton's Findley Middle School reduced the number of autos dropping and picking students up from 800+ a day to 400 cars by introducing a Safe Routes to School Program. [20] (Chapter 7)

S. **There are areas of the region with incomplete bicycling and walking facilities, less access to essential services and destinations, and have higher concentrations of environmental justice and underserved communities,** including communities in East Multnomah County, Portland east of I-205, areas of North Portland, areas along McLoughlin Blvd. and 82nd Avenue, areas of unincorporated Clackamas County, including the North Clackamas Revitalization Area, Forest Grove, Cornelius, Aloha and Beaverton. [21] (Chapter 8)

T. **Crashes and the resulting injuries and deaths cost the region $958 million a year in property damage, medical costs, and lost productivity.[22]** Studies have found that more people walking and riding bicycles make it safer to walk and ride a bicycle and increase road safety records for all users. (Chapter 3)

U. **Investments in active transportation have provided a high return on investment and multiple benefits to the region.** Comparatively small investments in capital active transportation projects and programming have benefitted the region on multiple levels, including cleaner air and water, healthier people, lower transportation costs, increased development feasibility and safer streets. (Chapter 2)

V. **Active transportation trips are being made for a variety of purposes, not just commuting.** Active transportation trips are consistently undercounted due to a reliance on US Census data which only collects information on travel to work. In the region, 18.5% of all trips to work, 15.1% of all school college trips, and 16.4% of all errands, entertainment and social trips are made by walking or bicycling.[23]

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[19] http://www.drivelesssavemore.com/pages/faqs#impact

[20] Information provided by Beaverton Safe Routes to School Program Coordinator for the 2009-10 year. The program does not have funding secured for 2012-13.

[21] Metro, Metropolitan Transportation Improvement Program, 2014-15 Regional Flexible Fund Allocation Transportation Equity Analysis (January 2012, available at www.oregonmetro.gov/mtip)

[22] Metro State of Safety Report presentation, 2012.

[23] 2011 OHAS

Opportunities

The opportunities below raise policy questions and potential implementation strategies that will be explored in the next phases of the ATP project.

A. **There is opportunity to support populations that are already driving less by improving conditions and providing more transportation options, making it easier to drive less.** Young people, people with lower incomes, people of color and people with disabilities that affect their transportation choices already drive less. Because lower income households, people with disabilities, young people and households of color use active transportation and transit more often than other populations, more transportation options, programs, access and mobility, provides transportation equity and helps the region achieve its transportation goals. [24]

B. **There is opportunity to dramatically increase safety for pedestrians and bicyclists and increase levels of active transportation by focusing improvements for active transportation on arterials, intersections and mid-block crossings.** A high level of walking and bicycle activity and accessing transit occurs on arterials; these roads often provide the most direct and efficient route for all modes. Metro's State of Safety Report recommends improving pedestrian and bicycle crossings particularly on multi-lane arterials, improving lighting and providing protected bicycle facilities along high-volume and/or high-speed roadways such as buffered bike lanes, cycle tracks, multi-use paths, or low-traffic alternative routes.[25]

C. **Replacing just 15% of short auto trips (one to three miles) with walking and bicycling would reduce congestion, reduce green house gas emissions, lower transportation costs, reduce wear and tear on roadways and increase health in the region.** A national study found that replacing 6-21% of short trips under three miles made by auto with walking and bicycling would avoid 21- 52 billion miles of driving annually in the U.S. A slow-paced, three mile bicycle trip takes less than20 minutes; it takes about 15 minutes to walk one mile. [26] Focusing improvements on areas with high levels of short auto trips could reduce barriers to walking and bicycling and improve active travel access to transit.

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[24] 2011 OHAS

[25] Metro State of Safety Report: A compilation of information on roadway-related crashes, injuries, and fatalities in the Portland Metro region and beyond, April 2012

[26] Pg. 14, Active Transportation for America, the case for increased federal investment in bicycling and walking. Rails to Trails Conservancy. The report notes that these are conservative estimates.

D. **Including bicycle and walking projects in roadway preservation projects, and following best-practice design guidelines, would improve the region's ability to make regional pedestrian and bicycle routes complete streets[27]**. The region is missing out on opportunities to improve walking and bicycling conditions in retrofit and preservation roadway projects.[28] For example, the 2005, $38 million renovation and redesign project of the St. John's bridge, which is a critical link in the regional pedestrian and bicycle network and the only bridge spanning the Willamette River for five miles north or south, did not improve the facility for bicyclists or pedestrians. A new highway project, the Sunrise Corridor in Clackamas County, while increasing auto capacity is reducing pedestrian and bicycle connectivity.

E. **Updates to local Transportation System Plans (TSPs), the 2035 RTP and the Regional Transportation Functional Plan (RTFP) provides opportunities to include policies and best practices for implementation.** Current regional and local transportation plans have clear visions, goals, and for balanced transportation systems that include bicycling, walking and taking transit, but not all of the policies and tools needed to implement. Best practices for implementable plans include prioritized project lists, concept level designs, funding plans and performance targets. Specific guidelines for some of the pedestrian and bicycle requirements in the RTFP would support performance measurement and consistent implementation across the region.

F. **Adjusting the regional mode share target for bicycle travel to reflect the increase in bicycling in the region (an increase of 191% since 1994) provides an opportunity to acknowledge the potential of bicycling in relieving strain on the regional transportation system.** The region has met the 2035 regional mode share target of tripling bicycle trips by 2035. All types of trips are made by bicycle in the region.

G. **Increasing the level of investment in active transportation in the 2035 RTP (walking, bicycle and trail projects) provides an opportunity to reach regional transportation goals and targets.** Regional transportation goals and targets, such as reducing congestion and transportation emissions, rely heavily on an increasing trips made by walking, bicycling and transit. Increasing access to destinations by foot, bike and transit, improving safety, designing comfortable, connected and enjoyable networks and providing education and programs have been proven to increase levels of active travel.

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[27] Oregon's current complete streets law, ORS 366.51, states that new construction projects or projects that increase capacity for automobiles (such as adding a turn-lane) must include bicycle and pedestrian improvements. Preservation and maintenance projects (e.g. roadway resurfacing) are not required to include bicycle and pedestrian enhancements.

[28] *Willamette Pedestrian Coalition, Complete Streets Policy Report Card: A 40 Year Progress Report for Oregon 2012.*

CHAPTER 1: PROJECT BACKGROUND

What is Active Transportation?

Active transportation is human-powered transportation that engages people in healthy physical activity while they travel from place to place. Walking, the use of strollers, wheelchairs and mobility devices, skateboarding, bicycling and rollerblading are included active transportation. Active transportation supports public transportation because most trips on public transportation include walking or bicycling. For brevity, the terms active transportation and "bicycling and walking" will be used throughout this report and are intended to include all active modes.[29]

Walkable and bikeable communities are places where it is easy and comfortable to make an active trip. They have connected streets integrated with walking and biking trails and paths, safe crossings of busy streets, directional signs making it easy to navigate, and a pleasant environment with places to go and things to do, including access to nature.

We all want communities that are healthy, productive, safe, welcoming and beautiful. Active transportation is an important part of whole and healthy communities. Increasing levels of active travel will help the Portland metropolitan region achieve its Six Desired Outcomes: Equity, Transportation Choices, Addressing Climate Change, Economic Prosperity, Clean Air and Water, and Vibrant Communities.[30]

In the second half of the 20th century, communities in the United States started to experience a decline in walking and bicycling while also seeing a rise in fatalities for people walking and bicycling and a rise in obesity related diseases. Responding to what communities value, a concerted effort at the national, state, regional and local levels has started to turn that trend around. Oregon and the Portland metropolitan region are leaders when it comes to active transportation. The League of American Bicyclists ranks Oregon 5th in the nation for bicycling.[31] Portland is only one of three communities in the nation to receive to receive "platinum" status as a bicycling city. Corvallis and Eugene are recognized as "gold" cycling cities, Bend and Sisters are "silver", and Beaverton, Gresham and Asheville are recognized as

[29] *Photo: The Oregonian, North Adair Street in Cornelius*
[30] The region's six desired outcomes were adopted by the Metro Council and MPAC in 2008, Resolution No. 08-3940.
[31] League of American Bicyclists , http://www.bikeleague.org/programs/bicyclefriendlyamerica/bicyclefriendlystate/

"bronze" cycling cities.[32] Gresham and Beaverton were rated in the top 10 in the country for bicycling friendly suburban communities[33]. Three of the nation's top fifty bike cities are in Oregon, and Portland and Wilsonville have been recognized as walkable cities. [34],[35]

Purpose of this Report

Existing conditions describe the current status of bicycling, walking and access to public transportation in the Portland metropolitan region in support of the development of a Regional Active Transportation Plan (ATP). Findings and opportunities identify potential policy and system changes. The report provides baseline information and analysis of existing policies, programs, infrastructure and levels of active transportation in the region. The report will be used by the ATP Stakeholder Advisory Committee, the Executive Council for Active Transportation, the Metro Council and other committees and groups involved in the development of the plan.

Regional Active Transportation Plan (ATP)

The need for the ATP was identified as an implementation activity of the 2035 Regional Transportation Plan (RTP) to be addressed after adoption of the RTP. [36] The ATP project is the result of many decades of planning and implementation that has the made the region one of the leaders in active transportation. As knowledge of the far-reaching benefits of active transportation continues to grow and investments in active transportation continue to increase, regional leaders have realized that the region needs an agreed upon implementation strategy and framework for prioritizing projects in the RTP. The ATP will be a modal plan of the RTP and will provide updates and changes for the update of the RTP in 2014. [37] The ATP will also recommend changes to the Regional Transportation Functional Plan (RTFP), and potentially the Urban Growth Management Functional Plan (UGMFP), all implementing plans of the RTP. Ultimately the adopted ATP will be implemented through local transportation system plans (TSPs) and local comprehensive plans.

[32]Current Bicycle Friendly Communities 2012, League of American Bicyclists. http://www.bikeleague.org/programs/bicyclefriendlyamerica/communities/pdfs/bfc_master_list_spring2012.pdf

[33] Sunset Magazine. June 2012. Take Back the Burbs. pp. 71-75.

[34] Portland (#1), Eugene (#9), and Salem (#22). *Bicycling Magazine, May 2012.* There are many publications that release "top" lists for the most bikeable and walkable cities in the country, using different criteria. Oregon, Portland and other cities in the state and region invariably end up on these lists.

[35] Prevention Magazine rated Portland the 9th most walkable city in the U.S. in 2012 and the Pedestrian and Bicycle Information Center designated Wilsonville a Bronze Walk Friendly Community.

[36] The 2035 RTP was adopted in 2010. Chapter 6 - Implementation, Section 6.7.14 of the RTP describes the need for developing a modal plan of the RTP for active transportation.

[37] The following modal plans were developed by Metro to inform the 2035 RTP: Regional Freight Plan (June 2010); Regional High Capacity Transit Plan (June 2010); Regional Transportation System Management and Operations Plan (June 2010).

Project Objectives

Project objectives guide the development of the project. Guiding principles, goals and objectives for regional active transportation will be developed in Phase 2 of the project.

A. **Develop Guiding Principles and Criteria** to guide development of the ATP, evaluate alternatives for the Principal Regional Active Transportation Network, and help prioritize funding and projects in the RTP and TSPs. Guiding principles and criteria will be consistent with the region's six desired outcomes.

B. **Identify the Principal Regional Active Transportation Network** of Regional Bicycle and Pedestrian Parkways and Districts. [38] Parkways will be the highest functional classification in the regional bicycle and pedestrian networks, and will include both on and off-street bicycling and walking facilities. The principal regional active transportation network will integrate pedestrian, bicycle and transit networks in a seamless, efficient green network connecting the region.

C. **Develop Active Transportation Policies, Performance Targets, and Concepts** that will update the RTP and RTFP, incorporating and synthesizing policies and priorities from local pedestrian, bicycle, and trail plans.

D. **Prioritize projects and develop a phased Implementation Plan and Funding Strategy** that clearly articulates state, regional and local roles and responsibilities.

ATP Project Phases

Phase 1 (January –June 2012)will develop an existing conditions report with findings and opportunities that will lay the groundwork for framing choices, understanding current investments, and understanding the impacts of active transportation to achieving the region's Six Desired Outcomes and the 2040 vision.

Phase 2 (July –December 2012) will identify guiding principles and criteria and develop a set of concepts for developing the region's Principal Active Transportation Network. Once a conceptual approach has been decided upon, several alternative approaches to implementing the concept will be developed. The alternatives will be modeled, rough cost estimates will be developed and benefits and tradeoffs weighed, and the preferred alternative will be selected. Policy, concept and map updates will be recommended for the RTP and the RTFP.

Phase 3 (January – June 2013) will focus on developing a tiered list of priority projects for development, a phased implementation plan and a proposed funding strategy for implementing the project. The ATP will be proposed for adoption in June 2013 and will be considered for amendment into the RTP either in 2013 or during the update of the RTP scheduled for 2014.

[38] Regional Bicycle Parkways were identified as a functional classification in the 2035 RTPto be further defined in the ATP. It was also identified that a pedestrian equivalent of the Bicycle Parkway would be defined in the ATP. In some instances Bicycle and Pedestrian Parkways may share the same facility (e.g. the Springwater Trail); in other cases there will be separate facilities.

Regional Framework

The ATP is concerned primarily with the regional active transportation system. The regional active transportation system provides the regional framework (the "skeleton") of the dense local walking and bicycling networks. All active transportation trips are local in nature because they are short; usually less than five miles for a one way trip. This does not mean the region does not have a strong interest in them. Replacing short trips made by auto with walking and bicycling helps achieve regional and state policy goals and transportation targets.

Chapter 2 of the RTP describes the regional transportation system in the following way:

> "Multi-modal regional transportation facilities and services are defined both functionally and geographically. Specific facilities or services are included in the RTP based on their function within the regional transportation system rather than their geometric design, ownership or physical characteristics. A facility or service is part of the regional transportation system if it provides access to any activities crucial to the social or economic health of the Portland metropolitan region, including connecting the region to other parts of the state and Pacific Northwest, and providing access to and within 2040 Target Areas (described below). Facilities that connect different parts of the region together by crossing county or city boundaries are crucial to the regional transportation system. Any link that provides access to or within a major regional activity center such as an airport or 2040 target area is also a crucial element of the regional transportation system."

While all roadways (minus some limited access freeways) should accommodate people walking, riding bikes and accessing transit safely and comfortably, the RTP identifies specific facilities that comprise the regional pedestrian and bicycle networks.

Project Area

The ATP will provide a plan for the area within Metro's jurisdictional boundary, which includes the urban portions of Multnomah, Washington and Clackamas Counties and twenty-five cities. Major bicycle and pedestrian connections to areas outside of the urban growth boundary (e.g. the Columbia Gorge, east Clackamas County, Stub Stewart State Park, and Willamette Valley) are included. The ATP will provide a plan for the area within Metro's jurisdictional boundary, which is similar to the urban growth boundary (UGB). Analysis to complete the project may use different **geographic boundaries** depending on the data source. See data used in report, below.

Project Background

The ATP project is a joint outcome of development of the RTP and The Intertwine initiative.[39] The integration of off-street trails, on-street pedestrian and bicycle facilities and public transportation in plans,

[39] Learn more about The Intertwine at www.theintertwine.org

across agency departments, and on the ground was championed by the Metro Blue Ribbon Committee for Trails in the *Case for an Integrated Mobility Strategy.*[40] The Blue Ribbon Committee met in 2008 and recommended that development of the regional trails system should be accelerated, and that it must be done as part of a larger strategy to support active transportation – including well integrated and mutually supportive bike, pedestrian and transit networks.

The Blue Ribbon Committee's final recommendations identified four main elements to implement such a strategy: 1) Organize leadership to champion building out the system, 2) Demonstrate Potential through pilot projects and identify funding (federal, state and local) to construct the projects, 3) Reduce Costs of building out trails and other facilities, especially when using federal funds, 4) and, Develop the System, primarily by fully integrating walking and bicycling into transportation plans.[41]

The committee and Metro established the Executive Council for Active Transportation to organize and grow leadership, and Metro and local partners developed a set of active transportation demonstration projects to develop as funding becomes available (several elements of the projects are moving forward). The development of the ATP implements the "Develop the System" recommendation.

The Role of Public Transportation in the ATP

Public transportation and active transportation are mutually supportive. Almost all trips on transit include a walking or bicycle trip. Five percent (5%) of all trips made in the region are made by transit. Of those trips, 84% of them start as a walking or bicycle trip.[42] Making it safer and more comfortable to walk and ride a bike increases access to public transportation and encourages the use of public transportation. The region's public transportation systems, operated by TriMet and SMART, are an integral part of the regional active transportation system and enable long distance active transportation trips. The region has an adopted High Capacity Transit system plan (2010) and TriMet and SMART have plans for transit system improvements which will be considered throughout the development of the ATP.

The ATP will:

- Focus on increasing access to transit, making it safer and more comfortable and supporting transit ridership by improving conditions for walking and bicycling near transit stops and stations. Identify ways to better integrate walking, bicycling and transit.
- Explore ways that funding for transit, pedestrian and bicycle projects can be leveraged and aligned.

The ATP will not:

- Plan new or different transit routes.
- Include funding recommendations for building or operating transit.
- Identify deficiencies and recommend transit frequency improvement areas or routes.

[40] Metro, 2008 www.oregonmetro.gov/activetransport
[41] Metro, Blue Ribbon Committee for Trails, Case for an Integrated Mobility Strategy, 2009. http://www.oregonmetro.gov/index.cfm/go/by.web/id=27329
[42] 2011 OHAS –0.7% of transit trips are accessed by auto.

Data Used in the Report

Definitions of terms, concepts and sources are provided in text as needed. The Appendices include a glossary derived from the 2035 RTP with additional terms added. In addition to original analysis, much of the material in this report is drawn from existing literature and studies, generally from the last 5-10 years, including various statistical sources, government agency reports and peer-reviewed academic journals. Sources are cited throughout the report. See Appendix 18 for draft list of data sources that provide useful information on active transportation.

- **2011 Oregon Household Activity Survey (OHAS).**[43] In Oregon, 18,100 households were surveyed to gather data on travel behavior. In addition, while not technically part of OHAS, 1,650 Clark County, WA households were surveyed using the same procedures and instruments, for a total of 19,750 households in total, of which 4,800 were in 3-county area (Multnomah, Clackamas and Washington counties), and 6,450 in the 4-county area (includes Clark County). Data from both the 3 and 4 county areas is used in the report. Data collected includes mode, duration, distance and purpose of trips. Walking and biking trips in order to access transit are counted as a separate trip from the transit trip. Demographic data is collected. The weights for the data were prepared by NuStats. An earlier survey was conducted in 1994-95. OHAS data was used in Chapter 1 to provide information current levels of active transportation in the region.
- **2012 Metro State of Safety Report/Oregon Department of Transportation crash data 2007-2010.** [44] Raw crash data provided by ODOT. Data organization, analysis and GIS coding conducted by Metro. Metro produced the Metro State of Safety Report, April 2012, with analysis of the data. The majority of the crash and safety analysis in Chapter 3 is derived from this report, with data from 2010 added. Additional analysis was conducted for this report on the location of pedestrian and bicycle crashes (e.g. intersection, roadway, mid-block crossing), on contributing factors broken out by driver, pedestrian or bicyclist, and driver, pedestrian or bicyclist error. The scope of the analysis is defined as area within the Urban Growth Boundary (UGB) as of December 31, 2012.
- **2006-2010 American Community Survey 5-year estimates** provided estimated data on bike and walk to work mode share for cities in the region.[45] All of the data is estimates because of the small sample size of the survey. ACS 5-year estimates provide the most accurate estimates. The ACS data was used to calculate the serious crash rate per pedestrian and bicycle commuter. The 2010 Census did not collect data on transportation modes used for commuting.
- **National Bicycle and Walking Study: 15-year Status Report, May 2010, Pedestrian and Bicycle Information Center, US Dept. of Transportation, Federal Highway Administration.** Includes data from 2001 and 2009 National Household Travel Survey, provides national context. [46]
- **Metro Regional Land Information System (RLIS).** Data from this data source includes Bikeway Network, Sidewalk Inventory, Trails Database, tree canopy, land use, roadway network and was used in the Cycle Zone Analysis and the analysis of the Regional Pedestrian Corridors and Districts.

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[43] http://cms.oregon.gov/ODOT/TD/TP/pages/travelsurvey.aspx

[44] "Metro State of Safety Report: A compilation of information on roadway-related crashes, injuries, and fatalities in the Portland Metro region and beyond", Metro, April 2012 http://library.oregonmetro.gov/files//state_of_safety_report_043012.pdf

[45] http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml

[46] http://katana.hsrc.unc.edu/cms/downloads/15-year_report.pdf.

- **Metro Transportation Research and Modeling.** Provided data on traffic volumes and speeds for the Cycle Zone Analysis and the analysis of the Regional Pedestrian Corridors and Districts.
- **Oregon Environmental Public Health Tracking** provided mapped data of body mass index at the block group level using Department of Motor Vehicle height, weight and address data.
- **Greater Portland Pulse** Provided U.S. 2000 and 2010 Census data on race and ethnicity, used in Chapter 2.[47]

[47] http://portlandpulse.org/

CHAPTER 2: ACTIVE TRANSPORTATION IN THE REGION TODAY

Regional Benefits from Active Transportation

Active transportation provides many benefits to individuals and communities in the Portland metropolitan region. Active transportation is cost effective; with relatively low levels of investment the region has constructed miles of pedestrian walkways, bikeways and trails connected to the public transportation system – a system that is helping the region achieve its transportation goals such as reducing the number of miles people drive and lowering green house gas emissions. Though the system is incomplete, it has already provided a substantial return on investment.

- Improve health and lower health care costs.
- Tourism.
- Supports the local economy. Bicyclists and pedestrians spend more money at restaurants, drinking establishments and grocery stores. .
- Foster active transportation related industries and jobs.
- Increase development potential and property values.
- Increase transit productivity.
- Provide transportation options and access to daily needs for those who choose not to or cannot drive, including young and older people and people with disabilities.
- Cost effectively protects water and air quality and lower green house gas emissions.
- Save taxpayers money; active transportation projects cost less per mile per user.
- Reduce congestion and crashes and the cost of crashes.
- Less reliance on foreign oil And more money circulating in the local economy.
- Lower household transportation costs, including parking costs.
- Improve quality of life and create vibrant neighborhoods.
- Provide wildlife corridors and improve watershed health with regional trail construction.

Numerous studies and ongoing research have documented the multiple benefits of active transportation. People in the Portland region are more active and have lower rates of obesity compared to national and state levels.[48] Over **11 million trips** were made on regional trails in 2010. With those trips users kept off an estimated **17 million pounds of fat** and **saved the region $155 million** in averted health care costs in

[48] Centers for Disease Control and Prevention. SMART: BRFSS City and County Data, Quick View Charts. Percentage of adults reporting health risks. http://apps.nccd.cdc.gov/brfss-smart/viewrpt.cwr?id=364855&apstoken=APP-V-CCDCRSTLP.CDC.GOV@717264JjtXTJvFytfAwspL717262JmWqyGuAwsDfVBuX&prompt0=OR&prompt1=2010&cmd=Export&Export_FMT=U2FPDF:0

2010.[49] A recent study in a peer reviewed journal found that by 2017, the City of Portland will have experienced a net positive return on investment in its bicycle infrastructure of **$500 million in healthcare savings and $200 million fuel savings.** [50]

Investments in active transportation have been shown to reduce crashes. [51] Metro's State of Safety Report found that crashes and the resulting injuries and deaths cost the region **$958 million a year in property damage, medical costs, and lost productivity** – not to mention the pain and suffering from the loss of life.[52]

The region's balanced transportation system and land use decisions provide transportation options resulting in people driving less than the national average. This translates into **less green house gas emissions** (transportation is responsible for about 25% of the region's green house gas emissions).[53] For **every 1-mile pedaled or walked rather than driven, nearly one pound of carbon dioxide is saved**.[54] By driving less, the Portland region realizes a "green dividend", reducing household transportation costs and keeping **$800,000,000 circulating in the local economy** every year that would have otherwise left the region. [55] A vehicle **costs about $8,946 a year to own and operate**.[56] This is second only to housing costs for the typical household. By comparison, a TriMet annual Adult **All-Zone Pass costs $968, just 12% of the cost of owning an auto.** A bicycle can cost less than a few hundred dollars and walking is free.

Active transportation projects are cheaper to build and maintain compared to auto related projects. Portland's entire 300+ mile bikeway network was constructed **for the approximate cost of one freeway interchange** $60 million ($2008).[57] Constructing active transportation related projects **creates more jobs** than traditional roadway projects. [58]

Active transportation supports tourism, jobs and industry in the region. In Portland, **68% of businesses involved** in the SmartTrips Business program said that promoting biking and walking helped them market

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[49] Beil. Kurt, ND, LAc, MPH. January 21, 2011*Physical Activity and the Intertwine:: A Public Health Method of Reducing Obesity and Healthcare Costs*. A Report to the Intertwine Alliance Partners

[50] Gotschi, Thomas. Costs and benefits of bicycling investments in Portland, Oregon. *Journal of Physical Activity and Health*, 2011,8(Suppl 1), S49-S58.

[51] Wesley E. Marshall, Norman W. Garrick . *Evidence on Why Bike-Friendly Cities Are Safer for All Road Users.* Environmental Practice 13:16–27 (2011).

[52] Metro State of Safety Report, 2012.

[53] Regional Greenhouse Gas Inventory, Metro 2010. http://library.oregonmetro.gov/files//regional_greenhouse_gas_inventory.pdf

[54] US Environmental Protection Agency, 2009 Clean Energy, Calculations and References. http://www.epa.gov/cleanenergy/energy-resources/refs.html . An average car emits 11,450 pounds of carbon dioxide a year, or 5.1 metric tons.

[55] CEO's for Cities. Portland's Green Dividend, by Joe Cortright. July, 2007. http://www.ceosforcities.org/files/PGD%20FINAL.pdf

[56] AAA. April 2012. 'Your Driving Costs'. The costs of owning an auto increased by 1.9% from 2011-2012. http://newsroom.aaa.com/wp-content/uploads/2012/04/YourDrivingCosts2012.pdf

[57] Roger Gelller. April 2011. Build it and they will come. City of Portland

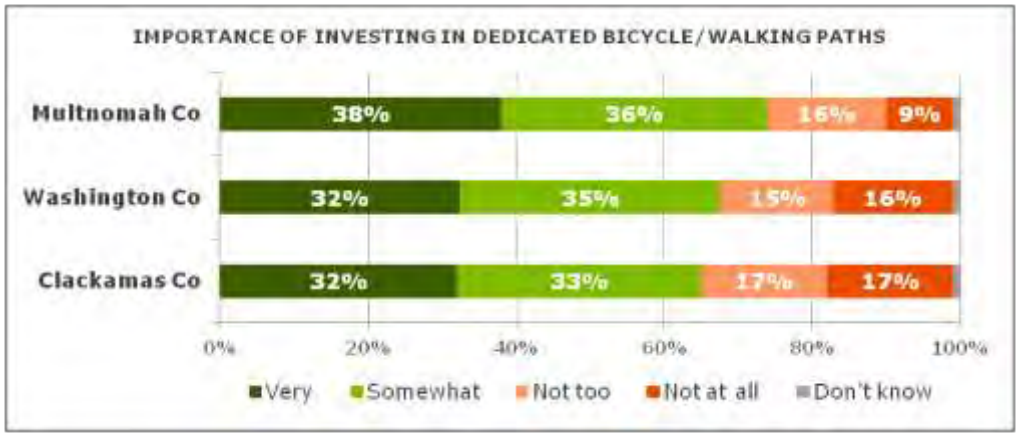
[58] Heidi Garrett-Peltier. 2011. Pedestrian and Bicycle Infrastructure: A National Study of Employment Impacts. http://www.peri.umass.edu/236/hash/64a34bab6a183a2fc06fdc212875a3ad/publication/467/

their business. [59]Over **100 articles in the NY Times** since 1985 have covered tourism associated with bikes in the Portland area.[60] And the bicycle industry brings **$90 million** and **1,500 jobs to Portland**.[61] Providing active transportation infrastructure has been identified as a crucial element to attracting a skilled and quality workforce.[62]

A Metro supported study found that public investment in high quality streetscapes, bicycle facilities, and transit service can **"tip the scale"** in the direction of development feasibility.[63] People are willing to pay more for homes that allow them to walk or bike rather than drive. [64]

Public Demand for Active Transportation

The benefits of active transportation are not lost to the public, and public demand continues to increase for better infrastructure and programs. A national survey conducted in May 2012, found that 83 percent of the respondents think Congress should maintain or increase federal funds for walking and bicycling.[65] In the Portland region there is also strong support for maintaining and increasing investments in active transportation. Active transportation is related to many of the core values that people in the Portland region hold. Local and regional surveys and studies reveal a strong public preference for walkable neighborhoods and safe and comfortable bicycling opportunities because of the benefits that active transportation provides.

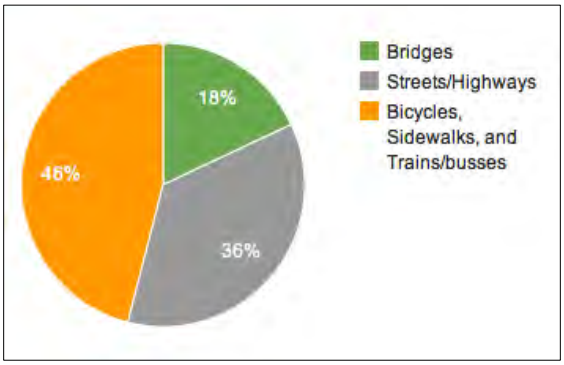


[59] 2011 City of Portland Smart Trips Business Annual Report. http://www.portlandoregon.gov/transportation/article/382810
[60] Google search of NY Times articles conducted by Metro, using search terms bicycle, Portland, bike, vacation
[61] Alta Planning and Design. The Value of the Bicycle Related Industry in Portland, 2008. http://www.altaplanning.com/App_Content/files/fp_docs/2008%20Portland%20Bicycle-Related%20Economy%20Report.pdf
[62] The Downtown Denver Partnership. http://www.bizjournals.com/denver/pdf/DDPMagnetReport021512.pdf
[63] The Impact of Amenities on Development Feasibility. December 2010. Fregonese Associates. http://library.oregonmetro.gov/files//metro-amenities-brochure-8pg-screen.pdf
[64] NY Times. "Now Coveted, a Walkable, Convenient Place to Live." June 5, 2012. http://www.nytimes.com/2012/05/27/opinion/sunday/now-coveted-a-walkable-convenient-place.html?_r=4
[65] America Bikes. 2012. *National poll: American support funding for sidewalks and bikeways.* http://www.americabikes.org/2012survey

A recent Metro supported Opt-In poll of 3,865 residents in the Portland metropolitan region found that three-quarters or more members in each county said it is "very" or "somewhat" important for them to have safe walking and bicycling paths in their neighborhood and city, and more than 65 percent of respondents in each county said it is very important or somewhat important to invest in separated bicycle and walking trails and pathways. [66]. Residents in Beaverton ranked establishing a system of sidewalks, bike paths and public spaces within and across all Beaverton neighborhoods number one out of a long list of community building goals.[67]

Respondents to a 2008 telephone survey of 600 voters in Washington County would like to see 46% of transportation resources dedicated to bicycle and pedestrian facilities and transit. See Figure 1 below. [68]

Figure 1: Washington County Residents Average Allocation of Transportation Resources



A 2012 regional poll by David, Hibbits and Midgehall had similar findings. The poll found that top issues for people are health, the environment, being economical and thrifty, experiencing new places and things, family time, independence, safety, and getting to know your community. While transportation ranks low, compared to other things, on the list of issues that people are concerned about, bicycling and walking provide one way for people achieve these priorities.

The National Survey of Pedestrian and Bicyclist Attitudes and Behaviors asked what they would improve for bicycling and walking- 73% of people over age 16 wanted to see more bicycle facilities and 74% wanted to see an increase in walking facilities. [69] Participants in regional focus groups asked about regional investments, most often cited investment in public transportation, especially MAX, as an example of good regional investments.[70] Participants in regional focus groups indicated support for compact neighborhoods and transportation policies that support public transit, walking and bicycling.[71]

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[66] http://panel.decipherinc.com/images/uploads/optin/Metro_Active_transportation--Nov1.pdf Opt In is an online survey tool open to all residents in the region.
[67] 2010 Beaverton Community Vision, Spring 2010 Survey Results
[68] 2008, Davis, Hibbits and Midghall, Inc. (DHM), telephone survey of Washington County voters.
[69] Highlights from survey, 2002. http://www.bts.gov/programs/omnibus_surveys/targeted_survey/2002_national_survey_of_pedestrian_and_bicyclist_attitudes_and_behaviors/survey_highlights/entire.pdf
[70] 2010, Davis, Hibbits and Midghall, Inc. (DHM) February 2010, Metro regional investment fund focus groups
[71] Davis, Hibbits and Midghall, Inc., DRAFT Climate Change Focus Group and Survey Report, prepared for Metro, March 2011.

Levels of Bicycling and Walking

Photos: Leslie Bloom and Nora Varnado, Alliance for Biking and Walking

Nationally, active travel has been in decline over the last three decades, but may finally be on the rise.[72] In the United States in 1990, fewer than 4.4% of commuting trips were made by bicycling and walking, down from 6.7% in 1980.[73] Analysis of the 2001 and 2009 NHTS surveys reveal a substantial increase in the share of trips by walking (from 8.6% to 10.5%) but only a slight increase in the share of trips by cycling (from 0.9% to 1.0%).[74] The National Bicycling and Walking Study set two overall goals for bicycling and walking in a 1994 report to the US Congress: 1) Double the percentage of total trips made by bicycling and walking in the US from 7.9% to 15.8%; and 2) Simultaneously reduce the number of bicyclists and pedestrians killed or injured in traffic crashes by 10%.[75]

There has also been in an increase in active travel in the Portland region, though, unlike national trends, the increase in trips by bicycle is higher than those made by walking. While active transportation is on the rise in the region and the U.S., however, European countries such as Germany, the Netherlands, France, the UK, and Denmark still have much higher the levels of active transportation. [76]

One in 6 trips in the 3-county Metro area is now made using active travel. Comparison of the 1994-1995 Travel Behavior Survey and the 2011 OHAS shows that between 1994-95 and 2011, all trips made by walking, biking and transit increased by 36% (from 13.1% to 17.8% of all trips) while trips made by auto declined by 5.7%. Walking trips increased by 14%, trips by biking increased over 190%, and trips by transit increased by 50% (Table 1). In Clark County, trips by walking and bicycling decreased by 31% and 9% respectively and transit trips increased by 40% (Table 1).

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[72] John Pucher, et. al.Walking and Cycling in the United States, 2001–2009: Evidence From the National Household Travel Surveys. American Journal of Public Health. Supplement 1, 2011, Vol 101, No. S1. http://www.policy.rutgers.edu/faculty/pucher/2001-2009.pdf

[73] The National Bicycle and Walking Study: 15-year Status Report, May 2010, Pedestrian and Bicycle Information Center, US Dept. of Transportation, Federal Highway Administration. http://katana.hsrc.unc.edu/cms/downloads/15-year_report.pdf

[74] Pucher, et al. 2011

[75] The targets do not have a timeline for completion.

[76] Alliance for Biking and Walking, 2012 Benchmarking Report, Trends in Cycling and Walking: Share of all daily trips in the U.S., Germany, the Netherlands, France, the UK, and Denmark, 1974-2009 http://www.peoplepoweredmovement.org/site/index.php/site/memberservices/2012_benchmarking_report/

For all trips made in Multnomah, Washington and Clackamas Counties (the 3-county region) , 10.4% of the trips are made by walking and 3.2% are made riding a bike. Nearly five percent of all trips are made by transit. For all transit trips, 84% of the trips are accessed by walking or bicycle. The majority of the trips, 81.5%, in the region are made by auto, but auto trips are declining. [77]

Table 1: Mode Share for All Trips in the 3-County Area, 1994-2011

	Walking	Biking	Walk or Bike to Transit	Total Active transport	Transit – Auto access	Total Transit	SOV*	HOV*	Total Auto
	3 Metro Counties	3 Metro Counties	3 Metro Counties	3 Metro Counties	3 Metro Counties	3 Metro Counties	3 Metro Counties	3 Metro Counties	3 Metro Counties
	Clark Co.	Clark Co.	Clark Co.	Clark Co.	Clark Co.	Clark Co.	Clark Co.	Clark Co.	Clark Co.
1994-95	9.1%	1.1%	2.9%	**13.1%**	0.4%	3.3%	43.4%	43.1%	86.5%
	6.9%	1.1%	0.9%	**8.9%**	0.1%	1%	43.5%	47.6%	91.1%
2011	10.4%	3.2%	4.2%	**17.8%**	0.7%	4.9%	41.4%	40.1%	81.5%
	4.7%	1.0%	0.7%	**6.4%**	0.7%	1.4%	47.1%	45.7%	92.8%
Percent Change	+14.3%	+190.9%	+44.8%	**+35.9%**	+75%	+51.5%	-4.6%	-6.9%	-5.7%
	-31.8%	-9.0%	-22.2%	**-28.0%**	+600%	+40%	+8.3%	-3.9%	+1.9%

Source: 2011 OHAS, SOV=single occupancy vehicle, HOV=high occupancy vehicle

Table 2, below, provides information included in the 2035 RTP on regional targets for active transportation mode share and modeled mode share data for 2005 and 2035. Comparing the modeled data to the 2011 OHAS data illustrates that walking, bicycling and transit use are increasing faster than anticipated. The increase in bicycle trips has met the regional bicycle mode share target (for 2035) of 3%.[78] See Table below.

[77] County and Portland data from the 2011 OHAS are not yet available. Detailed mode share may only be available for the City of Portland and Counties. This additional data will provide more detailed information on variations in mode share in the region. Lack of detailed mode share for each city is a challenge for measuring performance.

[78] Oregon does not have specific targets identified for active transportation mode shares. Section 660-012-0035 of the Transportation Planning Rule does include a performance target to increase the modal share of transit, walking and bicycle trips, but percentage of mode share is not defined.

Table 2: RTP Targets for Active Transportation Mode Share, 4-County Area

Active transportation mode	2010 Modeled Mode Share for all trips	2035 Modeled Mode Share for all trips with Full Build Out of State RTP Network	2035 RTP Active Transportation Target By 2035, triple walking, biking and transit mode share compared to 2005
Transit	3.8%	4.9%	10%
Walking	8.9%	9.6%	19%
Bicycling	2.8%	3.1%	3%

** Metro's travel forecast model, utilizing data from the 1994-95Travel Behavior Survey. Refer to Appendix 1.7 "Performance Outputs" in the 2035 RTP. Mode share targets and modeled data are for the 4-county area.*

Table 3, below, provides the mode share for sub-areas within Portland, illustrating the wide range in mode shares depending on the area. For example, while the 4-county areas bicycle mode share is 2.8%, the Portland bicycle share is 6% and the Northeast area of the city has a bicycle mode share of 9.8%. Walking and transit mode share is also higher than the regional average in certain areas of the city as well.

Table 3: Mode Share by Place of Residence, 1994-95 compared to 2011 Oregon Household Activity Survey

Area	Walk		Bike		Transit		Auto	
	1994	2011	1994	2011	1994	2011	1994	2011
1: Portland - Central City	37.6%	36.4%	2.2%	7.1%	13.6%	18.7%	46.5%	37.8%
2: Portland - Southwest	12.4%	6.7%	1.2%	1.3%	2.6%	5.6%	83.8%	86.3%
3: Portland - Northwest	20.6%	24.3%	1.4%	4.5%	4.3%	7.8%	73.7%	63.4%
4: Portland - North	*	10.4%	*	4.0%	2.8%	7.7%	84.1%	77.9%
5: Portland - Northeast	10.4%	15.9%	0.8%	9.8%	4.6%	5.8%	84.2%	68.5%
6: Portland - Southeast	12.3%	17.5%	2.6%	7.5%	6.8%	5.8%	78.3%	69.1%
7: Portland - East	6.8%	10.3%	0.5%	1.8%	5.1%	6.9%	87.5%	81.0%
8: Oregon - 3 Co Suburbs	6.3%	7.4%	0.7%	1.5%	1.7%	3.9%	91.2%	87.2%
9: Washington - Clark Co	6.9%	4.7%	1.1%	1.0%	1.0%	1.4%	91.0%	92.8%
4-County Area	**8.7%**	**9.2%**	**1.1%**	**2.8%**	**2.9%**	**4.2%**	**87.3%**	**83.8%**
Portland	**13.0%**	**15.0%**	**1.6%**	**6.0%**	**5.5%**	**6.6%**	**79.8%**	**72.4%**

*1994 Travel Behavior Survey and 2011 OHAS. *There were insufficient bike samples in subarea 4 (Portland - North) in 1994-95. Combining bike and walk trips, the bike-walk mode share for subarea 4 households in 1994-95 was 13.1%.*

Data on walking and bicycling mode share from the 2011OHAS is not available for cities other than Portland. The 2006-2010 American Community Survey (ACS) 5-year estimates provide another data source on transportation mode for workers over age 16.[79] Portland has the highest bicycle and pedestrian

[79] Workers were asked to list only the means of transportation they used on the largest number of days in that week. Likewise, workers were asked only for the means of transportation used for the longest distance during the trips. If someone biked or walked one mile to a bus stop and rode the bus for two miles they would not be recorded as a bicyclist or pedestrian.

commute of the cities surveyed. Over 5% of all commute trips are made by bicycle.[80] Appendix 2 provides pedestrian and bicycle mode shares for other cities and areas in the region.

Table 4: Bike to Work Mode Share in Beaverton, Gresham, Hillsboro and Portland, 2006-2010 Estimate

	Total pop. 2010	Total workers over 16 yrs.	Total bike to work	% Commute by bike
Portland	583,627	286,288	15,871	5.4%
Beaverton	90,203	45,039	514	1.0%
Hillsboro	91,507	42,648	547	1.3%
Gresham	105,588	46,451	136	0.3%

Population and total workers: 2010 U.S. Census. Bicycle commute mode share: 2006-2010 American Community Survey 5-year Estimate

Table 5: Walk to Work Mode in Beaverton, Gresham, Hillsboro and Portland, 2006-2010 Estimate

	Total pop. 2010	Total workers over 16 yrs.	Total Walk to Work	% Commute by Walking
Beaverton	90,203	45,039	1,970	4.3%
Portland	583,627	286,288	15,727	5.4%
Gresham	105,588	46,451	1,147	2.5%
Hillsboro	91,507	42,648	1,166	2.7%

Population and total workers: 2010 U.S. Census. Pedestrian commute mode share: 2006-2010 American Community Survey 5-year Estimate

A pedestrian density map in the Metro State of Safety Report (found in Appendix 22) illustrates pedestrian activity in the region using transit on and off boarding data from TriMet.

Who is Walking and Bicycling?

Regional demographics impact and are impacted by transportation. This section provides information on the income level, race and gender of the households using active transportation using 2011 OHAS data and 2010 US Census data.

- The region is experiencing growth in population. Between 2000 and 2010, the population of the 4-county area increased 15.5%. Households of color are growing faster than white households.
- The population over 65 is growing. This population will need more transportation options to maintain independence and "age" in place.
- Younger people appear to be driving less and using active transportation and transit more than previously. According to the National Household Travel Survey, from 2001 to 2009, the annual number of vehicle-miles traveled by young people (16 to 34-year-olds) decreased from 10,300 miles to 7,900 miles per capita—a drop of 23%. In 2009, 16 to 34-year-olds as a whole took 24% more bike trips than they took in 2001, despite the age group actually shrinking in size by 2%. In 2009, 16 to 34-year-olds walked to destinations 16% more frequently than did 16 to 34-year-olds in 2001. From 2001 to 2009, the number of passenger-miles traveled by 16 to 34-year-olds on public transit increased by 40%.[81]

[80] The Portland City Auditor estimates bicycle commute share at 8%.
[81] OSPIRG Foundation and Frontier Group, April 2012. Transportation and the New Generation, Why Young People are Driving Less and What it Means for Transportation Policy. http://ospirgfoundation.org/reports/orf/transportation-and-new-generation

Income

Table 6 provides information on the percentage of trips by mode for each of the income levels. Households with lower income levels make more of their trips using active modes, especially walking and taking transit. As income rises, more trips are made by auto. For example, for households with income under $15,000, 26% of all trips are made by active modes and 74% of trips are made by auto, compared to households with the highest level of income, $150,000 or more, where 11% of trips are made by active modes and 89% of trips are made by auto.

Table 6: Mode Share by Household Income, 4-County Area, 2011

Income Level	% of population	Walk	Bike	Transit	Auto	TOTAL
$0 - $14,999	8.8%	16.7%	1.3%	8.0%	74.0%	**100.0%**
$15,000 - $24,999	11.7%	12.1%	2.7%	9.6%	75.6%	**100.0%**
$25,000 - $34,999	10.5%	10.7%	2.7%	6.0%	80.6%	**100.0%**
$35,000 - 49,999	15.4%	9.0%	3.0%	4.7%	83.3%	**100.0%**
$50,000 - 74,999	18.6%	9.6%	3.0%	3.6%	83.8%	**100.0%**
$75,000 - $99,999	12.1%	7.8%	2.4%	2.7%	87.2%	**100.0%**
$100,000 - $149,999	14.8%	7.0%	3.1%	2.1%	87.8%	**100.0%**
$150,000 or more	8.3%	7.2%	1.4%	2.4%	89.0%	**100.0%**

Source: 2011 OHAS

Table 7 provides the information on household income by mode share. For walking trips, 32.8% of all walking trips are made by households with income under $35,000, 32.3% are made by households with income between $35,000 and $75,000, and 35% are made by households with income greater than $75,000.

For trips by bicycle, 21.2% of all trips by bicycle are made by households with income under $35,000, 37.1% are made by households with income between $35,000 and $75,000, and 41.8% are made by households with income greater than $75,000.

For transit trips, 44.6% of trips by transit are made by households with income under $35,000, 30% are made by households with income between $35,000 and $75,000 and 24.6% are made by households with income greater than $75,000.

Table 7: Household Income by Mode Share, 4-County Area, 2011

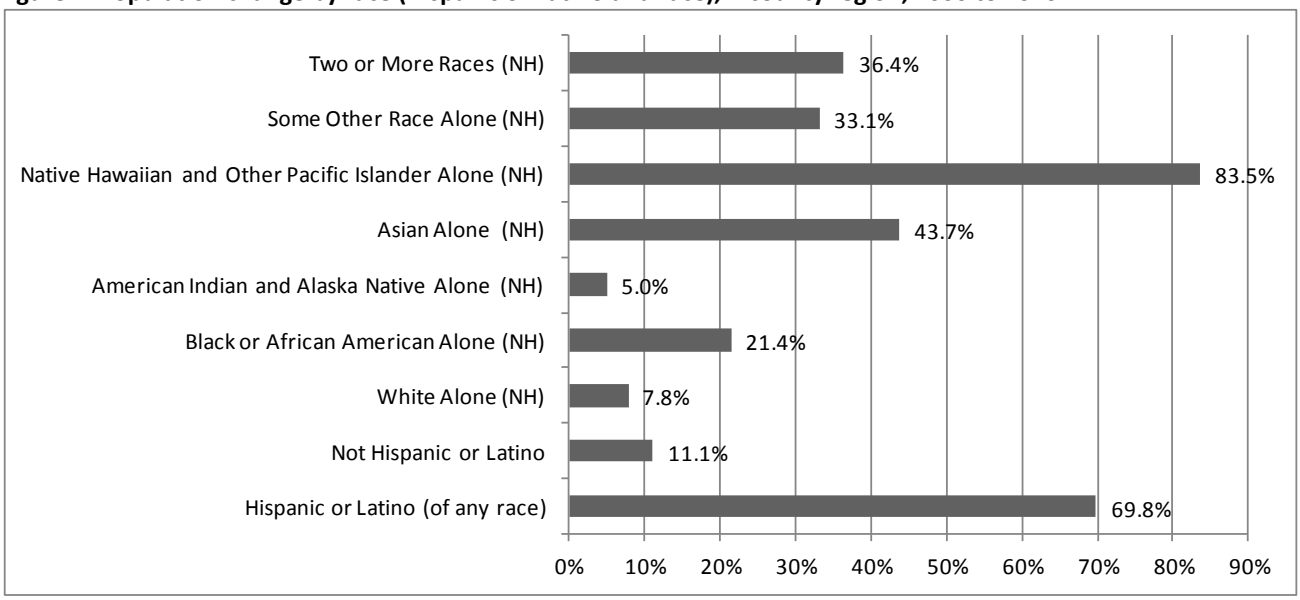
Income level	% of population	Walk	Bike	Transit	Auto
$0 - $14,999	8.8%	11.3%	3.2%	11.8%	5.5%
$15,000 - $24,999	11.7%	13.4%	10.6%	23.0%	9.2%
$25,000 - $34,999	10.5%	8.1%	7.4%	9.8%	6.7%
$35,000 - 49,999	15.4%	13.2%	15.4%	15.0%	13.4%
$50,000 - 74,999	18.6%	19.1%	21.7%	15.8%	18.5%
$75,000 - $99,999	12.1%	11.6%	12.6%	8.8%	14.4%
$100,000 - $149,999	14.8%	14.1%	22.8%	9.1%	19.7%
$150,000 or more	8.3%	9.3%	6.4%	6.7%	12.7%
TOTAL	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: 2011 OHAS

Race and Ethnicity

Between 2000 and 2010, the population of the 4-county area increased 15.5%.[82] The minority population has increased substantially in every county in the region. The Native Hawaiian and Pacific Islander population saw the largest increase, though it comprised the smallest segment of the population as a category. The next largest increases were seen in the Hispanic and Latino and Asian populations. The lowest increases were for American Indian and Alaskan Natives and Whites. The most significant increases in non-white populations are occurring in the under 18 age group.[83]See Figure below.

Figure 2: Population change by race (Hispanic or Latino and race), 4-county region, 2000 to 2010

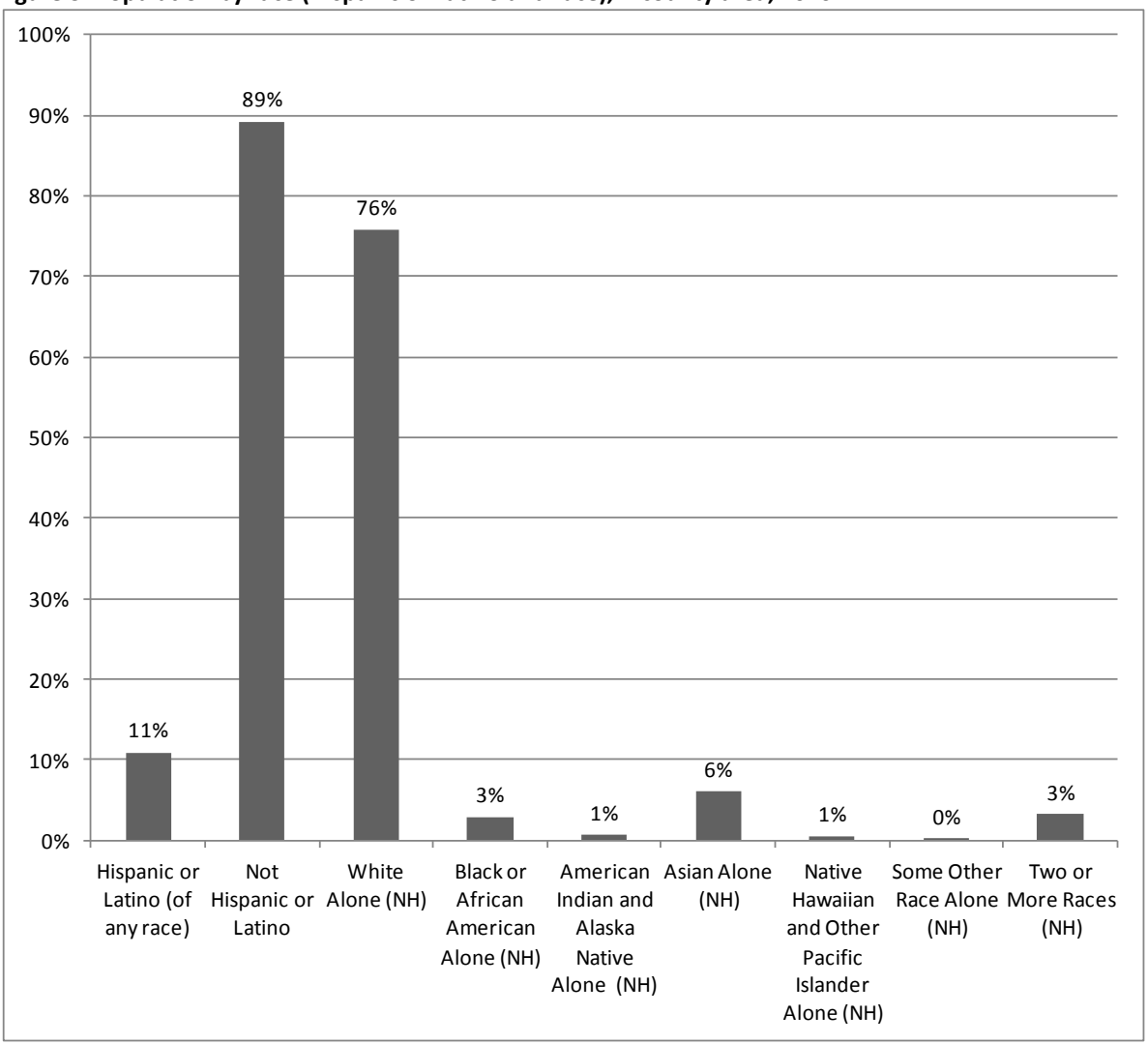


Source: Portland Pulse using 2000 and 2010 U.S. Census, Table SF 1

Figure 3 shows the population of the 4-county area by race and ethnicity (Hispanic and Latino).[84] Eleven percent of the total population identifies as Hispanic or Latino and 89% identifies as not Hispanic or Latino. Seventy-six percent of the population identifies as white (alone, not Hispanic or Latino).

[82] Data on race and ethnicity is from the Greater Portland Pulse project. http://gpvi.research.pdx.edu/ Data sources: U.S. Census Bureau, 2010 Census, SF1; 2000 Census, SF1. Tabulated by Population Research Center, Portland State University. http://www.census.gov/.
[83] Refer to Greater Portland Pulse project. http://gpvi.research.pdx.edu/
[84] Population percentages do not total 100.

Figure 3: Population by race (Hispanic or Latino and race), 4-county area, 2010



Source: Portland Pulse using 2010 U.S. Census, Table SF 1

In the 4-county region, both white and non-white heads of households make the majority of trips by auto. However, non-white householders make a greater percentage of *their* trips by walking, bicycling and transit than white householders. Table 8, below, shows that non-white householders make 20.5% of all their trips by walking and bicycling and transit, while white householders make 15% of all their trips by walking and bicycling and transit.

Table 8: Mode Share by Race of Householder, 4-County Area, 2011

	% population	Walk	Bike	Transit	Auto	**TOTAL**
Non-white	24%	10.7%	3.3%	6.5%	79.5%	**100.0%**
White	76%	8.8%	2.7%	3.5%	85.0%	**100.0%**
	100.0%					

Source: 2011 OHAS and 2010 U.S. Census, Table SF 1

Non-white and Hispanic or Latino households make up almost 25% of the population. Table 9, below, shows that for all walking trips in the region, 24.7% are made by non-white householders and 75.3% are

made by white householders; of all trips by bicycle, 25.1% are made by non-white householders and 74.9% are made by white householders; of all transit trips, 32.9% are made by non-white householders and 67.1% are made by non-white householders.

Table 9: Race of Householder by Mode Share, 4-County Area, 2011

	% population	Walk	Bike	Transit	Auto
Non-white	24%	24.7%	25.1%	32.9%	20.1%
White	76%	75.3%	74.9%	67.1%	79.9%
TOTAL	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: 2011 OHAS and 2010 U.S. Census, Table SF 1

Gender

For all transportation modes except bicycling, mode share is fairly equally divided between the genders. Women make slightly more of their trips by walking and driving than men. In the 4-county area, 53% of the population is female and 47% is male[85].

Table 10: Mode Share by Gender, 4-County Area, 2011

	Walk	Bike	Transit	Auto	TOTAL
Male	8.9%	4.0%	4.4%	82.6%	**100.0%**
Female	9.5%	1.8%	4.1%	84.6%	**100.0%**

Source: 2011 OHAS

Table 11: Gender by Mode Share, 4-County Area, 2011

	Walk	Bike	Transit	Auto
Male	42.7%	64.7%	46.7%	43.9%
Female	57.3%	35.3%	53.3%	56.1%
TOTAL	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: 2011 OHAS

Women and girls are often seen as an "indicator species" for comfort of the bicycling environment. As the comfort and safety of the bicycling environment increases, so do the number of women and girls riding bicycles. While women make up 53% of the 4-County area's population, they only make 35.3% of all bicycle trips. However, the proportion of women using the bicycle for trips is increasing, up 16.5% since the 1994-95 survey.

Table 12: Bicycle Mode Share by Gender, 4-County Area, 1994-2011

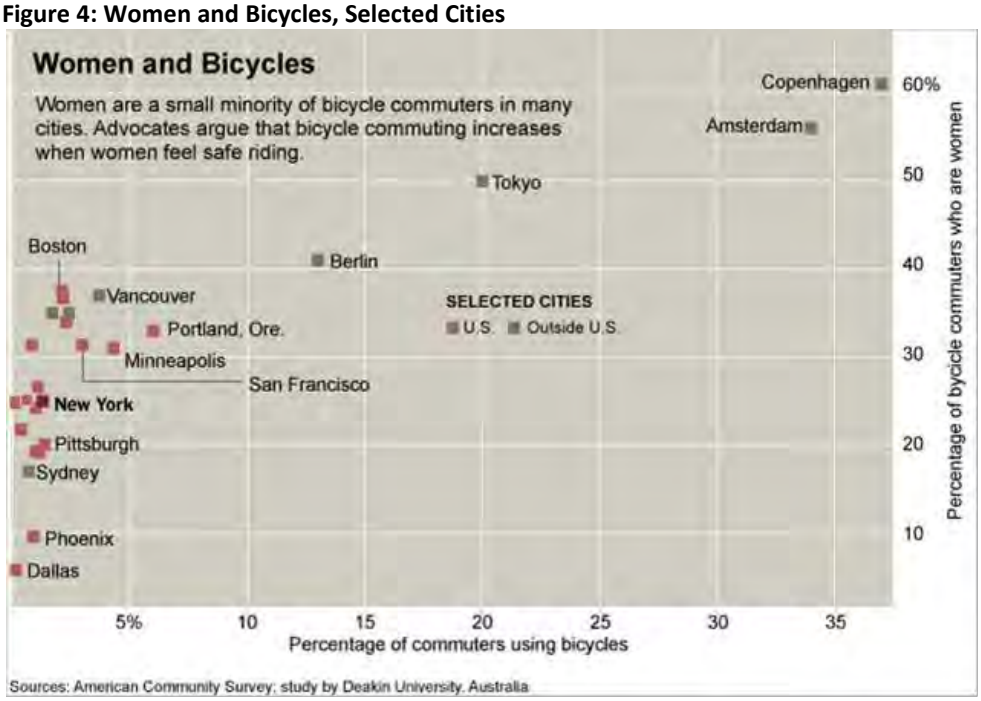
	1994	2011
Male	69.7%	64.7%
Female	30.3%	35.3%

Source: 2011 OHAS

Figure 4 illustrates that cities that are recognized for their investments in bicycle related infrastructure tend to have higher percentages of women riding bicycles. Copenhagen, one of the most bicycle friendly cities in the world, has a bicycle mode share of nearly 40%, 60% of whom are women.

[85] *2011 OHAS*

Figure 4: Women and Bicycles, Selected Cities



Age

Young and older populations are recognized as vulnerable populations when it comes to active transportation. They are also the populations that tend to walk, ride bicycles and take transit more often. Many are dependent on active transportation; that is, they do not have the option of driving. The very young and the very old often need more time to cross the street. Young people have less experience navigating the transportation system. In the 4-county area, nearly 32% of the population is under the age of 25, and over 23% are over the age 55. Children under the age of 14 make 23.2% of all walking trips in the region and 15.2% of all trips by bicycle.

People between the ages of 15 and 24 are driving less than any other age group. Young people under the age of 35 make the most trips by transit and walking.

Table 13: Mode Share by Age - 4 County Area, 2011

Age group	% of population	Walk	Bike	Transit	Auto	TOTAL
0-14	20.4%	14.0%	2.8%	1.7%	81.6%	**100.0%**
15-24	11.8%	9.2%	2.1%	8.1%	80.7%	**100.0%**
25-34	15.0%	12.6%	4.2%	7.4%	75.9%	**100.0%**
35-44	13.9%	9.0%	3.7%	4.3%	83.0%	**100.0%**
45-54	15.6%	6.2%	3.1%	3.4%	87.4%	**100.0%**
55-64	12.0%	6.6%	1.8%	3.3%	88.3%	**100.0%**
65+	11.3%	7.1%	0.8%	2.7%	89.4%	**100.0%**

Source: 2011 OHAS

For all trips made by walking in the region, 32.5% of the trips are made by people younger than 25; 20.8% by people ages of 25-34; 29.3% by people ages 35-54; and 17.3% by people over 55.

For all trips made by riding a bicycle, 22.2% of the trips are made by people younger than 25, 22.8% by people ages of 25-34; 43.6% by people ages 35-54; and 11.4% by people over 55.

For all trips made by transit (which include walking and bicycle trips), 24.2% of the trips are made by people younger than 25; 26.7% by people ages of 25-34; 32.5% by people ages 35-54; and 16.6% by people over 55.

Table 14: Age by Mode Share - 4 County Area, 2011

Age group	% of population	Walk	Bike	Transit	Auto
0-14	20.4%	23.2%	15.2%	6.2%	15.1%
15-24	11.8%	9.3%	7.0%	18.0%	9.1%
25-34	15.0%	20.8%	22.8%	26.7%	14.0%
35-44	13.9%	16.6%	22.9%	17.4%	17.1%
45-54	15.6%	12.7%	20.7%	15.1%	19.9%
55-64	12.0%	9.3%	8.5%	10.0%	13.7%
65+	11.3%	8.0%	2.9%	6.6%	11.1%
TOTAL	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: 2011 OHAS

Disability

Nearly 7% of the population reports having a disability that affects their ability to travel. [86] Table 15 shows that people with disabilities drive and bicycle less and walk and take transit more often than people that reported having no disability that affects their ability to travel. People with disabilities particularly rely on transit, and therefore accessing transit, for travel.

Table 15: Mode Share by Disability, 4-County Area, 2011

	Walk	Bike	Transit	Auto	Total
Disability that affects ability to travel	10.8%	1.6%	7.4%	80.2%	**100%**
No disability that affects ability to travel	9.1%	2.8%	4.0%	84.0%	**100%**
All persons (included non-responses)	9.2%	2.8%	4.2%	83.8%	**100%**

Source: 2011 OHAS

How are People Using Active Transportation?

The 2011 OHAS data provides information on the types of trips that people are making by active modes. For all trips with work as a destination, 18.5% of the trips are made by active modes. For all trips with school (k-12) and college as the destination, 15.1% of the trips are made by active modes and 47.2% are made by school bus (some of these trips may include walking or bicycling). For all social, recreation and errand (e.g. shopping) trips, 16.4% of the trips are made using active modes.

[86] 2011 OHAS

Table 16: Mode Share by ATP Trip Purpose – 3-County Area, 2011[87]

	Work	School, College	Social, Recreation, Errand
Walk	7.5%	9.2%	10.5%
Bike	4.2%	2.2%	2.6%
Transit - walk/bike access	6.8%	3.7%	3.3%
Transit - auto access	1.8%	0.8%	0.3%
SOV	68.7%	7.9%	39.6%
HOV	11.0%	28.9%	43.7%
School Bus	0.0%	47.2%	0.0%
TOTAL	**100.0%**	**100.0%**	**100.0%**

Source: 2011 OHAS

Table 17 shows that for walking, bicycling and transit trips accessed by walking or riding a bike, non-commute or school related trips make up the highest percentage of active transportation trips. This illustrates how using Census data, which only counts commute trips (and only for the main mode), undercounts active travel.

Table 17: ATP Trip Purpose by Mode Share – 3-County Area, 2011

	Work	School, College	Social, Recreation, Errand	**TOTAL**
Walk	18.9%	15.9%	65.2%	**100.0%**
Bike	34.3%	12.4%	53.3%	**100.0%**
Transit - walk/bike access	38.8%	14.7%	46.6%	**100.0%**
Transit - auto access	56.9%	18.1%	25.0%	**100.0%**
SOV	39.8%	3.2%	57.1%	**100.0%**
HOV	7.9%	14.2%	77.9%	**100.0%**
School Bus	0.0%	100.0%	0.0%	**100.0%**

Source: 2011 OHAS

Nationally, in 1969, approximately 50% of children walked or bicycled to school, with approximately 87% of children living within one mile of school walking or bicycling. Today, fewer than 15% of schoolchildren walk or bicycle to school.[88]

As a result, children today are less active, less independent, and experience obesity and overweight at a higher rate. As much as 20 to 30% of morning traffic can be generated by parents driving their children to schools, and traffic-related crashes are the top cause of death and major injury for children in the U.S. ages 1-17.

[87] 4-county area data for trip purpose was not available at the time of the report – 3-county data is used.
[88] Booz Allen Hamilton (July 2011). *Transportation and Health: Policy Interventions for Safer, Healthier People and Communities.* http://www.prevent.org/Additional-Pages/Transportation-and-Health.aspx

Table 18: Mode Share for Travel to School and College, 4-County Area, 2011

	Walk %	Bike %	Walk and Bike %	Transit %	Auto (SOV and HOV) %	School bus %
School, preK-12	13.2%	3.2%	N/A	2.3%	49.2%	32.1%
College	*	*	8.4%	27.2%	64.4%	N/A

Source: 2011 OHAS

Error! Reference source not found. illustrates the variety of modes that children use to get to school, as well as illustrating that for children living within one mile of school in Oregon, many of the trips are still made by auto.

Table 19: Modes of School Commute by Oregon Children who Live Within One Mile of School, 2007

Regular transportation mode	1st to 3rd grade	4th to 5th grade	6th to 8th grade	9th to 12th grade	Total
Walk to school at least 3 days/week	36.6%	38.3%	63.6%	62.2%	48.4%
Bikes to school at least 3 days/week	7.3%*	6.9%*	14.3%*	6.5%*	8.2%
Rides the school/ public bus at least 3 days/week	20.1%	24.3%	26.2%	10.7%	19.4%
Rides in a car or carpool to school at least 3 days/week	43.9%	39.5%	26.3%	40.0%	39.0%

*This number may be statistically unreliable, interpret with caution **Parents were asked to estimate frequency with which child used various modes of commute. Categories were not presented mutually exclusive and results do not necessarily total 100%
Source: 2001 Oregon Behavioral Risk Factor Surveillance System; Oregon Health Authority, Oregon Overweight, Obesity Physical Activity and Nutrition Facts, 2012

Short Trips by Auto in the Region

In the 4-county area, the majority of trips made by auto in the region are for short trips. Over 60% are less than five miles in length. Nearly 44% of all trips made by autos are less than three miles in length.[89] The region is making fewer short trips by auto than the national average. Nationally, 50% trips of all auto trips are less than three miles.[90]

Table , below, shows the share of trips by trip lengths for trips made only within the 4-county area. Nearly 15% of all trips made by auto are less than one mile and over 16% are less than two miles. It takes between 15 -20 minutes to walk a mile and about 5-10 minutes to ride a bicycle a mile. Trips less than

[89] 2011 OHAS
[90] National Household Travel Survey, 2009.

three miles could easily be replaced by a bicycle or walking trip if safe and comfortable routes connected people to the destinations they wanted to get to.

Table 20: Vehicle Trips by Length for Trips Wholly Within 4-County Area, 2011

0.10 to 0.99 miles	14.71%
1.00 to 1.99 miles	16.37%
2.00 to 2.99 miles	12.61%
3.00 to 3.99 miles	9.64%
4.00 to 4.99 miles	7.02%
5.00 to 5.99 miles	5.81%
6.00 to 6.99 miles	5.00%
7.00 to 7.99 miles	3.57%
8.00 to 8.99 miles	3.92%
9.00 to 9.99 miles	2.90%
10.00 to 30.00 miles or more	18.44%
TOTAL	**100.0%**

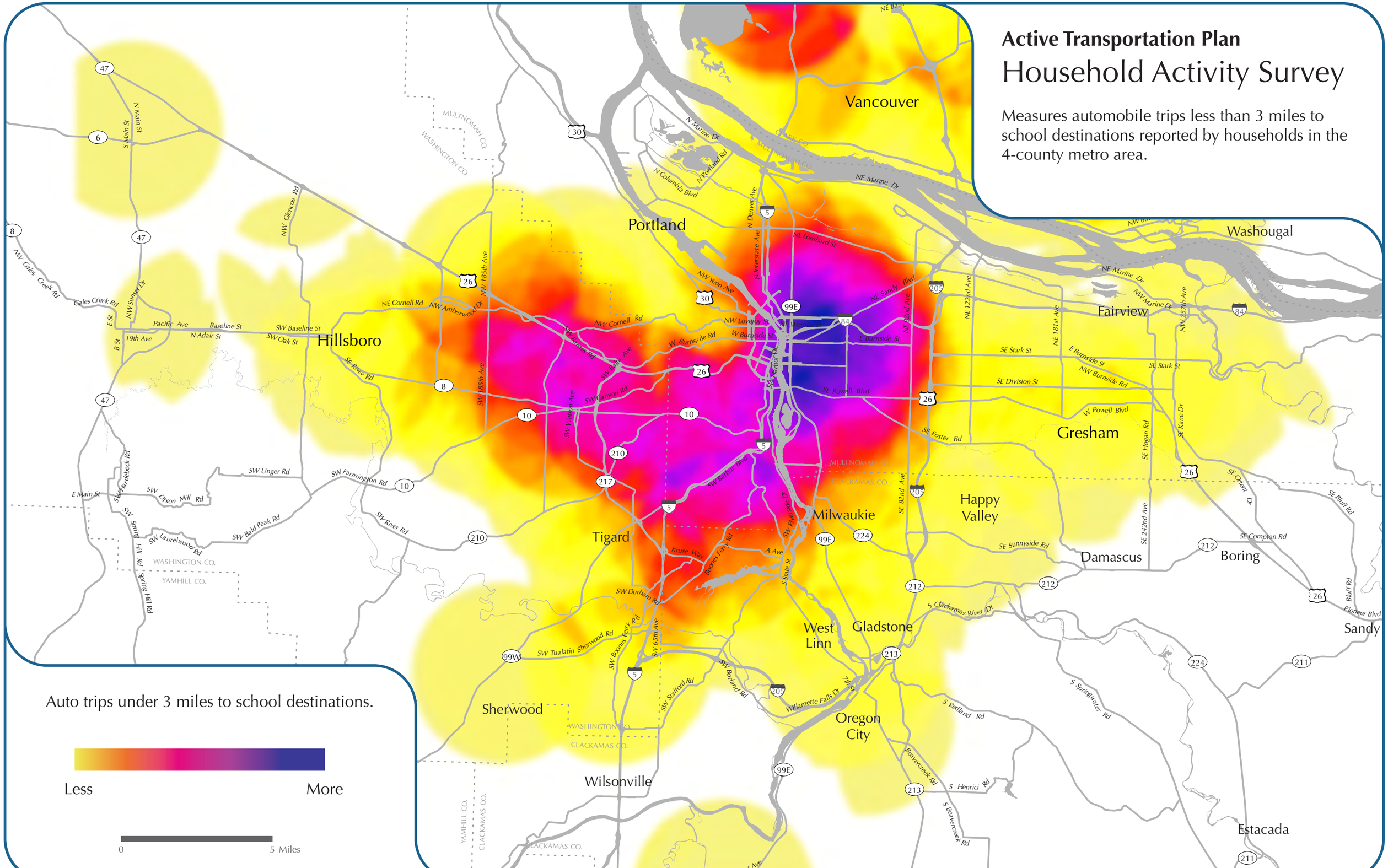
Source: 2011 Oregon Household Activity Survey

The following heat density maps show where the most auto trips traveling less than three miles to reach work, school, or recreation/social/shopping destinations are occurring. A visual analysis of the maps suggests that many of the trips under three miles are clustered in the central city and near in neighborhoods, SW Portland, along Hwy 217, Washington Square, along the MAX line near Beaverton and Hwy 26 east of Hillsboro.

Active Transportation Plan

Household Activity Survey

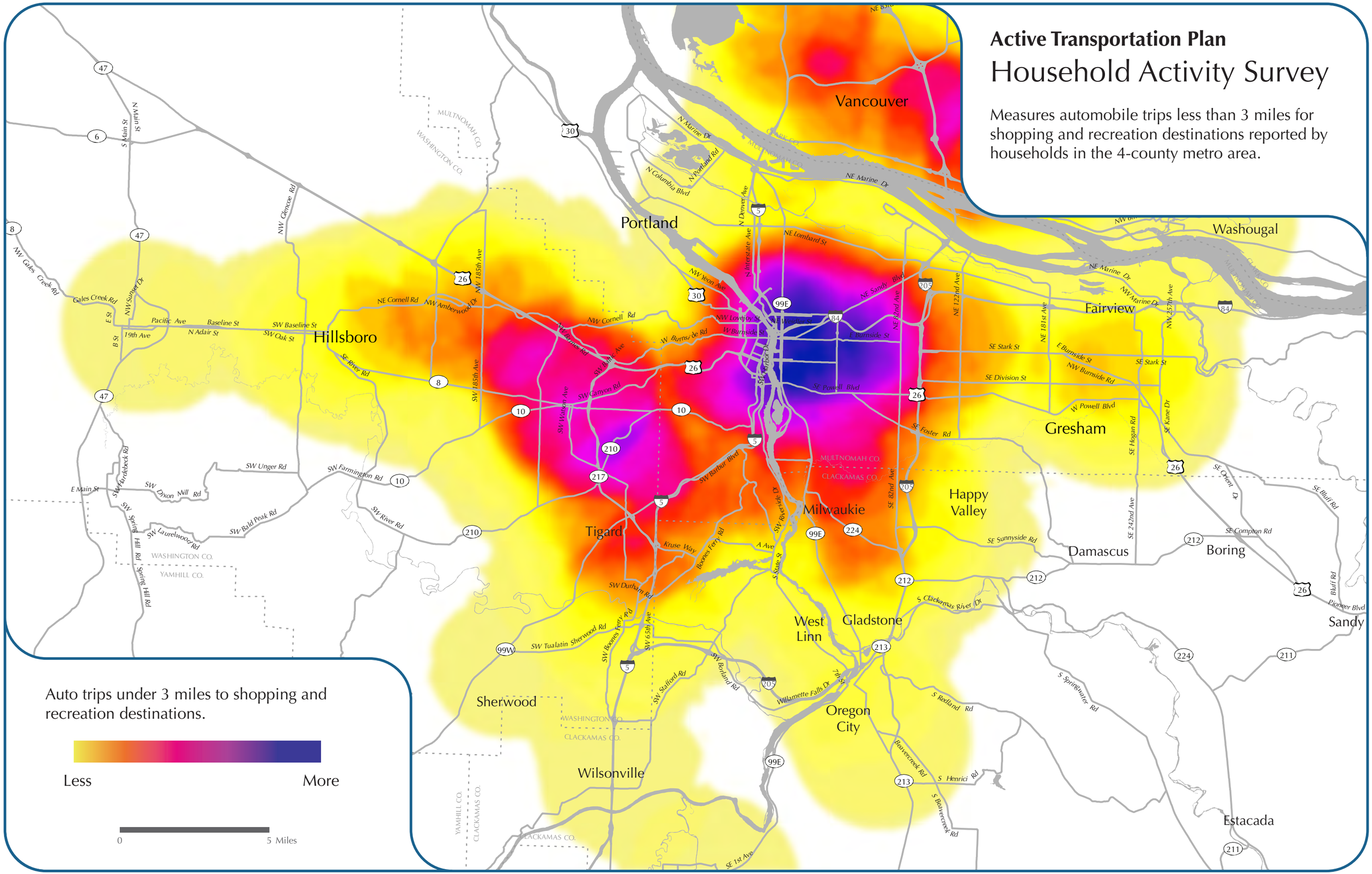
Measures automobile trips less than 3 miles to school destinations reported by households in the 4-county metro area.



Active Transportation Plan

Household Activity Survey

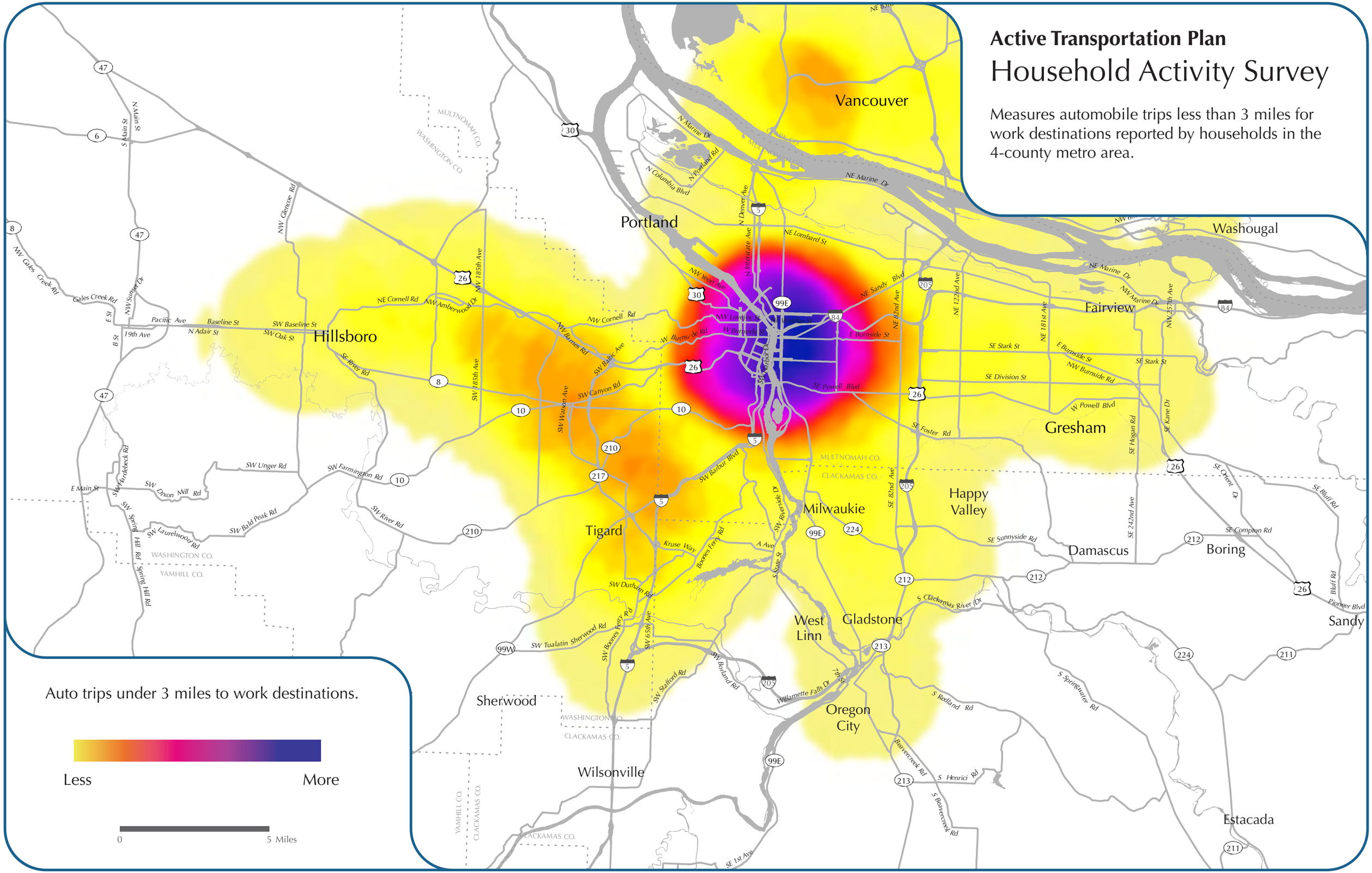
Measures automobile trips less than 3 miles for shopping and recreation destinations reported by households in the 4-county metro area.



Active Transportation Plan

Household Activity Survey

Measures automobile trips less than 3 miles for work destinations reported by households in the 4-county metro area.



CHAPTER 3: HEALTH, SAFETY AND ACTIVE TRANSPORTATION

This chapter provides information on the relationship between active transportation, human health and health of the natural environment. The Centers for Disease Control and Prevention (CDC) has identified transportation policies that can have profound positive impact on health. The CDC supports strategies that can provide a balanced portfolio of transportation choices that supports health and reduces health care costs. The policy recommendations are provided in Appendix 2. [91]

Regional Health Goals and Performance Targets

The RTP has several goals related to health and transportation safety. Safety here refers to reducing traffic related fatalities and injuries. Simultaneously increasing walking and bicycling while preventing pedestrian and bicycle crashes is an important part of human health. Because human and environmental health is dependent upon a complex web of factors, it is possible to connect health outcomes to all of the goals in the RTP. See Chapter 4.

Goal 7, "Enhance Human Health," states that "multi-modal transportation infrastructure and services provide safe, comfortable and convenient options that support active living and physical activity, and minimize transportation-related pollution that negatively impacts human health".

Goal 5: Enhance Safety and Security states, "Multi-modal transportation infrastructure and services are safe and secure for the public and goods movement"; Objective 5.1 Operational and Public Safety states, "Reduce fatalities, serious injuries and crashes per capita for all modes of travel."

Other goals and objectives of the RTP also relate to health, directly and indirectly, including, Goal 6: Promote Environmental Stewardship (clean air and water, and climate change), and Goal 8: Ensure Equity (for example, reducing housing and transportation costs frees up resources for health care, food, etc).

Increasing opportunities for active transportation is a health equity issue. Women and girls, people of color, older adults, People with disabilities, people with low educational attainment and people with low incomes have greater rates of inactivity.[92]

The RTP does not have a specific performance target for health in the region (e.g. reduce obesity). However, the following performance targets have related health outcomes

- Active transportation – By 2035, triple walking, biking and transit mode share compared to 2005.
- Safety –By 2035, reduce the number of pedestrian, bicyclist, and motor vehicle occupant fatalities plus serious injuries each by 50% compared to 2005.[93]

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[91] The Centers for Disease Control and Prevention (CDC) http://www.cdc.gov/transportation/recommendation.htm

[92] Frank, Lawrence D., & Engelke, Peter. (2000). How Land Use and Transportation Systems Impact Public Health: A Literature Review of the Relationship Between Physical Activity and Built Form. Active Community Environments Initiative.

[93] Some countries and cities have adopted "Vision Zero" policies. Sweden has a target to eliminate fatalities for all modes by 2050. The policy has had an impact - the absolute number of traffic fatalities in Sweden continues to fall even as traffic is on the rise. In 2009, Sweden had 4.3 traffic deaths per 100,000 people, while the United States had

- Climate change – By 2035, reduce transportation-related carbon dioxide emissions by 40 percent below 1990 levels.
- Clean air – By 2035, ensure zero percent population exposure to at-risk levels of air pollution.

In addition to the above targets, reduced congestion, access to daily needs and basic infrastructure, reduced VMT, and affordable transportation all have health related outcomes.

Health

Healthier individuals and communities are two direct outcomes of active transportation. When people integrate walking and bicycling into their daily activities, they can easily achieve the recommended 30 minutes of daily physical activity. Research finds that people that use public transit are more likely to meet the recommended level of daily physical activity than individuals who did not take transit.[94]

Figure 2: The Determinants of Health (Barton & Grant 2006)

Health is defined as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.[95] As Figure 2 illustrates, there are many determinants for health. The built environment, including streets and routes, and activities such as physical movement and play, are

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12.3 (the European Union average was 11 in 2007). The City of Chicago has a goal to eliminate all pedestrian, bicycle, and overall traffic crash fatalities within 10 years. That is the first "performance measure" listed in the safety section of the Chicago plan, which also calls for a 50 percent reduction of roadway injuries to pedestrians, bicycles, and motorists in five years.

[94] Lachapelle, Ugo and Lawrence Frank. "Transit and Health: Mode of Transport, Employer-Sponsored Public Transit Pass, and Physical Activity". *Journal of Public Health Policy (2009) 30, S73–S94 doi:10.1057/jphp.2008.52* http://www.palgrave-journals.com/jphp/journal/v30/nS1/pdf/jphp200852a.pdf

[95] World Health Organization (2011). http://www.who.int/en/

determining factors of health. Research shows that people who live in built environments where they can walk, bike, and take transit live longer, healthier lives, with lower rates of diabetes, cancer, stroke, and heart disease.

The positive relationship between mental health and physical activity has been investigated in a number of studies. People who are physically active experience less depression and anxiety. Physical activity can prevent some mental disorders and prevent depression from occurring. Conversely, people that do not get enough physical activity may be more prone to depression and some mental disorders. [96]

Physical Activity and Weight Related Health Problems

Walking and bicycling levels in the United States decreased 67% between 1960- 2000. If trends continue at current rates, nearly half of American adults will be obese by the year 2020.[97] During the same time period, obesity levels increased by 241%.[98] Active commuting that incorporates cycling and walking is associated with an overall 11% reduction in cardiovascular risk, according to one study.[99]The Centers for Disease Control and Prevention's Guide to Community Preventive Services states that the number of people who are physically active three times a week would increase by 25% with improved access to active transportation.[100]

The Portland metropolitan region, like the rest of the United States, is facing a health crisis in the form of an obesity epidemic. Nearly two-thirds of Oregonians are overweight or obese. However, the Portland metropolitan region has lower rates of obesity than much of the rest of the state. Obesity is defined as having a body-mass index (BMI) of 30 or higher and is related to health outcomes such as cardiovascular disease and diabetes. BMI is a number calculated from a person's weight and height. For most people, BMI provides a reliable indicator of body fatness for most people and is used to screen for weight categories that may lead to health problems. BMI ranges are: 18.5 – underweight; 18.5 to 24.9 – normal or healthy weight; 25.0 to 29.9 – overweight; 30.0 or higher – obese.[101]

Table provides information comparing health risks for people in the region compared to the Eugene-Springfield Metropolitan Statistical Area (MSA), Oregon and the rest of the nation. Nationally, 23.9% of people reported having no physical activity or exercise in the last 30 days, while only 15.8% of people in the Portland region reported having no physical activity. Regionally, fewer people reported having fair or poor health, diabetes or a BMI of equal to or greater than 30 than at the national, state and Eugene-Springfield levels.

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[96] Ströhle, Andreas (Aug. 23, 2008). Physical activity, exercise, depression and anxiety disorders. *Journal of Neural Transmission*.

[97] Stewart, S., et al., 2009, Forecasting the effects of obesity and smoking on U.S. life expectancy, The New England Journal of Medicine, 361, 2252-2260.

[98] Alliance of Bicycling and Walking, "Bicycling and Walking in the United States: 2012 Benchmarking Report" 2012. Available at http://www.PeoplePoweredMovement.org.

[99] Hamer M, Chida Y. Journal of Preventative Medicine. 2008 Jan;46(1):9-13. Epub 2007 Mar 20. *Active commuting and cardiovascular risk: a meta-analytic review.*

[100] http://www.thecommunityguide.org/pa/pa-ajpm-evrev.pdf

[101] *Centers for Disease Control and Prevention. Body Mass Index.* http://www.cdc.gov/healthyweight/assessing/bmi/

Table 21: Percentage of Adults Reporting Selected Health Risks, BRFSS 2010

	Nationwide Median	Oregon	Eugene-Springfield MSA	Portland-Vancouver-Beaverton, OR-WA MSA
Health Status – Reported as fair or poor	14.7%	15.8%	16.6%	13.6%
Exercise – Reported no exercise or physical activity in the last 30 days	23.9%	17.5%	18.2%	**15.8%**
Diabetes – Told by doctor they have diabetes	8.7%	7.2%	7.0%	6.5%
Obesity – Reported BMI greater than or equal to 30.0	27.5%	27.6%	30.0%	26.0%

Source: Behavioral Risk Factor Surveillance System, BRFSS 2010[102]

Table provides additional detail for counties in the region.

Table 22: Modifiable Risk Factors among Adults by County, age adjusted – 2006-2009

	% Obese	**%Overweight**	**% of adults who met CDC recommendations for physical activity**
Oregon	36.1%	24.5%	55.8%
Clackamas	35.7%	23.6%	55.6%
Multnomah	33.8%*	21.8%*	55.2%
Washington	36.9%	23.2%	53.8%

Source: Oregon BRFSS County Combined Dataset 2006-2009; Oregon Health Authority, Oregon Overweight, Obesity Physical Activity and Nutrition Facts, 2012[103]

*Statistically significant difference compared to Oregon

Age adjusted estimates are adjusted to the 2000 Standard Population using three age groups (18-34, 35-54, and 55+)

Recent data compiled by Oregon Environmental Public Health Tracking show age-adjusted BMI by block groups in the Portland region. [104] BMI was calculated from driver's license and identification cards issued by Driver and Motor Vehicles Services (DMV). Over 3.5 million records were compiled for the analysis to

[102] Centers for Disease Control and Prevention. SMART: BRFSS City and County Data, Quick View Charts. http://apps.nccd.cdc.gov/brfss-smart/viewrpt.cwr?id=364855&apstoken=APP-V-CCDCRSTLP.CDC.GOV@717264JjtXTJvFytfAwspL717262JmWqyGuAwsDfVBuX&prompt0=OR&prompt1=2010&cmd=Export&Export_FMT=U2FPDF:0 The Behavioral Risk Factor Surveillance System (BRFSS) is the world's largest, on-going telephone health survey system, tracking health conditions and risk behaviors in the United States yearly since 1984. Currently, data are collected monthly in all 50 states, the District of Columbia, Puerto Rico, the U.S. Virgin Islands, and Guam.

[103] Oregon BRFSS County Combined Dataset 2006-2009; Oregon Health Authority, Oregon Overweight, Obesity Physical Activity and Nutrition Facts, 2012 http://public.health.oregon.gov/PreventionWellness/PhysicalActivity/Documents/Oregon_PANfactst_2012.pdf and http://public.health.oregon.gov/

[104] http://public.health.oregon.gov/HealthyEnvironments/TrackingAssessment/EnvironmentalPublicHealthTracking/Pages/index.aspx

provide precise weight estimates at the census block group level.[105] This data represents the most detailed data on weight available and will be a useful tool for tracking trends over time.

Maps prepared by Oregon Environmental Public Health Tracking showing this information are included in Appendix 1. The maps illustrate that, in general, the Portland region has lower BMI than the rest of the state. It also illustrates, as do the other two maps, the level of variation that can exist within small geographic areas. While land use (such as street connectivity and street block density) is a factor in determining weight, other factors, such as age, income, and educational attainment are also determinants. Data provided by Kaiser Permanente, from health records, corresponds with the Oregon Environmental Public Health Tracking data. The Kaiser maps illustrate rates of diabetes, obesity and co-morbidity rates for the 4-county area. The maps are in Appendix 1.

Air Pollution and Green House Gas Emissions

The Portland metropolitan region has a long standing commitment to a healthy environment with clean air and water. Residents and businesses already drive less here than in other regions. Growth management, the built environment and providing transportation options have played a part in reducing the number of VMT.

When walking or bicycling replaces a motor vehicle trip, overall harmful transportation-related emissions are reduced.[106] Transportation related emissions such as carbon monoxide (CO), nitrogen dioxide, ozone (e.g., smog), particulate matter, sulfur dioxide and toxins (e.g., lead) have a direct negative effect on human health. Short-term exposure to these pollutants can exacerbate asthma and other respiratory diseases. Some pollutants, such as noise, carbon monoxide and particulates, have local impacts so their costs vary depending on where emissions occur, while others, such as ozone, methane and carbon dioxide, have regional and global impacts.[107]

Greenhouse gas emissions

A cost-benefit analysis of Portland's future bikeway network estimates that increased bicycle trips in the city of Portland will avoid between 540 and 830 million metric tons of greenhouse gas emissions by the year 2040.[108] This is quite a lot when considering that the total annual greenhouse gas emissions generated by the region's residents and businesses is 31 million metric tons.

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[105] The methodology addresses the issue of self-reported height and weight on driver's license and ID cards.

[106] Booz Allen Hamilton. July 2011. *Transportation and Health: Policy Interventions for Safer, Healthier People and Communities.*

[107] Todd Litman (2009), "Air Pollution Costs," Transportation Cost and Benefit Analysis, Victoria Transport Policy Institute (www.vtpi.org). Available at www.vtpi.org/tca/tca0510.pdf.

[108] Gotschi, Thomas. Costs and benefits of bicycling investments in Portland, Oregon. .*Journal of Physical Activity and Health*, 2011,8(Suppl 1), S49-S58. This analysis was conducted for the "World Class Bicycle Network" in the City of Portland's 203 Portland Bicycle Plan.

In 2010, transportation was responsible for 25% percent of total carbon dioxide ($CO^{2)}$ emissions in the Portland region.[109]

- Local passenger transport (light trucks and cars): 14%
- Other passenger transport (aircraft, inter-city rail, intercity buses, cars and trucks making long-distance trips crossing the urban growth boundary): 10%
- Local freight: 1%
- Transit: <0.01%

Taking into account the production and maintenance of producing and shipping bicycles, emissions from cycling were over ten times lower than those stemming from the private auto.[110] For every one mile pedaled rather than driven, nearly one pound of CO^2 (0.88 lbs) is saved. An average car emits 11,450 pounds of CO^2a year.[111] Walking produces no air pollution or emissions.

Air pollution

Overall, air pollution in the Portland region has decreased dramatically over the last 30 years. [112] However, air quality remains an environmental justice and equity issue. Current asthma prevalence differs between groups, with higher rates among females, children, non-Hispanic black and Puerto Rican persons and those with family income below the poverty level.[113]

The effects of transportation-related emissions on asthma are most prevalent among people who live within 475 feet (0.09 miles) of a main road.[114] Long-term exposure to transportation-related pollutants results in higher rates of mortality and adverse pregnancy outcomes such as pre-term birth and low birth weight.[115] Environmental justice and vulnerable populations can be more likely to live closer to highways and busy roadways where levels of pollutants known as fine particulate matter are greater. People living

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[109] Regional Greenhouse Gas Inventory, Metro 2010.Materials (goods and food) account for 48% and energy consumption accounts for 27% of sources of green house gas emissions in the region.

[110] European Cyclists' Federation

[111] US Environmental Protection Agency, 2009. According to the EPA, there are three major pollutants that come from driving an auto: hydrocarbons, nitrogen oxides, and carbon monoxide. The average passenger vehicle emits 77 pounds of hydrocarbons, 38 pounds of nitrogen oxides, and 575 pounds of carbon monoxide each year. According to the National Safety Council, Hydrocarbons can cause coughing, wheezing, and shortness of breath and can lead to permanent lung damage. Nitrogen oxides contribute to the formation of acid rain and to water quality problems. Carbon monoxide can impair mental functions and visual perception. According to the NSC, motor vehicles are responsible for as much as 90 percent of carbon monoxide in the air in urban areas. The EPA shows that the average passenger car emits 11,450 pounds of carbon dioxide into the air, which traps heat and contributes to global warming.

[112] Department of Environmental Quality, Air Quality and Toxics, http://www.deq.state.or.us/aq/toxics/pats.htm

[113] "Asthma Prevalence, Health Care Use, and Mortality: United States, 2005–2009" Data from the National Health Interview Survey, the National Ambulatory Medical Care Survey, the National Hospital Ambulatory Medical Care Survey, the National Hospital Discharge Survey, and the National Vital Statistics System were used to calculate national estimates on asthma prevalence and health care use.

[114] Booz Allen Hamilton (July 2011). *Transportation and Health: Policy Interventions for Safer, Healthier People and Communities*.

[115] Booz Allen Hamilton (July 2011). *Transportation and Health: Policy Interventions for Safer, Healthier People and Communities*.

near areas with high levels of traffic experience much greater exposure to particulate matter.[116] Particulate matter can cause heart disease, lung cancer, asthma and other life-threatening diseases and conditions.[117] Their small size allows them to become deeply lodged in the lungs and can enter the bloodstream. Long-term exposure is associated with a variety of cardiovascular and respiratory health effects, including respiratory illness and death.

The Portland Air Toxics Solutions Committee Report and Recommendations mapped census block groups with minority populations above 25% overlaid with total times above benchmarks for all pollutants observed in the study, including emissions from cars and trucks.[118] Visual inspection of the overlay suggests that there is an overlap between high minority and high impact areas in some areas of the study boundary. Those areas include Forest Grove, Hillsboro, Aloha, Beaverton, North Portland, East Portland and Gresham. See Appendix 1 for a map of Air Toxics Concentrations for Vehicle Emission Pollutants in 2017 for the 4-county area.

Safety

Making streets much safer for people walking and riding bicycles and dramatically reducing bicycle and pedestrian crashes is an important element of health. Feeling and being safe while walking and bicycling is an important factor in the choices people make whether to walk or cycle at all, and therefore is a critical part of a complete regional active transportation system.

Photo: Greg Wahl-Stephens, Portland Tribune, Dec 4, 2008 "Unsafe passage? Parents face uphill battle making kids' walk to school less perilous"

With the advent and eventual dominance the auto, the definition of a safe street has been measured in terms of auto safety. Changing perceptions about what makes a safe street are starting to include all modes of travel and tools such as multi-modal level of service, are beginning to measure safety in broader ways. For example, one definition of a safe street is one on which a 12-year old can walk or bicycle to school alone.[119] Transportation safety is also an equity issue. Research and data show that often people

116 Oregon Environmental Public Health Tracking.

[117] Berg, Nate (Sept. 26, 2011). WHO: Iran, South Asia ranked worst in urban air pollution. *The Atlantic Cities*.

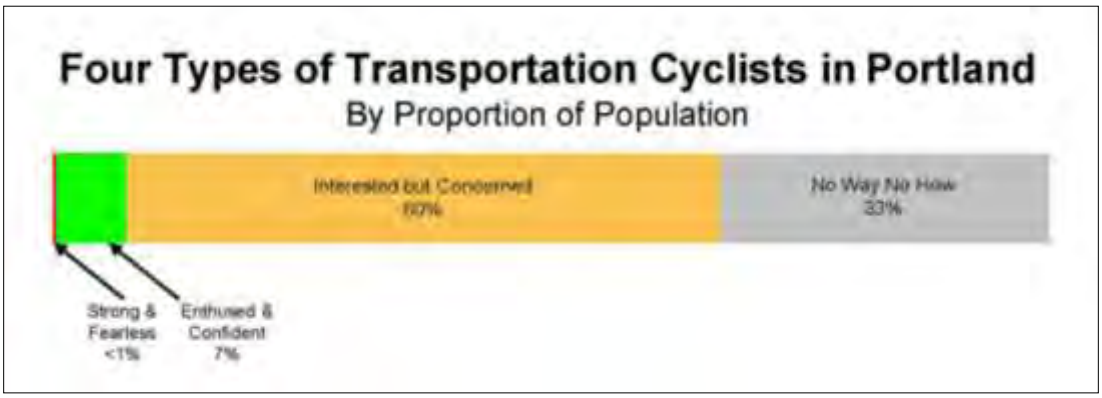
[118] http://www.deq.state.or.us/aq/planning/patsReport.htm

[119] Furth, Peter. Mekuria, Maaza, and Hilary Nixon. May 2012. Mineta Transportation Institute. MTI report 11-19. Low-Stress Bicycling and Network Connectivity. http://transweb.sjsu.edu/PDFs/research/1005-low-stress-bicycling-network-connectivity.pdf

with low incomes and people of color are much more likely to live near wide, high-traffic streets and are thus much more likely to be injured by an auto.[120]

Oregon is the third safest state in the nation to ride a bicycle and Portland is the fifth safest city. Oregon is the 19th safest sate to walk in and Portland is the 11th safest city.[121] However, studies have found that walking and cycling in U.S. cities is much more dangerous than in many European countries. One study found that American pedestrians and cyclists were four times as likely to be killed or injured than were Dutch and German pedestrians and cyclists, both on a per-trip and on a per-kilometer basis.[122] Safety fears prevent many people from choosing to walk or bike. For example, research by the City of Portland found that 60% of Portlanders were interested in bicycling more if they felt safer.[123] They are "interested but concerned". Additional research supports the city's findings.[124]

Figure 6: Four Types of Cyclists in Portland



Source: City of Portland

A recent Metro Opt-In poll of 3,865 residents in the Portland metropolitan region found that 86-91% of respondents in each county were interested in using a bicycle as a transportation mode more often, and between 70-79% of respondents in each county stated that they were interested in walking more for transportation.[125]

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[120] Patrick Morency, Lise Gauvin, Céline Plante, Michel Fournier, and Catherine Morency. (2012). Neighborhood Social Inequalities in Road Traffic Injuries: The Influence of Traffic Volume and Road Design. American Journal of Public Health. e-View Ahead of Print doi: 10.2105/AJPH.2011.300528 Streetsblog: "Study: Low-Income Neighborhoods Much More Likely to Have Dangerous Roads"

[121] According to the Alliance for Bicycling and Walking, 2012 Benchmarking Report for Bicycling and Walking in the U.S. http://www.peoplepoweredmovement.org/site/index.php/site/memberservices/2012_benchmarking_report/

[122] Pucher and Dijkstra, Promoting Safe Walking and Cycling to Improve Public Health. *American Journal of Public Health Public Health Matters* 1509, September 2003, Vol 93, No. 9

[123] Geller, Roger. 2005. *Four types of cyclists.* Portland Bureau of Transportation. http://www.portlandonline.com/transportation/index.cfm?&a=158497&c=44671

[124] Recent research by Dr. Jennifer Dill has confirmed the City of Portland's four types of cyclists definition. Dill, Jennifer and Nathan McNeil. *Four Types of Cyclists? Testing a Typology to Better Understand Bicycling Behavior and Potential.*

[125] http://panel.decipherinc.com/images/uploads/optin/Metro_Active_transportation--Nov1.pdf Opt In is an online survey tool open to all residents in the region.

Metro State of Safety Report, Pedestrian and Bicycle Crash Data

Serious pedestrian and bicycle crashes account for 20% of all serious crashes in the region. [126] The table below shows that people walking and biking are involved in a disproportionate number of the serious and fatal crashes in the region. While 3.2% of all trips (not counting trips to access transit) take place by bicycle, 8% of all serious and fatal crashes involve bicyclists. Over 10% of all trips in the region are made by pedestrians (not counting trips to access transit) and 12% of all serious and fatal crashes involve a pedestrian.

Table 23: Number and Percentage of Serious Crashes by Mode, 2007-2009, Portland 3-County Region (within UGB)

	Number of serious and fatal crashes	Percentage of all crashes	Percent of all trips, 3-county area*
Pedestrian	188	12%	10.4%
Bicycle	122	8%	3.2%
Auto	1285	81%	81.5%
Total	**1595**	**100%**	**N/A**

*Source: Metro 2012. *Percent of walking and bicycle trips do not include trips accessing transit by walking or bicycling.*

There were a total of **1,297 pedestrian crashes** resulting in injury in the Portland region between 2007 and 2010. Of those crashes, **252 resulted in a death or an incapacitating injury**. The majority of pedestrian crashes occur while pedestrians are crossing the roadway, either at an intersection or mid-block. Nearly 80% of all serious and fatal pedestrian crashes occur when people are crossing the roadway.

There were a total of **1,503 bicycle crashes** resulting in injury in the Portland region between 2007 and 2010. Of those crashes, **140 resulted in a death or an incapacitating injury**. Most bicycle crashes occur at intersections – 73% of all serious and fatal bicycle crashes occur at an intersection.

Metro's recent *Metro State of Safety Report* documents roadway crash data, patterns and trends for all modes in the region.[127] The report includes chapters on pedestrian and bicycle crashes. The findings and recommendations of the report are included below, and the report in its entirety is included in Appendix 22. Additional analysis was conducted for this report to supplement the *Metro State of Safety Report* and is included in this section.

Metro State of Safety Report: Findings

- Nationally and in Oregon, fatalities are decreasing year-to-year for all modes except motorcycle, which is increasing.
- Higher levels of vehicle miles travelled (VMT) correlate with more fatal and serious crashes due to increased exposure. *(Note: However, the inverse has been found to be true in many places for walking and bicycling; higher rates of pedestrian and bicycling activity have been shown to result in lower crash rates for pedestrians and bicyclists. See below.)*

[126] Serious crashes are those that result in a fatality or an incapacitating injury.
[127] "Metro State of Safety Report: A compilation of information on roadway-related crashes, injuries, and fatalities in the Portland Metro region and beyond", Metro, April 2012 http://library.oregonmetro.gov/files//state_of_safety_report_043012.pdf

Main Contributing Factors for Serious Crashes

- **Streets with more lanes** have higher serious crash rates per road mile and per VMT. This follows trends documented in AASHTO's Highway Safety Manual. Streets with more lanes have an especially high serious crash rate for pedestrians, producing higher crash rates per mile and per VMT as compared to other modes.
- **Arterial roadways** comprise 59% of the region's serious crashes, 67% of the serious pedestrian crashes, and 52% of the serious bike crashes, while accounting for 40% of vehicle travel. Arterials have the highest serious crash rate per road mile and per VMT.
- **Alcohol or drugs** were a factor in 57% of fatal crashes.
- **Excessive vehicle speed** is a contributing factor in 26% of serious crashes, while aggressive driving is a factor in 40% of serious crashes.
- **Lack of adequate street lighting.** Serious pedestrian crashes are disproportionately represented after dark. While 29% of all serious crashes happen at night, 45% of serious pedestrian crashes happen at night. Nighttime serious pedestrian and bicycle crashes occur disproportionately where street lighting is not present. 79% of serious pedestrian crashes and occurring at night and 85% of serious bicycle crashes occurring at night happen where lighting is not present, as compared to 18% of all serious crashes occurring at night.
- **Higher levels of congestion on freeways** correlate with higher serious crash rates, except for severe congestion, which correlates with lower serious crash rates, likely due to lower speeds.

Factors Contributing to Safer Conditions

- **Higher levels of congestion on surface streets** correlate with lower serious crash rates across modes, likely due to lower speeds.
- **Transit Use.** Travel by transit is relatively safe, with no passenger deaths in the study period, and 0.23 deaths involving a transit vehicle per 100-million-transit-passenger-miles. For comparison, the rate for all traffic was 0.42 deaths per 100-million-motor-vehicle-passenger -miles.

Metro State of Safety Report: Short Term Recommendations

- Continue data collection and analysis of ODOT crash data to support regional and local planning efforts.
- Develop arterial safety program to identify high crash arterials and develop targeted strategies to make these corridors safer.
- Convene targeted workgroup of expanded safety professionals to develop targeted strategies to reduce the prevalence of driving under the influence of alcohol and drugs, speeding and aggressive driving.
- Focus on improved pedestrian crossings including lighting, particularly on multi-lane arterials.
- Focus on providing protected bicycle facilities along high-volume and/or high-speed roadways, such as buffered bike lanes, cycle tracks, multi-use paths, or low-traffic alternative routes.
- Further explore bicycle and pedestrian safety as part of the Regional ATP currently underway.

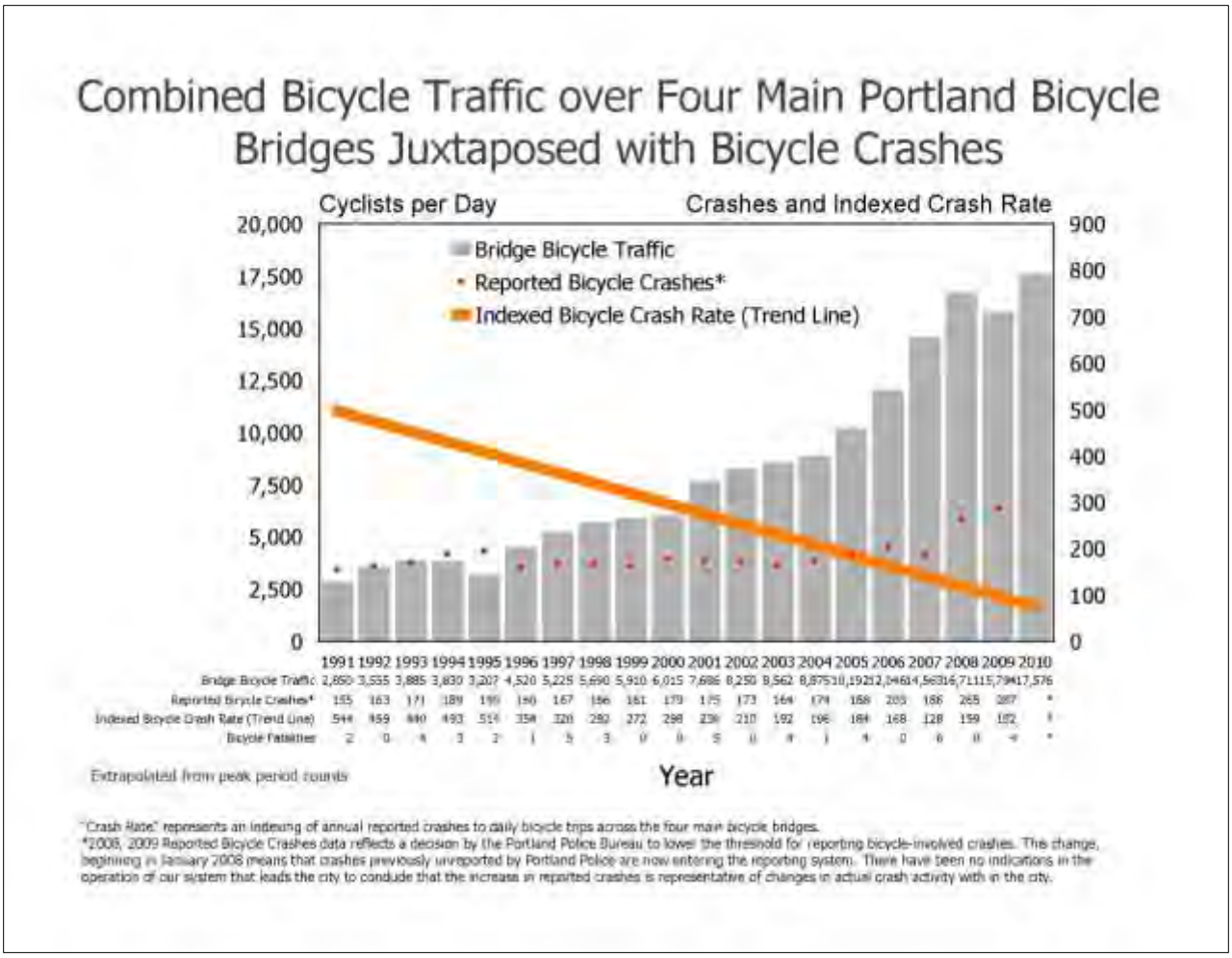
Safety in Numbers: Increase in Bicycling and Walking Make it Safer to Bike and Walk

Several studies have found that as the number of people walking and riding bicycles increases, the rate of crashes for pedestrians and bicyclists decreases. More people walking and riding bicycles make it safer to walk and ride a bicycle. One study of collision rates at specific intersections found that collision rates declined with increases in the numbers of people walking or bicycling.[128] Cities with higher bicycling rates also have better road safety records for all users. [129]

Data from the City of Portland illustrates this point in the graph below, "Combined Bicycle Traffic over Four Main Portland Bicycle Bridges Juxtaposed with Bicycle Crashes", 2010. The graph shows that as bicycle traffic over the bridges increased, the rate of reported bicycle crashes citywide decreased.

[128] Jacobsen, P. L. (2003). *Safety in numbers: More walkers and cyclists, safer walking and bicycling.* Injury Prevention, 9, 205-209. The report found that the likelihood that a given person walking or bicycling will be struck by a motorist varies inversely with the amount of walking or bicycling. This pattern is consistent across communities of varying size, from specific intersections to cities and countries, and across time periods. Since it is unlikely that the people walking and bicycling become more cautious if their numbers are larger, it indicates that the behavior of motorists controls the likelihood of collisions with people walking and bicycling. It appears that motorists adjust their behavior in the presence of people walking and bicycling. There is an urgent need for further exploration of the human factors controlling motorist behavior in the presence of people walking and bicycling. A motorist is less likely to collide with a person walking and bicycling if more people walk or bicycle.
http://injuryprevention.bmj.com/content/9/3/205.full.pdf+html

[129] Wesley E. Marshall, Norman W. Garrick . *Evidence on Why Bike-Friendly Cities Are Safer for All Road Users.* Environmental Practice 13:16–27 (2011). The study analyzed 11 years of road safety data in 24 California cities. The study found that overall, cities with a high bicycling rate among the population generally show a much lower risk of fatal crashes for *all* road users when compared with other cities in the study. The analysis strongly suggests that the crashes in cities with a high bicycling rate are occurring at lower speeds, agreeing with the finding that street network density was one of the most notable differences found between the safer and less safe cities. Portland increased its bicycle mode share from 1.2% in 1990 to 5.8% in 2000. At the same time, the number of road fatalities went from averaging over 60 per year in 1990 to fewer than 35 per year since 2000.
http://files.meetup.com/1468133/Evidence%20on%20Why%20Bike-Friendly.pdf



Source: City of Portland

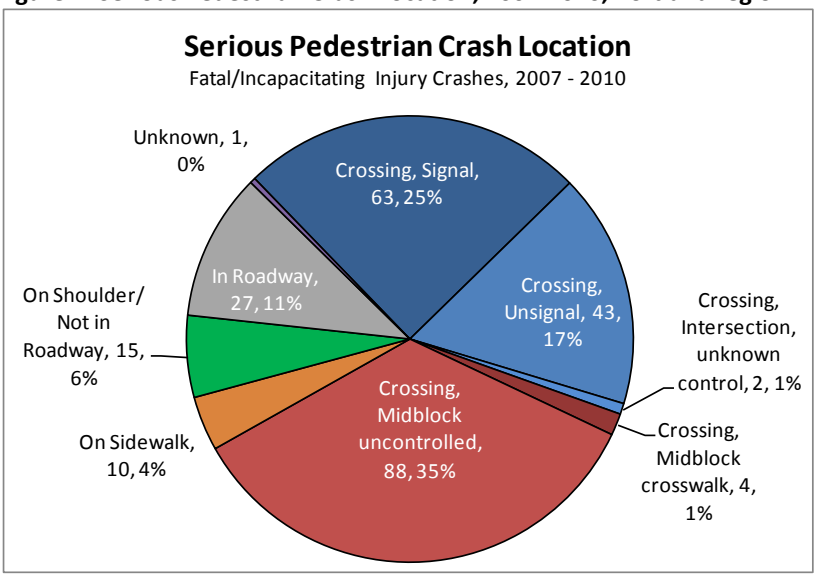
Pedestrian Crashes in the Region

With the highest population, transit usage, VMT, and likely the largest number of pedestrians, Portland has 56% of the region's serious pedestrian crashes. Portland also has the highest rate of serious pedestrian crashes per capita and per VMT, however, **Error! Reference source not found.**, above, shows that per pedestrian commuter, Portland has a lower serious crash rate than Hillsboro and Gresham (for the cities included in the per commuter analysis). Beaverton has the lowest serious pedestrian crash rate per pedestrian commuter. East Multnomah County also has high rates of serious pedestrian crashes per capita and per VMT. Clackamas County and Washington County have relatively low rates of serious pedestrian crashes, which is likely largely due to fewer people walking (see page 39 of the Metro State of Safety Report in the Appendix 22).

While Portland has the largest number and rate of serious pedestrian crashes there are a number of other cities and areas with a high rate of serious pedestrian crashes per capita. Gresham, Cornelius, Tigard, unincorporated Multnomah County, unincorporated Clackamas County, Tualatin, and Hillsboro all experience relatively high rates of serious pedestrian crashes.

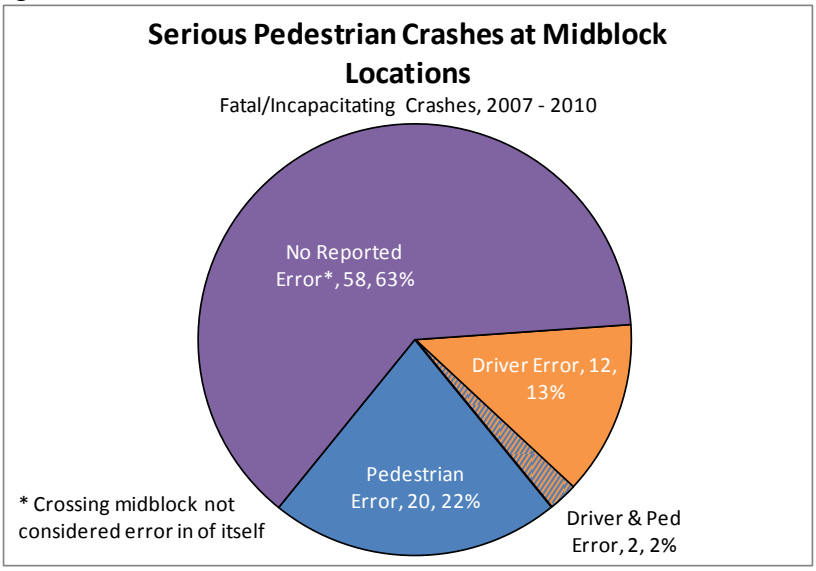
Error! Reference source not found. below shows that uncontrolled mid-block and both signalized and un-signalized intersection crossings are where a majority of the serious pedestrian crashes occur - nearly 80%. Thirty-five of serious pedestrian crashes occur at uncontrolled mid-block crossings; 1% at mid-block crossings with crosswalks installed; 17% occur at un-signalized intersections and 25% occur at intersections without signals. **Error! Reference source not found.** shows the reported errors for the crashes.

Figure 7: Serious Pedestrian Crash Location, 2007-2010, Portland region



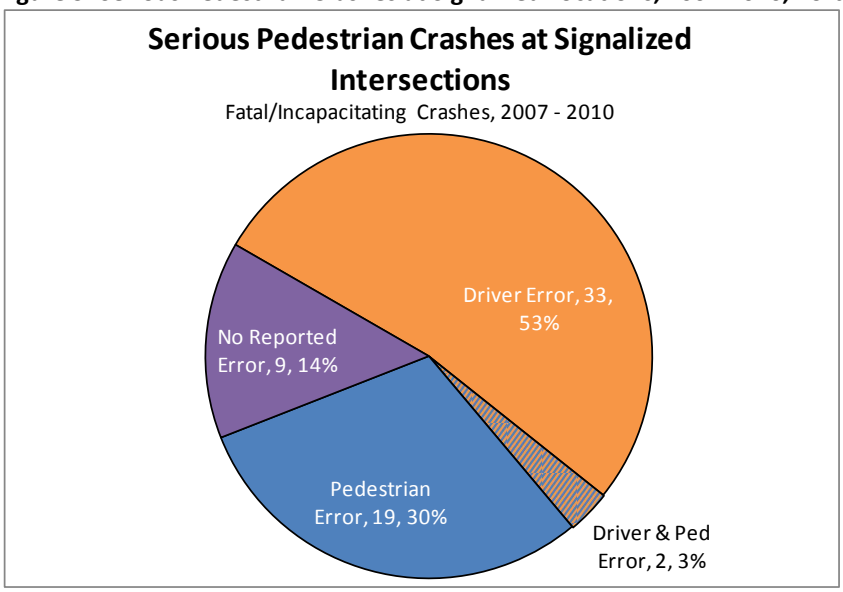
Source: Metro 2012

Figure 8: Serious Pedestrian Crashes at Mid-block Locations, 2007-2010, Portland region



Source: Metro 2012

Figure 9: Serious Pedestrian Crashes at Signalized Locations, 2007-2010, Portland region

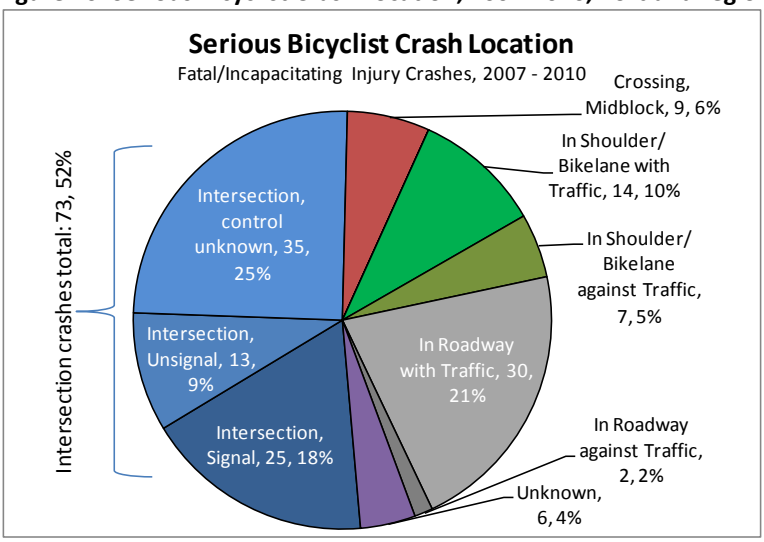


Source: Metro 2012

Bicycle Crashes in the Region

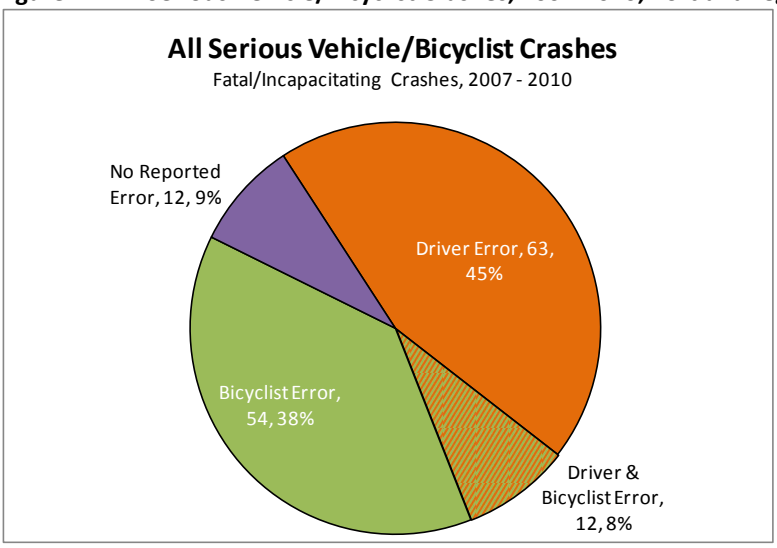
With the highest population, transit usage, VMT, and trips by bicycle, Portland has 68% of the region's serious bicycle crashes. Portland also has the highest rate of serious bicycle crashes per capita and per VMT, however **Error! Reference source not found.**, above, shows that per bicycle commuter, Portland has a lower serious crash rate than the other cities included in the analysis, Beaverton, Hillsboro and Gresham. East Multnomah County has moderate rates of serious bicycle crashes per capita and per VMT. Clackamas County and Washington County have relatively low rates of serious bicycle crashes, which is likely largely due to fewer people cycling (see page 50 of the Metro State of Safety Report in the Appendix 22). There are a number of other cities with a high rate of serious bicycle crashes per capita. Gresham, Tigard, Oregon City, and Gladstone all experience relatively high rates of serious bicycle crashes. **Error! Reference source not found.**, below, indicates that intersections are where the majority of bicycle crashes occur in the Portland region. **Error! Reference source not found.** shows error for serious bicycle crashes, demonstrating that in more cases drivers are at error.

Figure 10: Serious Bicyclist Crash Location, 2007-2010, Portland region



Source: Metro 2012

Figure 11: All Serious Vehicle/Bicyclist Crashes, 2007-2010, Portland region



Source: Metro 2012

The True Cost of Unwalkable, Unbikeable Communities

The United States walks and bicycles the least of any industrialized nation.[130], [131] Studies continue to indicate that improving conditions for walking and bicycling, especially in cities, is vital for America's public health.[132]It is a quality of life issue, as well as an economic issue. For example, one study shows that for every mile a person walks, society saves 24 cents on medical and associated costs.[133] While the health costs associated with current transportation choices have a high cost to society. These costs are described in Table , below. The estimated national health costs associated with transportation related health outcomes, such as driving more and walking and riding bicycles less, are very high.

Table 24: Estimated National Costs of Transportation Related Health Outcomes, 2008

National Health Cost Issue	Estimated National Cost	Data Included in Estimates
Obesity and overweight	$142 Billion	Healthcare costs Lost wages due to illness and disability Future earnings lost by premature death
Air Pollution from traffic	$50-80 Billion	Healthcare costs Premature death
Traffic Crashes	$180 Billion	Healthcare costs Lost wages Property damage Travel delay Legal/administrative costs Pain and suffering Lost quality of life

Source: The Hidden Health Costs of Transportation, 2010, American Public Health Association[134]

[130] John Pucher, et. al.2003 http://www.policy.rutgers.edu/faculty/pucher/2001-2009.pdf
[131] The Crisis of walking http://www.slate.com/articles/life/walking/2012/04/why_don_t_americans_walk_more_the_crisis_of_pedestrianism_.html
[132] John Pucher, et. al.2003
[133] Arednt, Randall (August/September 2011). Putting greenways first. American Planning Association.
[134] *The Hidden Health Costs of Transportation*, February 2010, American Public Health Association. http://www.apha.org/NR/rdonlyres/E71B4070-9B9D-4EE1-8F43-349D21414962/0/FINALHiddenHealthCostsShortNewBackCover.pdf

CHAPTER 4: EXISTING POLICY FRAMEWORK

Active transportation in the region is supported by a substantial number of national, state, regional and local goals, laws and policies that have helped create the system that so many people enjoy today, as evidenced by the list provided in Appendix 5 - Active Transportation Policy Framework. Despite such a robust policy framework, however, implementation of many of these goals remains elusive. For example, the current 2035 RTP does not achieve many of the regional transportation performance targets.[135] Goals are implemented through required actions within transportation plans. Transportation requirements for the RTP are identified in the RTFP.

One of the most well known policies supporting active transportation is Oregon's "Bike Bill" ORS 366.514, the nation's first complete streets legislation passed in 1972. The law addresses both pedestrians and bicyclists. The statewide statute has ensured that Oregon has made crucial investments in providing safe places for people to walk and bike and is one of the reasons that Oregon is recognized as a leader in active transportation.[136] A recent review of the policy by the Willamette Pedestrian Coalition (WPC), a pedestrian advocacy group, identifies ways in which the policy falls short. The WPC provides recommendations on how the policy can be improved.[137] See Appendix 7.

Recently, the region has made strides forward with polices in the 2035 RTP, updates of local TSPs that are incorporating the goals and polices of the RTP, and other plans such as the 2009 City of Portland and Multnomah County Climate Action Plan and the 2012 Portland Plan.

> Walking and bicycling are safe, convenient and enjoyable to support walking and bicycling as legitimate forms of travel. The RTP supports this vision with a complete network of on and off-street facilities well integrated with transit.
>
> *-RTP Vision for Active Transportation*

2035 RTP Vision, Goals, and Objectives

The 2035 RTP provides the basis for regional policy on active transportation, laying out a vision for transportation in the region using an **outcomes-based framework** to achieve the region's desired outcomes and stressing the integration of land use and transportation. The outcomes based framework guides transportation planning and investment decisions to balance equity, the environment and the economy.[138] The goals, objectives and targets of the RTP guide future planning, investment decisions and

[135] Refer to Chapter 2 and 5 of the 2035 RTP http://library.oregonmetro.gov/files//2035_rtp_final_document_as_submitted_to_dlcd_usdot_web.pdf and to the sections below. Targets were evaluated using modeled data of the 2035 planned transportation network.

[136] A 2010 policy analysis conducted by the National Complete Streets Coalition (NCSC) ranked states with existing complete streets state policies. Out of the 15 states with policies in place, Oregon ranked 11th. Complete Streets Policy Analysis 2010: A Story of Growing Strength http://www.completestreets.org/webdocs/resources/cs-policyanalysis.pdf

[137] Willamette Pedestrian Coalition. 2012. Complete Streets Policy Report Card, a 40 year progress report for Oregon

[138] Six Desired Outcomes: Equity, Transportation Choices, Addressing Climate Change, Economic Prosperity, Clean Air and Water, and Vibrant Communities

monitoring.[139] Appendix 6 provides goals and objectives from other regional plans that refer to active transportation. The figure below illustrates the relationship of the RTP vision, goals, objectives, policies, performance targets and measures, ongoing performance evaluation and monitoring, and implementation of the RTP (actions) through the requirements in the RTFP.

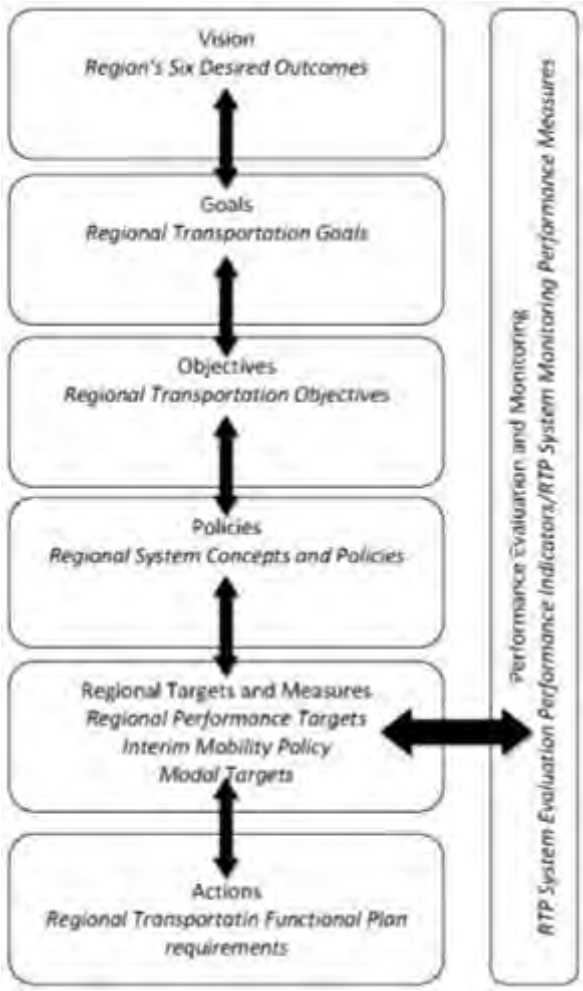


Figure 12: Relationship of Elements of the 2035 RTP

RTP Adopted Goals Objectives

Many of the RTP goals and objectives relate to and/or impact active transportation. Throughout the goals and objectives active transportation is described as an outcome in and of itself and as a means to achieve other goals and objectives, such as health and transportation equity. *The ATP may identify a separate set of goals and objectives, as well as propose additional goals and/or objectives to the RTP.*

[139] Chapter 2 of the RTP describes the vision for the regional transportation system. http://www.oregonmetro.gov/index.cfm/go/by.web/id=25038

Goal 1: Foster Vibrant Communities and Efficient Urban Form - Land use and transportation decisions are linked to optimize public investments and support active transportation options and jobs, schools, shopping, services, recreational opportunities and housing proximity.

- **Objective 1.1 Compact Urban Form and Design** - Use transportation investments to reinforce growth in and multi-modal access to 2040 Target Areas and ensure that development in 2040 Target Areas is consistent with and supports the transportation investments.
- **Objective 1.2 Parking Management** – Minimize the amount and promote the efficient use of land dedicated to vehicle parking.
- **Objective 1.3 Affordable Housing** – Support the preservation and production of affordable housing in the region.

Goal 2: Sustain Economic Competitiveness and Prosperity - Multi-modal transportation infrastructure and services support the region's well-being and a diverse, innovative, sustainable and growing regional and state economy.

- **Objective 2.1 Reliable and Efficient Travel and Market Area Access** - Provide for reliable and efficient multi-modal regional, interstate and intrastate travel and market area access through a seamless and well-connected system of throughways, arterial streets, freight services, transit services and bicycle and pedestrian facilities.
- **Objective 2.2 Regional Passenger Connectivity** – Ensure reliable and efficient connections between passenger intermodal facilities and destinations in and beyond the region to improve non-auto access to and from the region and promote the region's function as a gateway for tourism.
- **Objective 2.3 Metropolitan Mobility** - Maintain sufficient total person-trip and freight capacity among the various modes operating in the Regional Mobility Corridors to allow reasonable and reliable travel times through those corridors.
- **Objective 2.4 Freight Reliability** –Maintain reasonable and reliable travel times and access through the region as well as between freight intermodal facilities and destinations within and beyond the region to promote the region's function as a gateway for commerce.
- **Objective 2.5 Job Retention and Creation** – Attract new businesses and family-wage jobs and retain those that are already located in the region.

Goal 3: Expand Transportation Choices - Multi-modal transportation infrastructure and services provide all residents of the region with affordable and equitable options for accessing housing, jobs, services, shopping, educational, cultural and recreational opportunities, and facilitate competitive choices for goods movement for all businesses in the region.

- **Objective 3.1 Travel Choices** - Achieve modal targets for increased walking, bicycling, use of transit and shared ride and reduced reliance on the automobile and drive alone trips.
- **Objective 3.2 Vehicle Miles of Travel** - Reduce vehicle miles traveled per capita.
- **Objective 3.3 Equitable Access and Barrier Free Transportation** - Provide affordable and equitable access to travel choices and serve the needs of all people and businesses, including people with low income, children, elders and people with disabilities, to connect with jobs, education, services, recreation, social and cultural activities.
- **Objective 3.4 Shipping Choices** – Support multi-modal freight transportation system that includes air cargo, pipeline, trucking, rail, and marine services to facilitate competitive choices for goods movement for businesses in the region.

Goal 4: Emphasize Effective and Efficient Management of the Transportation System - Existing and future multi-modal transportation infrastructure and services are well-managed to optimize capacity, improve travel conditions and address air quality goals.

- **Objective 4.1 Traffic Management** – Apply technology solutions to actively manage the transportation system.
- **Objective 4.2 Traveler Information** – Provide comprehensive real-time traveler information to people and businesses in the region.
- **Objective 4.3 Incident Management** – Improve traffic incident detection and clearance times on the region's transit, arterial and throughways networks.
- **Objective 4.4 Demand Management** – Implement services, incentives and supportive infrastructure to increase telecommuting, walking, biking, taking transit, and carpooling, and shift travel to off-peak periods.
- **Objective 4.5 Value Pricing** – Consider a wide range of value pricing strategies and techniques as a management tool, including but not limited to parking management to encourage walking, biking and transit ridership and selectively promote short-term and long-term strategies as appropriate.

Goal 5: Enhance Safety and Security - Multi-modal transportation infrastructure and services are safe and secure for the public and goods movement.

- **Objective 5.1 Operational and Public Safety** - Reduce fatalities, serious injuries and crashes per capita for all modes of travel.
- **Objective 5.2 Crime** - Reduce vulnerability of the public, goods movement and critical transportation infrastructure to crime.
- **Objective 5.3 Terrorism, Natural Disasters and Hazardous Material Incidents** - Reduce vulnerability of the public, goods movement and critical transportation infrastructure to acts of terrorism, natural disasters, hazardous material spills or other hazardous incidents.

Goal 6: Promote Environmental Stewardship - Promote responsible stewardship of the region's natural, community, and cultural resources.

- **Objective 6.1 Natural Environment** – Avoid or minimize undesirable impacts on fish and wildlife habitat conservation areas, wildlife corridors, significant flora and open spaces.
- **Objective 6.2 Clean Air** – Reduce transportation-related vehicle emissions to improve air quality so that as growth occurs, the view of the Cascades and the Coast Range from within the region are maintained.
- **Objective 6.3 Water Quality and Quantity** – Protect the region's water quality and natural stream flows.
- **Objective 6.4 Energy and Land Consumption** - Reduce transportation-related energy and land consumption and the region's dependence on unstable energy sources.
- **Objective 6.5 Climate Change** – Reduce transportation-related greenhouse gas emissions.

Goal 7: Enhance Human Health - Multi-modal transportation infrastructure and services provide safe, comfortable and convenient options that support active living and physical activity, and minimize transportation-related pollution that negatively impacts human health.

- **Objective 7.1 Active Living** – Provide safe, comfortable and convenient transportation options that support active living and physical activity to meet daily needs and access services.
- **Objective 7.2 Pollution Impacts** – Minimize noise, impervious surface and other transportation-related pollution impacts on residents in the region to reduce negative health effects.

Goal 8: Ensure Equity - The benefits and adverse impacts of regional transportation planning, programs and investment decisions are equitably distributed among population demographics and geography, considering different parts of the region and census block groups with different incomes, races and ethnicities.

- **Objective 8.1 Environmental Justice** – Ensure benefits and impacts of investments are equitably distributed by population demographics and geography.
- **Objective 8.2 Coordinated Human Services Transportation Needs** - Ensure investments in the transportation system provide a full range of affordable options for people with low income, elders and people with disabilities consistent with the Tri-County Coordinated Human Services Transportation Plan (CHSTP).
- **Objective 8.3 Housing Diversity** - Use transportation investments to achieve greater diversity of housing opportunities by linking investments to measures taken by the local governments to increase housing diversity.
- **Objective 8.4 Transportation and Housing Costs**– Reduce the share of households in the region spending more than 50 percent of household income on housing and transportation combined.

Goal 9: Ensure Fiscal Stewardship - Regional transportation planning and investment decisions ensure the best return on public investments in infrastructure and programs.

- **Objective 9.1 Asset Management**– Adequately repair and maintain transportation facilities and services to preserve their function, maintain their useful life and eliminate maintenance backlogs.
- **Objective 9.2 Maximize Return on Public Investment** - Make transportation investment decisions that use public resources effectively and efficiently, using performance-based planning.
- **Objective 9.3 Stable and Innovative Funding** – Stabilize existing transportation revenue while securing new and innovative long-term sources of funding adequate to build, operate and maintain the regional transportation system for all modes of travel at the federal, state, regional and local level.

Goal 10: Deliver Accountability - The region's government, business, institutional and community leaders work together in an open and transparent manner so the public has meaningful opportunities for input on transportation decisions and experiences an integrated, comprehensive system of transportation facilities and services that bridge governance, institutional and fiscal barriers.

- **Objective 10.1 Meaningful Input Opportunities** - Provide meaningful input opportunities for interested and affected stakeholders, including people who have traditionally been underrepresented, resource agencies, business, institutional and community stakeholders, and local, regional and state jurisdictions that own and operate the region's transportation system in plan development and review.
- **Objective 10.2 Coordination and Cooperation** - Ensure representation in regional transportation decision-making is equitable from among all affected jurisdictions and stakeholders and improve coordination and cooperation among the public and private owners and operators of the region's transportation system so the system can function in a coordinated manner and better provide for state and regional transportation needs.

Regional Transportation Functional Plan and Local Transportation System Plans

RTP goals and objectives are implemented primarily through the RTFP (included in Appendix 23). Updates of local TSPs, which include pedestrian and bicycle plans, must include the requirements included in the

RTFP.[140] The RTP is also implemented through the UGMFP, local comprehensive plans and l development codes. Along with requirements that TSPs must include, the RTFP *allows* for implementation of certain transportation and complete street designs, including those included in Metro's Creating Livable Streets: Street Design Guidelines for 2040, or similar resources consistent with regional street design policies.[141],[142] Specific best practices for pedestrian or bicycle systems or design are not required for inclusion in TSPs. All of the requirements in the RTFP impact the development of the regional active transportation system; selected *requirements* that are especially pertinent include:

- Title 1, Pedestrian System Design Sec 3.08.130A - Include a pedestrian plan, for an interconnected network of pedestrian routes within and through the city or county. The plan shall include:
  - An inventory of existing facilities that identifies gaps and deficiencies in the pedestrian system;
  - An evaluation of needs for pedestrian access to transit and essential destinations for all mobility levels, including direct, comfortable and safe pedestrian routes;
  - A list of improvements to the pedestrian system that will help the city or county achieve the regional Non-SOV modal targets in Table 3.08-1 of the RTFP, and other targets established pursuant to section 3.08.230;
  - Provisions for sidewalks along arterials, collectors and most local streets, except that sidewalks are not required along controlled roadways, such as freeways;
  - Provision for safe crossings of streets and controlled pedestrian crossings on major arterials
- Title 1, Bicycle System Design Sec 3.08.140 - Include a bicycle plan for an interconnected network of bicycle routes within and through the city or county. The plan shall include:
  - An inventory of existing facilities that identifies gaps and deficiencies in the bicycle system;
  - An evaluation of needs for bicycle access to transit and essential destinations, including direct, comfortable and safe bicycle routes and secure bicycle parking, considering TriMet Bicycle Parking Guidelines;
  - A list of improvements to the bicycle system that will help the city or county achieve the regional Non-SOV modal targets in Table 3.08-1 of the RTFP and other targets established pursuant to section 3.08.230;
  - Provision for bikeways along arterials, collectors and local streets, and bicycling parking in centers, at major transit stops shown in Figure 2.15 in the RTP, park-and-ride lots and associated with institutional uses;
  - Provision for safe crossing of streets and controlled bicycle crossings on major arterials
- Title 1, Street System Design Sec 3.08.110C –Provides for connectivity of the street system.
- Title 1, Sec 3.08.110E(4)&(5)- Connectivity requirements developments of five or more acres must provide include full street connections every 530 feet and if full street connection is prevented, bicycle and pedestrian accessways not more than 330 feet apart.

[140] This is first RTFP. It was adopted with the 2035 RTP in 2010. The requirements in the RTFP were developed to help achieve compliance with the adopted non-SOV modal targets.
[141] 2nd Edition, 2002http://www.oregonmetro.gov/index.cfm/go/by.web/id=26334
[142] Requirements are highlighted in "Transportation and Land Use Implementation Guidance" prepared in October 2011, which provides guidance for implementing the RTP through the RTFP and the UGMFP. More information and a copy of the RTFP is available at www.oregonmetro.gov/tsp

- Title 1, Transit System Design Sec 3.08.120A - Include investments, policies, standards and criteria to provide pedestrian and bicycle connections to all existing transit stops and major transit stops designated in Figure 2.15 of the RTP.
- Title 1, Transit System Design Sec 3.08.120B(1)- Transit plans shall show the locations of regional bike-transit facilities and transit-priority treatments such as bicycle and pedestrian routes.
- Title 1, Transit System Design Sec 3.08.120B(2)(a)(b)(c)- Provides for safe and reasonably direct pedestrian/transit connections at new development.
- Title 1, Transportation System Management and Operations Sec 3.08.160
- Title 2, Transportation Needs Sec 3.08.210 - Consideration and documentation of the needs of youth, seniors, people with disabilities and environmental justice populations within the city of county, including minorities and low-income families.
- Title 2, Sec 3.08.220 Transportation Solutions - Consider the following strategies in the order listed, to meet the transportation needs determined pursuant to section 3.08.210 and performance targets and standards pursuant to section 3.08.230. The city or county shall explain its choice of one or more of the strategies and why other strategies were not chosen:

  - TSMO, including localized TDM, safety, operational and access management improvements

  -Transit, bicycle and pedestrian system improvements

  -Traffic-calming designs and devices

  -Land use strategies in OAR 660-012-0035(2)

  -Connectivity improvements

  -Motor vehicle capacity improvements
- Title 2, Performance Targets and Standards Sec 3.08.230 - Modal and performance targets
- Title 4, Parking Management Sec 3.08.410I – includes bicycle parking

In some instances, requirements in the RTFP relating to pedestrian and bicycle elements lack specificity.

- **No requirements for spacing of bicycle routes.** Requirements are given for the spacing of roadways[143] which provides connectivity for pedestrians and bicyclists; under state law these streets must accommodate pedestrians and bicyclists. The regional street spacing standard of 530 feet (or a 330 ft ped/bike accessway when full street unfeasible) serves as a de-facto pedestrian route spacing standard. The City of Portland recommends providing a designated bikeway every 800 feet.
- **Safe crossing is not defined; no spacing requirements given for improved crossings of major streets**. Title 1, Pedestrian System Design Sec. 3.08.1300A and Title 1, Bicycle System Design Sec. 3.08.140 requires "Provision for safe crossings of streets and controlled pedestrian/bicycle crossings on major arterials". What constitutes a safe crossing is not defined, nor are spacing requirements for controlled crossings of major arterials provided.[144], [145]

[143] RTFP, Title 1, Street System Design Sec 3.08.110C, one-mile for arterials and half-mile for minor arterials and collectors

[144] The variety of contexts of roadway crossings makes it challenging to identify practical guidelines for safe crossings. For example, the city of Portland has many marked but uncontrolled crossings along Martin Luther King Jr.

- **Connectivity requirements apply only to new residential or mixed-use developments.** Title 1, Street System Design, Sec 3.08.110.
- **Lack of specificity for implementing Title 2, Sec 3.08.220 Transportation Solutions.** This requires that jurisdictions consider a list of cheaper options (in a specific order) before choosing auto capacity as a solution to a given need identified in its TSP (TSMO, transit/bike/ped, traffic calming, land use, connectivity). It is unclear if this hierarchy should also apply to ranking/prioritizing its TSP project list.
- **No design requirements for regional bicycle and pedestrian facilities, including trails.** Title 1, Sec 3.08.110A Street System Design allows for implementation of various best practice designs, but they are not required.[146] Result can be inconsistent quality of regional facilities.

Local Transportation System Plans

The regional active transportation network is implemented by local jurisdictions. Most of the region's twenty-five cities and the three counties develop TSPs. [147] The TPR requires that TSPs must include a bicycle and a pedestrian plan. Some jurisdictions also develop stand alone bicycle, pedestrian and/or trail plans (see Appendix 8- Best Practices Checklist for list of plans). These stand-alone plans are usually amended in full into the TSP, as in the case of Portland and Wilsonville. Sometimes only elements of the stand alone plans are brought into the TSP, as in Hillsboro where the Parks Master Plan (which includes the trails master plan) is not part of the TSP.

TSPs and stand alone bicycle and pedestrian plans were reviewed for this report, using a Best Practices Checklist to better understand the policies and planning framework that local jurisdictions are using to implement active transportation. [148], [149] See Appendix 8 for the checklist.

Boulevard, one the most heavily-travelled arterials in the region, that operate safely. The street's moderate speeds, tempered by traffic calming elements like narrow lanes, medians, on-street parking, and enclosure created by street trees and street front buildings all contribute to the safety of the crossings. Such crosswalks may not be as effective without the supporting urban street elements. However, a working definition of what constitutes a safe roadway crossing under certain conditions would help with evaluating performance. Such definitions should include key traffic factors such as volume and speed, as well as geometric design and operation factors that facilitate safe crossings.

[145] Data on crossings collected for the SW Corridor study provides a case study of pedestrian and bicycle crossings of major roadways, primarily arterials, in a major part of the region. The SW Corridor project identified the locations of "signalized" and "marked crosswalks" on arterial roadways in the SW Corridor study area. See map in Appendix 1. Approximately 15% of the intersections in the study area were improved. A total of 2,770 improved crossings would be needed to provide an improved crossing every 530 feet in the study area.

[146] Projects funded with Regional Flexible Funds (RFF) are required to use Complete Street and Green Street best practices; some regional facilities are not constructed with RFF.

[147] The following cities can will likely seek an exemption from developing a TSP, primarily because of the small population size and limited opportunities for growth: Durham, King City, Rivergrove, Johnson City, Maywood Park.

[148] The elements in the Best Practices Checklist developed from: Bicycle Network in Victoria, AUS method called the "5 minute bike plan assessment" http://www.bicyclenetwork.com.au/general/bike-futures/10209/; Pedestrian and Bicycle Information Center – "General Implementation Considerations" and "Policy and Planning Strategies to Support Bicycling and Walking" http://www.bicyclinginfo.org/develop/policies.cfm and http://www.walkinginfo.org/develop/policies.cfm best practices identified through the review of local TSPs and staff experience.

[149] The review utilized the Willamette Pedestrian Coalition's (WPC) "Getting Around on Foot Action Plan", which provides a helpful review of a majority of the region's TSP's pedestrian plans. The WPC review describes a disconnection between TSP goals for pedestrian improvements and identified prioritized and funded projects.

1. Projects are prioritized with planning level cost estimates.
2. Concept level design for prioritized projects, with planning level cost estimates.
3. Funding plan for prioritized projects.
4. Programming and education addressed.
5. Performance measures for bicycling and walking.

- All plans include goals for balanced, safe, efficient multi-modal transportation systems; many plans do not yet include funding plans for active transportation to implement the goals.
- All TSPs identify a set of bicycle and walking projects, many of the plans prioritize projects; however none of the plans prioritize all modes together in a master "priority list".
- Jurisdictions that have developed stand-alone bicycle, pedestrian and trail master plans tend to have prioritized project lists, have developed more refined cost-estimates and implementation strategies for active transportation that include policy changes, clearly articulated challenges and opportunities.
- Many plans do not include concept level design or planning level cost estimates for the prioritized projects. (Wilsonville is an example of a plan that does).
- Some local plans identify priority projects that are not listed in the 2035 RTP's federally constrained list of projects. Example: *Wilsonville's Bicycle and Pedestrian Master Plan* identifies a set of tiered priority projects, with planning level costs, but several of the regional level top priority projects are not listed in the RTP. Further work is needed to identify all of the top local active transportation priorities that are not in the RTP.
- Trail Master Plans are not always adopted into TSPs, reinforcing the assumption that trails are not transportation facilities (e.g. Hillsboro; Washington County).
- A few TSPs call for annual set-aside funding for implementing the pedestrian and bicycle plans. Portland and Tigard identify the set aside in their TSPs; Washington County dedicates funding from the Metropolitan Surface Transportation Improvement Program (MSTIP) to bicycle and pedestrian improvements, primarily when included in a roadway capacity improvement project.
- In some TSPs, the roadway classification for arterials and collectors includes no reference to these roadways being used by pedestrians and bicyclists, even though these types of roadways serve regional bicycle and pedestrian networks. (e.g. Washington County does not; Gresham does)
- Many TSPs prioritize projects that fill in gaps (increase connectivity rather than capacity) and serve essential destinations.

RTP Performance Targets and Measures

The 2035 RTP developed performance targets and measures to evaluate success at achieving regional transportation goals and outcomes.[150] Evaluation of the RTP system has two levels: transportation targets (**Regional Transportation Targets for the year 2035** and **Regional Non-Single Occupancy Vehicle Modal Targets**) and performance evaluation measures of the RTP investment strategies using a set of **System**

[150] Development of a performance measurement framework satisfies benchmarks mandated by the Oregon Transportation Planning Rule (TPR) and federal requirements to establish a performance monitoring system as part of the region's Congestion Management Process (CMP).

Evaluation Performance Measures and **System Monitoring Performance Measures**. [151] The performance targets are the highest order of evaluation measures, setting quantifiable goals for achieving the region's desired policy outcomes. In comparison, the investment strategy evaluation measures changes between current conditions and the set of transportation investments the region chooses to pursue (reflected in the RTP project list).

The current RTP does not meet several of the 2035 RTP transportation performance targets. The transportation targets are included below in Table 25 and Table 26 below. A **summary of the system evaluation** is provided here: [152]

1. Total average weekday VMT increases. However, VMT per person continues to decrease.
2. Traffic delay on the regional freight network increases significantly. The cost of delay increases over five fold. Motor vehicle delay increases for travel periods and origin-destinations.
3. Modest increases in transit travel times. Corridors with significant increase in transit service see travel time savings.
4. Congestion increases.
5. System wide, non-drive alone trips increase only slightly (2%). All centers and the City of Portland had the highest increase in non-drive alone trips.[153]
6. Average weekday boarding of transit increase by 40%.
7. When comparing both 2035 RTP Investment Systems to the 2035 No Build, approximately 23% more households are within ½ mile of a regional trail.
8. Environmental justice households access to high capacity transit increases by at least 13%.
9. There is significant reduction in transportation related air pollutants.
10. Green house gas emissions increase by at least 41%.
11. More projects intersect in high value habitat

Table includes findings on how well the 2035 RTP plan performs in relation to the Regional Transportation Targets. The supporting data for the evaluation is available in RTP Appendix 1.7. [154] Successfully meeting

[151] Each of the investment strategies in the RTP (2005 Base Year, 2035 No Build, 2035 RTP Federal Priorities System (Constrained) and the 2035 RTP Investment Strategy (Non-Constrained)) was evaluated in the RTP at the system-wide level and for some measures at the mobility corridor level. The evaluation relied on data generated by the regional travel demand forecast model and Metroscope, the regional land use model, to generate current and future year findings. http://www.oregonmetro.gov/index.cfm/go/by.web/id=25038

[152] The System Evaluation Measures and System Monitoring Performance Measures and results can be found in Chapter 5 of the RTP
http://library.oregonmetro.gov/files//2035_rtp_final_document_as_submitted_to_dlcd_usdot_web.pdf

[153] In general, the evaluation for non-SOV mode share in Mobility Corridors (see Chapter 4, RTP) finds that the 2035 RTP Investment Strategy has a higher rate of non-drive alone trips than the 2035 Federal Financially Constrained System. In both investment systems, over half of the mobility corridors (58%) increase the rate of non-drive alone trips within and for all trips. About 21% of these corridors increase non-drive alone trips by at least 5%. For example, MC #10 (Portland central city to Milwaukie) increases non-drive alone trips by 8-9% due to increased light rail service. Several MCs (42%) in the No Build scenario and 33% from the two investment strategies showed a slight decrease in non-drive alone trips when compared to the 2005 Base Year.

one target, such as reduction of vehicle miles traveled, is often dependent on meeting other targets, such as increasing pedestrian, bicycle and transit mode share. Achieving most of the targets in the RTP will require an increase in walking, bicycling, rideshare and transit trips.

Table 25: RTP Regional Transportation Targets

Target	Performance	Finding
ECONOMY		
Safety –By 2035, reduce the number of pedestrian, bicyclist, and motor vehicle occupant fatalities plus serious injuries each by 50% compared to 2005.	Between 2003 – 2005, there were an estimated: 55 pedestrian fatalities and serious injuries 27 bike fatalities and serious injuries 392 motor vehicle fatalities and serious injuries	The region has established a baseline to track progress toward achieving the target over time.
Congestion – By 2035, reduce vehicle hours of delay (VHD) per person by 10 percent compared to 2005.	By 2035: VHD per person increases by 193% in 2 hour pm peak travel period VHD per person increases by 255% in the 1 hour mid-day travel period	The region does not meet the target. The data shows that VHD per person increases dramatically from 2005 based on the planned level and mix of investments.
Freight reliability – By 2035, reduce vehicle hours of delay truck trip by 10 percent compared to 2005.	By 2035: VHD per truck trip increases by 180% in 2 hour pm peak travel period VHD per truck trip increases by 235% in the 1 hour mid-day travel period	The region does not meet the target. The data shows that VHD per truck trip increases dramatically from 2005 based on the planned level and mix of investments.
ENVIRONMENT		
Climate change – By 2035, reduce transportation-related carbon dioxide emissions by 40 percent below 1990 levels.	By 2035: Carbon dioxide emissions increase by 50% above 2005 levels	The State is developing a 1990 baseline and developing targets for light duty vehicles pursuant to House Bill 1059.The data shows that carbon dioxide increases from 2005 based on the planned level and mix of investments.
Active transportation – By 2035, triple walking, biking and transit mode share compared to 2005.[155]	By 2035: Transit mode share increases from 3% to 4% compared to the 10% target Walking increases from 6% to 7% compared to the 19% target Biking increases from 1.01% to 1.11% compared to the 3% target	The region does not meet the target. However, the data shows that the region is making progress toward achieving the target.
Basic infrastructure – By 2035, increase by 50 percent the	Data under development	The methodology for establishing a base line for this target is being

[154] 2035 RTP Technical Appendix: http://library.oregonmetro.gov/files//2035_rtp_appendix_june2010_web.pdf

[155] The 2011 OHAS data suggests that the region has achieved the 2035 target for bicycle mode share and the modeled data underestimated the pedestrian and transit mode shares. The current mode share for pedestrian and transit are higher than the 2035 modeled estimates.

Target	Performance	Finding
number of essential destinations[156] accessible within 30 minutes by trails, bicycling and public transit or within 15 minutes by sidewalks for all residents compared to 2005.		developed.
Clean air – By 2035, ensure zero percent population exposure to at-risk levels of air pollution.	In 2035: Carbon monoxide is estimated at 836,484 lbs/day, 29% below the regional motor vehicle emissions budget for 2035 Hydrocarbons (VOC) is estimated at 17 tons/day, 58% below the regional motor vehicle emissions budget for 2035 Nitrogen oxide (NOX) is estimated at 16 tons/day, 73% below the regional motor vehicle emissions budget for 2035	The region meets the target for carbon monoxide and ozone (VOC and NOX) exposure from transportation sources. A regional standard for air toxics is under development.
Travel – By 2035, reduce vehicle miles traveled per person by 10 percent compared to 2005.	In 2035: Vehicle miles traveled per person decline 4% below 2005 levels.	The region does not meet the target. However, the data shows that the region is making progress toward achieving the target.
EQUITY		
Affordability – By 2035, reduce the average household combined cost of housing and transportation by 25 percent compared to 2000.	In 2005, the average household in the Portland region spend about 44 percent of its income on housing and transportation.	The region will track progress toward this target.
Access to daily needs – By 2035, increase by 50 percent the number of essential destinations accessible within 30 minutes by bicycling and public transit for low-income, minority, senior and disabled populations compared to 2005.	Data under development	The methodology for establishing a base line for this target is being developed.

Source: 2035 RTP

Regional non-SOV modal targets, Table below, are goals for cities and counties to work toward.[157] Active transportation is not separated out from non-SOV auto trips. The system evaluation (summarized above) found that system wide, non-drive alone trips increase only slightly (2%). All centers and the City of Portland had the highest increase in non-drive alone trips.

[156] Consistent with the evaluation methodology used for the High Capacity Transit plan, essential destinations are defined as: hospitals and medical centers, major retail sites, grocery stores, elementary, middle and high schools, pharmacies, parks/open spaces, major social service centers (with more than 200 monthly LIFT pick-up counts), colleges and universities, employers with greater than 1,500 employees, sports and attraction sites and major government sites.

[157] Non-SOV, non-single occupancy vehicles includes autos with more than one occupant (High Occupancy Vehicles), transit, walking, and bicycling.

Table 26: Regional Non- SOV Modal Targets[158]

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

Note: The targets apply to trips to and within each 2040 design type. The targets reflect conditions needed in the year 2040 to comply with Oregon Transportation Planning Rule objectives to reduce reliance on single-occupancy vehicles.

[158] Metro adopted non-SOV (single occupancy vehicle) modal targets to achieve compliance with Section 660-012-0035 - Evaluation and Selection of Transportation System Alternatives of the state Transportation Planning Rule (TPR).

CHAPTER 5: RTP PEDESTRIAN AND BICYCLE NETWORK VISIONS, POLICIES AND CONCEPTS

This chapter provides information on the vision, concepts and policies for the regional bicycle and pedestrian networks, including the regional trails network.[159] The transit, system design, and freight network concepts are also included because of the intersection with the bicycle and pedestrian networks.

The regional transportation system is comprised of the following **overlapping and integrated networks** -

- Pedestrian
- Bicycle
- Transit
- Freight
- Arterial and throughway

The **regional transportation system** is identified in the RTP.[160] The regional system is limited to facilities of regional significance generally including regional arterials and throughways, high capacity transit and regional transit systems, regional multi-use trails with a transportation function, bicycle and pedestrian facilities that are located on or connect within or connect to 2040 target areas, air and marine terminals, as well as regional pipeline and rail systems. **Error! Reference source not found.**, below, illustrates the relationship and meaning of "system", "networks and functional classifications", "demand and system management" and facilities as organized in the RTP.

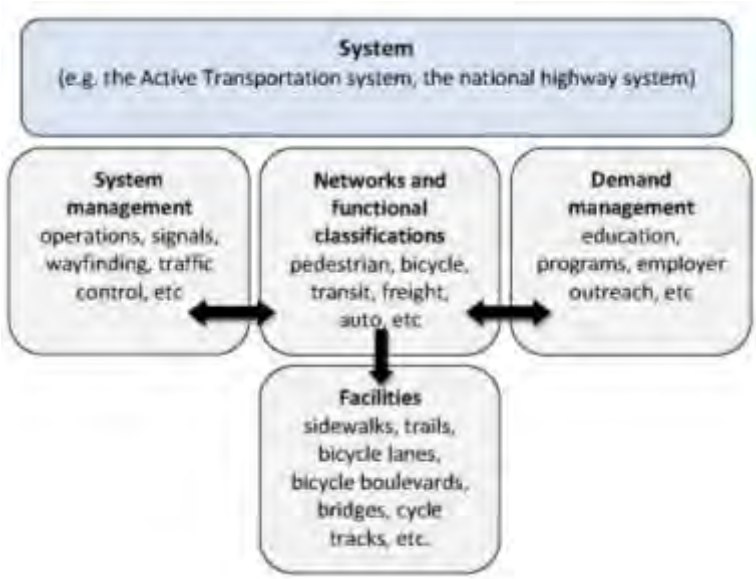


Figure 13: Relationship of Transportation System, Networks, Management and Facilities

[159] Information is derived primarily from Chapter 2 of the 2035 RTP.
[160] 2035 RTP Chapter 2, regional transportation network maps

In this context, the **vision** is the completed regional pedestrian and bicycle networks and **concept** is defined as abstracted construct that provides a framework for understanding how the pedestrian and bicycle network will function "on the ground". Concepts are formed from experience and reflect the ideal network that responds to defined criteria and principles (e.g. supports short trips by walking and biking, increases access to transit, equitably distributes benefits and burdens, maximizes connectivity, etc). Concepts are not specific and do not reflect a real place. Rather, they serve as a diagram that illustrates how the networks should function.

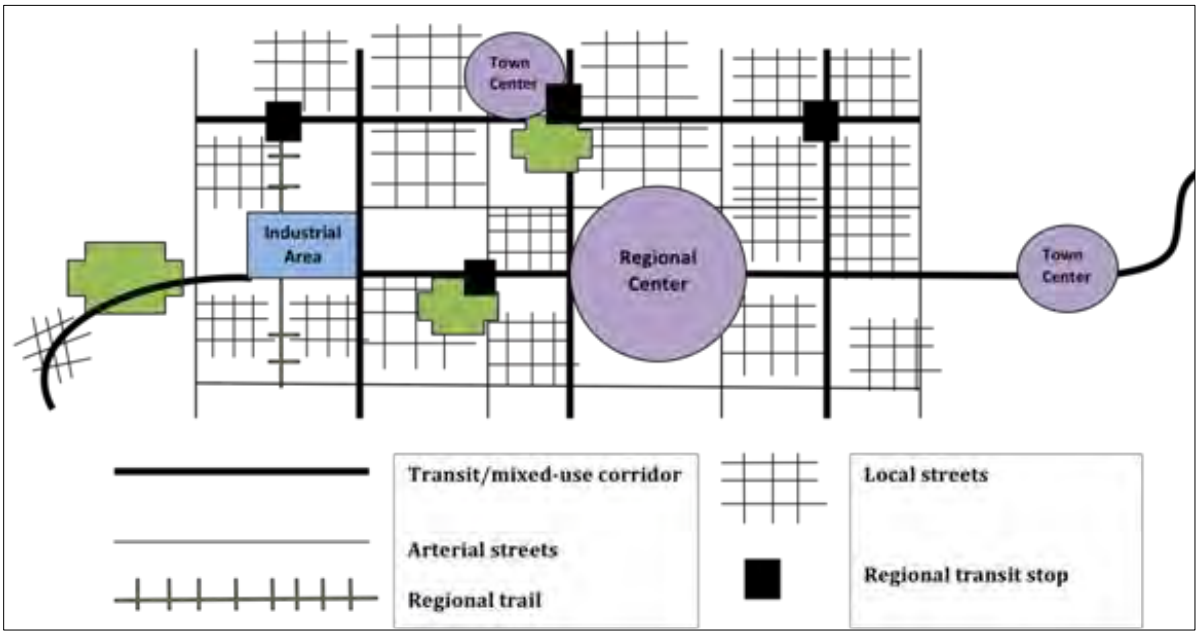
Pedestrian Network Vision

The Region 2040 plan sets forth a vision for making walking safe, convenient and enjoyable to support walking as a legitimate travel choice for all people in the region. The RTP supports this vision with a region-wide network of on-street and off-street pedestrian facilities integrated with transit.

The RTP indentifies **four pedestrian policies** to guide the implementation of the vision:

1. Promote walking as primary mode for short trips
2. Build a well-connected network of pedestrian facilities that serves all ages and abilities
3. Create walkable downtowns, centers, main streets and station communities
4. Improve pedestrian access to transit

Figure 14: RTP Regional Pedestrian Network Concept



Regional Pedestrian Network

The Regional Pedestrian System map in Appendix 1 illustrates the future vision of the Regional Pedestrian Network and translates the pedestrian network concept into actual regional facilities and connections.

The current regional pedestrian network is comprised of *pedestrian districts* linked by *regional corridors* and *trails* where future development is focused and where there are high levels of activity, services and destinations. The regional pedestrian system is the skeletal structure of the overall pedestrian system that includes every street, sidewalk and trail in the region. The regional pedestrian system knits cities and counties together and is comprised of mixed-use centers and transit corridors where future development is focused and where there are high levels of activity, services and destinations. The regional pedestrian system overlaps substantially with the other regional systems – street, bicycle, trail, transit and freight.

The 2035 RTP defines *corridors* as a type of land use that is typically located along regional transit routes and arterial streets, providing a place for somewhat higher densities than is found in 2040 town centers. These land uses should feature a high-quality pedestrian environment and convenient access to transit. While some corridors may be continuous, narrow bands of higher-intensity development along arterial streets, others may be more nodal, that is a series of smaller centers at major intersections or other locations along the arterial that have high quality pedestrian environments, good connection to adjacent neighborhoods and transit service.

A *pedestrian district* is a comprehensive plan designation or set of land use regulations designed to provide safe and convenient pedestrian circulation, with a mix of uses, density, and design that support high levels of pedestrian activity and transit use. The pedestrian district can be a concentrated area of pedestrian activity or a corridor. Pedestrian districts can be designated within the following 2040 Design Types: Central City, Regional and Town Centers, Corridors and Main Streets. Though focused on providing a safe and convenient walking environment, pedestrian districts also integrate efficient use of several modes within one area, e.g., auto, transit, and bike.

Regional trails are paved off-street facilities serving bicyclists and pedestrians. They typically serve as longer distance routes connecting neighborhoods to 2040 target areas, often providing access to parks, schools, and natural areas. 75% of a regional trail must be off street. [161]

[161] The RTP definition of regional trails is a follow up "issue" because it states that regional trails are paved, yet Metro's criteria for adding trails to the regional trail plan map does not require that they be paved. It should be clarified that paved vs. unpaved is a facility type, while regional vs. non-regional is a functional classification. Most local trail plans split trails into variations of these three functional classes: regional, community, and local. Metro defines the three trail functional classes as follows: Regional = tend to be multi-jurisdictional, exceptionally long, and connect to regionally significant features such as parks, rivers, and population centers. Community = typically much longer than local trails though not as long as regional trails, community trails link important land uses and areas of interest within a single jurisdictions. Examples are Tigard's Pathfinder-Genesis Trail, Portland's Columbia Boulevard Trail, and Gresham's Butler Creek Greenway. Local = sometimes called "local access trails" or "neighborhood trails", these provide relatively short connections to local destinations such as parks, community centers, and schools, and provide internal circulation within parks, open spaces, planned developments, and campuses. Local trails also include most public stairways and even some alleyways and unimproved rights-of-way.

The regional pedestrian network does not include functional classifications of facilities; however, the facilities that generally make up the network include:

- Sidewalks with ramps and curb cuts
- Off-street trails, street crossings for trails, frequent access points
- Protected street crossings
- Pedestrian bridges and sidewalks on multi-modal bridges

A pedestrian equivalent of the "Regional Bicycle Parkway" will be developed as part of the ATP.

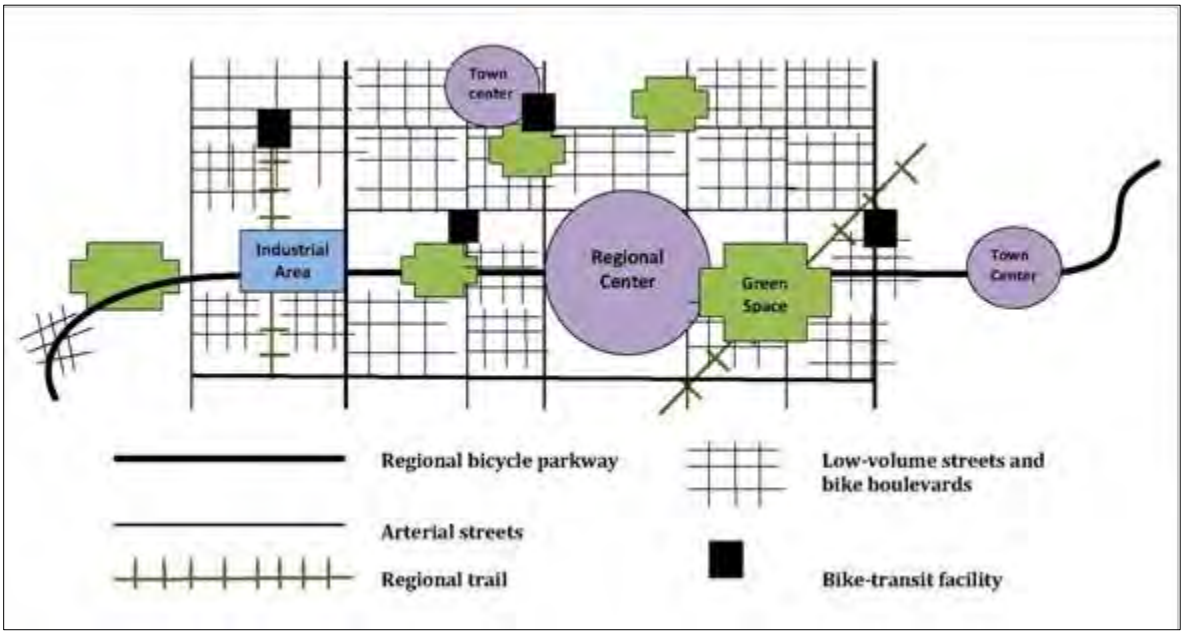
Bicycle Network Vision

The Region 2040 plan sets forth a vision for making bicycling safe, convenient and enjoyable to support bicycling as a legitimate travel choice for all people in the region. The RTP supports this vision with a region-wide network of on-street and off-street bikeways integrated with transit.

The RTP indentifies **three bicycle policies** to guide the implementation of the vision:

1. Build an interconnected network of bicycle facilities that provides seamless access to 2040 target areas
2. Improve bike-transit connections
3. Build a green ribbon of bicycle parkways as part of the region's integrated mobility strategy

Figure 15: RTP Regional Bicycle Network Concept



Regional Bicycle Network

The Regional Bicycle System map in Appendix 1 illustrates the future vision of the Regional Bicycle Network and translates the bicycle network concept into actual regional facilities and connections.

Functional Classifications

Local jurisdictions nominate facilities to be part of the regional network. The 2035 RTP includes a bicycle functional classification system with the following designations. The designated facilities on the RTP bicycle network include both completed and un-built segments.

- **Regional Bicycle Parkways** form the backbone of the regional bicycle network, providing for direct and efficient travel with minimal delays in different urban environments and to destinations outside the region. The 2035 update of the RTP included updated policies to create a network of Regional Bicycle Parkways to form the backbone of the regional bicycle system. This concept emerged from work by the Metro Blue Ribbon Committee for Trails as part of the broader Connecting Green Initiative. A bicycle parkway serves as a green ribbon connecting 2040 activity centers, downtowns, institutions and greenspaces within the urban area while providing an opportunity for bicyclists to travel efficiently with minimal delays. Key experiential aspects that bike parkways embody: A green environment, Comfort and safety provided by protection from motorized traffic, Large volumes of cyclists traveling efficiently with minimal delays.
- **Regional Bikeways** provide for travel to and within the Central City, Regional Centers, and Town Centers.
- **Community Bikeways** provide for travel to and within other 2040 Target Areas. These routes also provide access to regional attractions such as schools and parks and connect neighborhoods to the rest of the regional bicycle network. *Regional and Community Bikeways* typically follow arterial streets but may also be located on low-volume streets. These on-street bikeways should be designed using a flexible "toolbox" of bikeway designs, including bike lanes, cycle tracks (physically separated bicycle lanes) shoulder bikeways, shared roadway/wide outside lanes and bicycle priority treatments (e.g. bicycle boulevards).
- **Regional Trails** are paved off-street facilities serving bicyclists and other non-motorized users. They typically serve as longer distance routes connecting neighborhoods to 2040 target areas, often providing access to parks, schools, and natural areas.
- **Bike-Transit Facilities** provide connections between modes, i.e. large-scale bike parking facility at a transit station. The 2035 update of the RTP included updated policies for improving bicycle-transit connections. A key component of the bike-transit connection is bicycle parking at transit stations. TriMet, with input from regional stakeholders, has developed Bicycle Parking Guidelines. The guidelines consider station context and regional travel patterns, and are focused on three major factors for parking: location, amount and design. The guidelines will help TriMet and local jurisdictions determine the appropriate location, size and design of large-scale bike-parking facilities, including Bike-Transit Facilities.

Regional Trails Vision

Regional trails are an important element of the regional bicycle and pedestrian networks. In the 2035 RTP, regional trails with a transportation function are integrated into the adopted pedestrian and bicycle network

visions, concepts, and policies. [162] In addition to the RTP pedestrian and bicycle network visions, the RTP also includes a map of the Regional Trails and Greenways Vision. See Appendix 1. The regional trail vision includes that are part of the regional bicycle and pedestrian networks (and therefore serving an RTP transportation function), as well as regional trails and greenways that are not designated in this way.[163] These trails are not included in the regional pedestrian and bicycle networks because they did not meet the criteria to serve as a regional transportation facility. See Appendix 9 for the criteria and for a list of regional trails that serve an RTP transportation function. All trail projects included in the RTP must serve primarily a transportation purpose. The ATP may develop and propose additional guidelines for regional trails to support their transportation function, such as lighting, open 24-hours.[164]

Regional Transit Vision

The 2040 Growth Concept sets forth a vision for connecting the central city to regional centers like Gresham, Clackamas and Hillsboro with high capacity transit. The RTP expands this vision to include a complete network of regional transit along most arterial streets to better serve suburban communities. Existing land use mixes and future transit-oriented development potential should be considered and incorporated into service and station location decisions.

The RTP indentifies **five transit policies** to implement the vision:

1. Build the total system and transit-supportive land uses to leverage investments
2. Expand high capacity transit
3. Expand frequent service transit
4. Improve local service transit
5. Support expanded commuter rail and intercity transit service

The Transit System map in Appendix 1illustrates the RTP Regional Transit Network Vision.

[162] All trails serve a transportation function. Whatever the purpose, recreation, relaxation, commuting, getting from point A to point B, if people walk or bike on a trail it serves a transportation function. However, for the purposes of the RTP

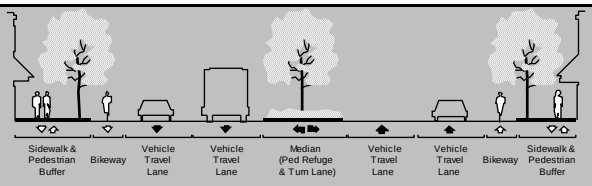
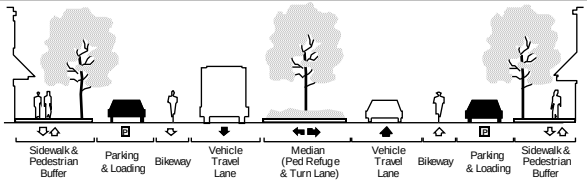
[163] See Glossary for Regional Trail and Greenways definitions.

[164] A follow up issue that has been identified: Some streets which serve as connections between trails and fall under the 75% off street rule that applies to regional trails are identified as "Complete Regional Trails" on the Regional Trails map though they have no special designs or improvements to make them more trail-like and they are not separated from traffic in any way- they look like any other street with a bike lane. Most of the segments fall under the "moderately suitable" rating (busy streets with bike lanes, suitable for experienced riders) on the Bike There map; not a trail like experience, and include:

•Kane Drive in Gresham (part of 40 mile loop)
•Terwilliger Blvd (Terwilliger Trail, part of 40 mile loop)
•Olson Drive (Red Electric Trail)
•Segment of the I-205 Trail
•St John's Bridge and a segment of Hwy 30 (part of 40 mile loop)
•Airport Way streets (near airport – some on-street, some sidewalk)

Regional System Design and Placemaking Concept

The regional system designs are based on Metro's Livable Streets Handbooks and vary depending on intended function of the street or throughway and the land uses the roadway serves. Consideration is given to various arterial designs, designs for pedestrians, bicyclists and transit and the link between street design and storm water management. An example of the Design Concepts is provided below.

Examples of RTP Design Concepts				
Regional / City	**Regional Boulevard** *2040 centers* *Station communities* *Main streets*	Major Arterial		4 through lanes with turn lanes
City	**Community Boulevard** *2040 centers* *Station communities* *Main streets*	Minor Arterial		2 through lanes with turn lanes

Source: 2035 RTP

The design classifications guide how pedestrian and bicycle travel will be included in the overall street concept, including how trails will connect to the on-street system. The concept and Best Practices Guidebooks includes suggested designs for pedestrians, bicyclists and transit users and designs for storm water management and natural resource protection. These are not required designs, and include traffic calming measures, improvements for safer crossings, and wildlife crossings. Map X in Appendix 1 shows the regional design classifications.

Overlap of Pedestrian, Bicycle and Freight Networks and State Highways

The regional pedestrian, bicycle, freight and state highway networks overlap on many facilities, primarily arterials and state highways. Accommodating multiple modes on these facilities presents many challenges of design and trade-offs. Maps in Appendix 1 show the overlap of regional pedestrian, bicycle and freight routes identified. Regional trails that could potentially affect the right of way (ROW) of regional freight routes area also identified.

<u>Overlapping Designated Regional Freight, Bicycle and Pedestrian Routes</u>

1. US 30
2. TV Hwy (OR 8, west of OR 217)
3. Pacific Hwy (OR 99W outside the City of Portland)
4. McLoughlin Blvd (OR 99E)

5. Milwaukie Expressway (OR 224)
6. OR 212
7. Powell Blvd – from 82nd Ave to Gresham (US 26 in the City of Portland)
8. US 26 in Gresham
9. The segment of OR 99E north of Columbia Blvd that is still a State Hwy
10. Lombard Avenue (US 30 Bypass)
11. Multi-use trails paralleling US 26, I-84, and I-205 (the trails themselves are subject to ORS 366.215 because they are not accessible to freight vehicles, but if any trail improvements were to impinge on the mainline itself or on its on- or off-ramps and thus "reduce capacity" for freight vehicles, they might be subject to ORS 366.215)
12. Segments of Hwy 10 (Farmington Rd) bike and pedestrian
    Columbia, on the bike map
13. A section of NE Sandy Blvd. on the bike and pedestrian map
14. A segment of US 47 (TV HWY, Quince Street and the Nehalem Hwy) that goes through Forest Grove, and B St. and NW Sunset Drive, on the regional bike map
15. Hwy 43 (Willamette Dr., SW Riverside dr.,) on Regional bike and pedestrian maps
16. Hwy 213 appears to be part of the regional bike system through parts of Oregon City and unincorporated Wash Co.
17. Historic Columbia River Hwy outside of Troutdale (but in MPO boundary) is on the regional bike map

Oregon statute ORS 366.215 impacts these shared routes. ODOT is currently engaged in a rule making process to determine how the statute is implemented. ORS 366.215 states that the Oregon Transportation Commission may not permanently reduce the vehicle-carrying capacity of an identified freight route. The restriction can impact the types of pedestrian and bicycle improvements that can be made to facilities/routes identified on the ORS 366.215 map. Map in Appendix 1 identifies the ORS 366.215 routes; highlighted areas identify those routes that are *also* regional pedestrian and bicycle routes. The routes are the same as those listed above (including trails that may trigger ROW issues), with one addition – North Lombard Avenue (US 30 Bypass).

There are locally adopted multi-modal streetscape plans for Pacific Hwy in Tigard; McLoughlin Blvd. in Milwaukie, unincorporated Clackamas County, and Oregon City; and Powell Blvd and Lombard Avenue in Portland that predate ORS 366.215 and that include design features that could now be considered a reduction in capacity.

CHAPTER 6: EXISTING REGIONAL ACTIVE TRANSPORTATION SYSTEM

Studies have found that numerous factors influence whether people will choose to walk or bike.[165]Safety and separation from traffic are primary *built environment* factors influencing this decision. Others include overall safety and comfort of facilities, ease of way finding, directness of route, security, travel distance to destinations, end of trip facilities, buffers from traffic such as trees and parked autos, and topography. The efficacy of these factors is impacted by design and investment. Income and demographics, land use, density of population, social and psychological factors such as comfort with trying new things and social acceptance of the mode of travel, also impact choice; program, marketing and education are used to address these factors.

This chapter describes and analyzes the current regional active transportation system of pedestrian and bicycle networks, and access to the existing public transportation network and other destinations. This chapter focuses on infrastructure; Chapter 6 focuses on programs and education including system management and demand management.

Analysis of the current system is provided by the Regional Cycle Zone Analysis and the Pedestrian System Analysis. TriMet's 2010 Pedestrian Network Analysis provides focus areas for pedestrian access to transit improvements. Facility types and functional classifications for the regional pedestrian and bicycle networks are also described. Most regional trails function as both pedestrian and bicycle facilities (some are pedestrian only paths.

Influence of the Built Environment on Trip Choice

Investing in pedestrian and bicycle infrastructure has been shown to result in increases in walking and bicycling, especially when supported by programs and education, such as Safe Routes to School and driver's education. Infrastructure that supports active transportation includes:

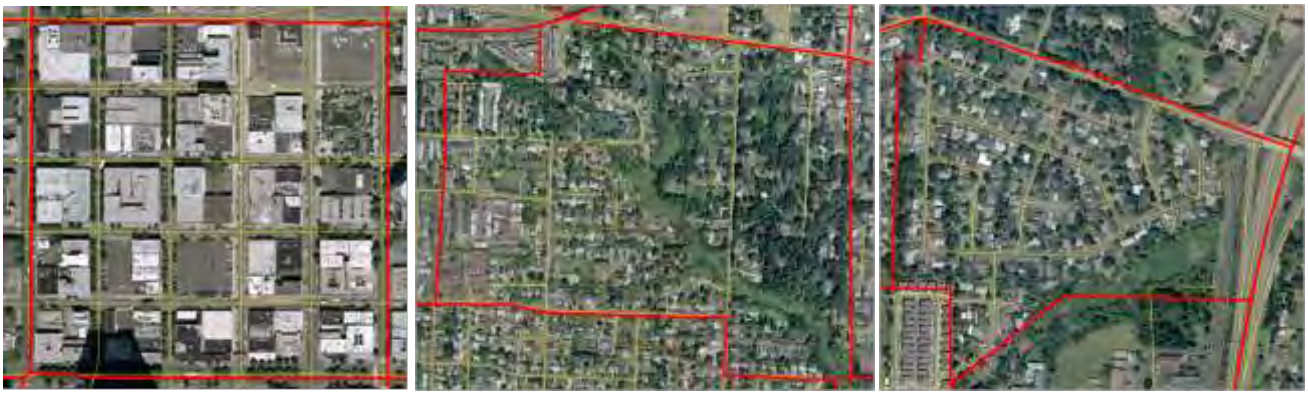
- **Pedestrian-supportive infrastructure**: Frequent and improved crossings of roadways and barriers such as rivers, railways and freeways, sidewalks, lighting, wayfinding signage, accessibility standards, pedestrian only and multi-use trails, pedestrian crossings, pedestrian signals, medians and other pedestrian "refuges," high-visibility crosswalk striping, raised pedestrian crossings, in-pavement lighting, overhead illuminated crosswalks, recessed stop lines, warning signs, sidewalk extensions and narrowed roadways.
- **Bicycle-supportive infrastructure:** Frequent and improved crossings of roadways and barriers such as rivers, railways and freeways, bicycle lanes, multi-use trails, wayfinding (on pavement and signs), cycle tracks, lighting, bicycle boulevards, paved shoulders, buffered bicycle lanes, demand activated traffic signals and bicycle-actuated signals to support green wave cycling.

The types and intensities of land uses are significant factors influencing travel demand and mode choice. Low-density, single-use development tends to support higher motor-vehicle demand, whereas denser, mixed-use developments have been found to result in shorter trips and more use of transit, bicycling and walking.

Most walking and bicycling trips are short. Long distances between destinations deter walking and bicycling, as are destinations that can only be easily accessed by an automobile. Active transportation is positively associated with high levels of street connectivity, residential density and land use mixes. Residents in

[165] Booz Allen Hamilton (July 2011). *Transportation and Health: Policy Interventions for Safer, Healthier People and Communities*.

neighborhoods with shorter block lengths are more likely to walk to their destinations, especially when connected to a mix of urban amenities. Street connectivity is an important element for walking and bicycling. The images below illustrate different land use patterns in the region (by transportation analysis zones – TAZs).



20 connections per mile (TAZ 24) *10 connections per mile (TAZ 1263)* *8 connections per mile (TA Z 1081)*

One study found that a five percent increase in neighborhood walkability, described as sidewalks and ease of reaching places, was associated with a 32 percent increase in active transportation.[166]

<u>Examples of Built Environment Features Supporting Walking and Bicycling</u>

- Number of transit lines and the number of high frequency transit stops within ½ mile
- Density of jobs and people
- Density of trip generators, such as grocery stores, shops, schools, restaurants, entertainment, etc.
- Density and quality of bicycle and pedestrian facilities, such as trails, sidewalks, and bike lanes
- High street connectivity and street density
- Land use forms such as sidewalk oriented entrances, windows.

An example of how the built environment affects mode choice is provided by a recent study in the Portland metropolitan region. [167] The study determined how people arrived at three different types of establishments (high turn-over sit down restaurants, 24-hour convenience markets, and drinking places) at various locations in the region representing different types of land use (Central Business District, Urban Core, Regional Centers, Suburban Town Centers, and Suburban Areas). A total of 78- establishments were included in the study. The following map from the report shows the breakdown of different travel modes that people used to reach the establishments. The study found that people are using a variety of modes, not just in inner urban areas, but in traditional suburban areas as well – especially walking. And, where there is good street connectivity, higher densities, better access to transit there are also much higher instances of people running errands or going out to eat and drink by foot, bicycle and transit.

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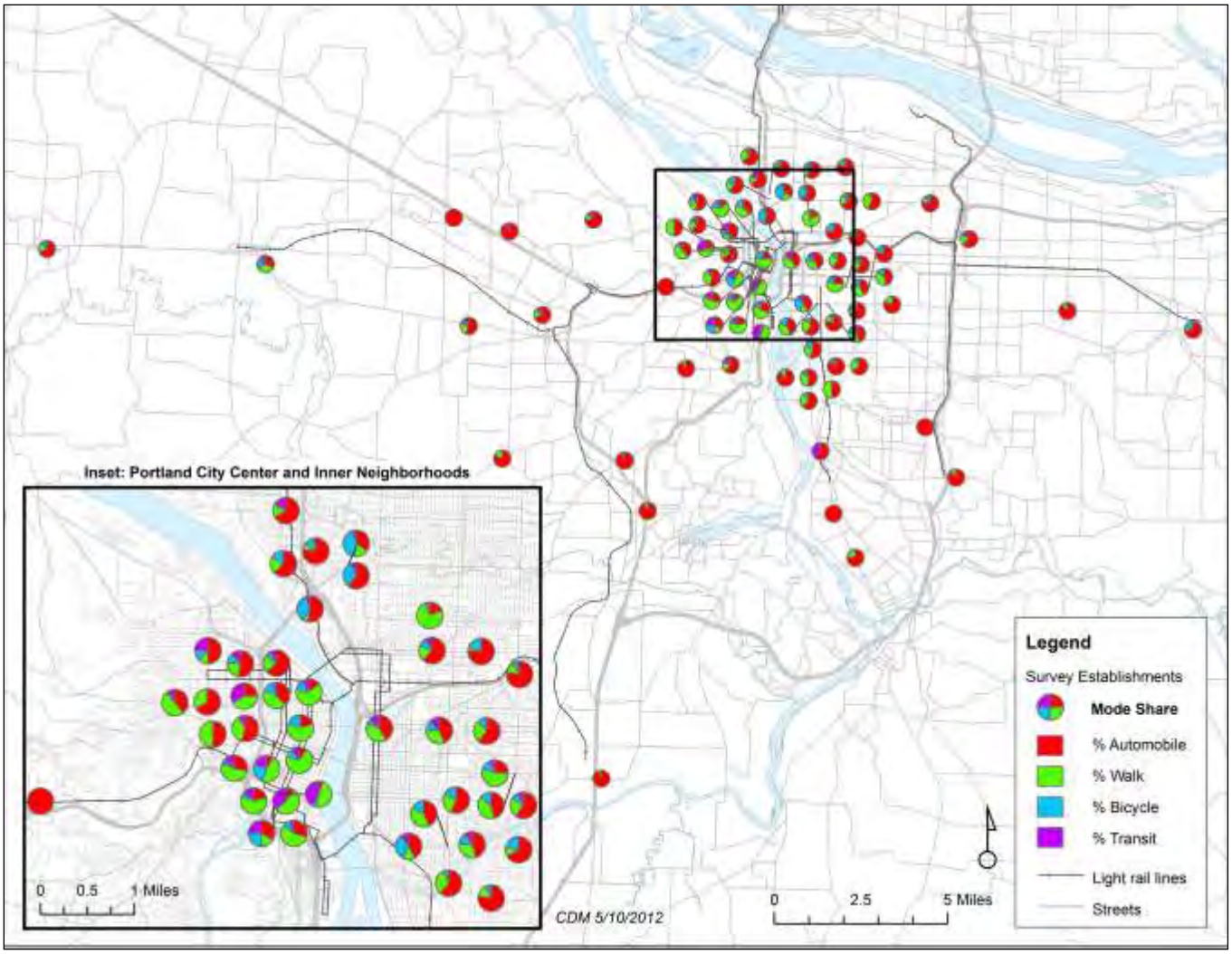
[166] Clapp, Elizabeth, & McSharry, Moriah (June 2011). *Built Environment Atlas: Active Living, Healthy Eating*. Multnomah County Health Department.
[167] Clifton, Kelly J. *Contextual Influences on Trip Generation.* Final Report. *OTREC 2011-407.* Portland State University



Source: Contextual Influences on Trip Generation. Final Report. OTREC 2011-407. Clifton, Kelly J. , Portland State University

Miles Built and Un-Built of Sidewalks and Bikeways

One way to measure completeness of the regional pedestrian and bicycle networks is to calculate the miles of built and un-built sidewalks and bikeways. As the analysis of the regional pedestrian network and bicycle zones in the following sections demonstrates, the existence of sidewalks, trails, bike lanes and bike boulevards is only one measure of completeness. None-the-less, it is an important measure. The tables below show the number of miles completed and the number of miles of gaps for:

- Sidewalks in the regional pedestrian system (pedestrian districts, 2040 corridors and transit corridors) and on all roadways in the region.
- Regional trails/multi-use paths
- Regional and community bikeways

The Existing Conditions Maps in Appendix 1 illustrate how much of the regional bicycle and pedestrian systems have been completed. **Note these are still being developed and will be included in the final draft.**

Table 27: Miles of Completed Sidewalks, Regional Transportation Plan Pedestrian Network and All Roadways, 2012

	Regional Pedestrian Districts	Regional Pedestrian Corridors	All Roadways in Region
Miles of roadway with sidewalk on both sides	400	306	2787
Miles of roadway with sidewalk on one side	156	84	2285
Miles of roadway with no sidewalk either side	121	96	189
Total miles of roadway	**677**	**486**	**6043**

Source: Metro, 2012 Regional Land Inventory System (RLIS), Sidewalk Inventory

In the regional pedestrian network of districts and corridors, 19.2% of all roads have no sidewalks, 18.7% have sidewalks on at least one side of the road and 61.9% of the roads have sidewalks on both sides of the road.[168]

Table28: Miles Built and Un-built, Regional Transportation Plan On and Off Street Bicycle Network, 2012

Regional Transportation Plan Bicycle Network, 2012	Network Miles
Miles of built on-street regional bikeways	450
Miles of built off-street regional trails/multi-use paths	121
Miles of un-built on-street regional bikeways	368
Miles of un-built off-street regional trails/multi-use paths	242
Total miles of built and un-built regional on and off-street bikeways	**1081**

Source: Regional Transportation Plan, 2012

The regional bicycle network, as identified in the 2035 RTP, has a total of 1,081 miles (built and un-built on and off-street bikeways). Of the total network, 33% of the regional trails have been completed and 55% of designated regional bikeways have either bike lanes or are bike boulevards. Data on miles of regional and local bikeway facilities has been tracked more consistently over time than has data on miles of sidewalks. The table below provides information on miles of completed regional and local bicycle networks over time. Since 1999, the region has constructed 194 miles of bike lanes and bike boulevards and 170 miles of trails.

Table 29: Miles of Completed On and Off-Street Bikeways, Regional and Local Networks, 1999-2012

All Facilities, Regional and Local	1999	2002	2006	2012
On-street bicycle lanes and bicycle boulevards	430	512	547	624
Off-street trails/multi-use paths	41	110	127	211
Total miles of completed regional and local bicycle networks	**471**	**622**	**674**	**835**

Metro, 2012 Regional Land Inventory System (RLIS), Bike Dataset

The following general regional needs and strategies related to active transportation were identified in the RTP Mobility Corridor Strategies.[169] Defined needs for bicycle, pedestrian and trail projects are much less specific than for other modes.

[168] See Appendix for sidewalk methodology.
[169] RTP, Chapter 4

Needs – General

- Safe, direct, continuous and enjoyable bicycle and pedestrian pathways between essential destinations, transit stops, housing, jobs, and retail.
- Direct connections between trails and on-street bicycle and pedestrian facilities.
- Direct, safe, enjoyable, bike and pedestrian connections to all transit stops.
- Provide bicycle parking and options for bike sharing at all HCT stations.
- Ensure actual and perceived bicycle and pedestrian safety along arterials.
- Make pedestrian and bike crossings of arterials easier and safer.
- Manage auto access points along arterials to provide better safety to bikes and pedestrians.

Ensure actual and perceived bicycle and pedestrian safety on regional bridges.

Strategies –General strategies to meet the needs identified in the RTP Mobility Corridors include:

- Implement Regional Transportation Functional Plan and Urban Growth Management Functional Plan.
- Identify where essential destinations are in relation to transit stops, housing, jobs, and retail and prioritize pedestrian pathways between these areas.
- Analyze transit stops in relation to bicycle and pedestrian network and build direct, safe, enjoyable bicycle and pedestrian facilities in areas where they do not exist. Refer to TriMet's Pedestrian Network Analysis project for recommended places to focus attention and for replicable analysis methodology.
- Refer to the RTP Regional Transit Network map for regional bike-transit facility locations where demand is expected to be sufficient to warrant a major bike parking facility. Bikeway connections to these stations should be prioritized. For all other stations, refer to TriMet's bike parking design guidelines. When finances permit, TriMet will implement.
- Incentivize high to medium density, mixed-use, pedestrian oriented development in the Central City, Regional Centers, Town Centers, Main Streets, and around HCT station areas.
- Analyze regional trail access points in relation to on-street bicycle and pedestrian network and build direct, safe, enjoyable bicycle and pedestrian facilities in areas that do not have these connections.
- Identify auto access points along arterials and work with city and property owner to find design solutions to unsafe areas.
- Identify arterials where bicyclists and pedestrians feel unsafe and provide better pedestrian and bicycle facilities along these arterials.
- Identify intersections located on arterials where bicyclists and pedestrians feel unsafe and have high accident rates. Once identified, provide better pedestrian and bicycle crossing protections at these intersections.
- Identify regional bridges where bicyclists and pedestrians feel unsafe, and provide better pedestrian and bicycle facilities on these regional bridges.

An initial comparison of the un-built sections of the regional pedestrian and bicycle networks and the pedestrian, bicycle and trail projects listed in the Financially Constrained and Non-Constrained 2035 RTP project lists, indicates that several un-built sections of the pedestrian and bicycle networks do not have

corresponding stand alone planned projects listed in the RTP.[170] The ATP should identify any missing projects, suggest stand alone projects for the principal regional network, and identify local priority projects for bicycling and walking that are not currently in the RTP. Appendix 1 includes maps of the current bicycle and pedestrian networks in the Regional Transportation Plan. Chapter Six provides maps showing in the networks. The Mobility and Community Building Investment Maps in Appendix 1 show the location of projects that are programmed in the 2035 RTP project list. The project numbers on the maps correspond with the RTP project lists.[171]

Bridges and Crossing Gaps

Without appropriate bicycle and pedestrian facilities, rivers, railroads, freeways and some major streets can be substantial barriers to getting around actively. The RTP Bridges – Facility Type map in Appendix 1 shows the location of the region's existing bridges. The RTP identifies twelve regional bridges spanning the Willamette and Columbia Rivers.[172] Of the twelve regional bridges, two are not open to bicycle and pedestrian travel (Marquam and Fremont) and several need to be improved for safety and comfort (Sellwood, Ross Island, St. Johns, Interstate and Glen Jackson). Modeled bicycle volumes for 2035 indicate that some of the bridges, such as the Steele Bridge, may not accommodate increased demand. Bridges provide critical connections for active transportation. Not all bridges are open to people walking and biking, and some are dangerous to cross with little separation from auto traffic. The list below illustrates the need for additional bridge crossings for bicycle and pedestrian travel. A more thorough analysis of bridge crossing gaps for pedestrian and bicycle travel is needed.

Identified bridge and barrier crossings to improve pedestrian and bicycle access.

1. 7th Ave. crossing of I-84, Portland
2. Crossing of Hall Blvd. for the Fanno Creek Trail
3. French Prairie Bike/Ped Bridge (RTP 10133)
4. Causey Ave Overcrossing of I-205 at Bob Schumaker Road and I-205 path (RTP 10007)
5. Boeckman Rd. I-5 overcrossing in Wilsonville, connect to regional trails (RTP 10132)
6. I-5 at Gibbs, SW: Pedestrian/Bike Overcrossing, Portland (this project is completed)
7. Replace RR over crossing at Historic Columbia River Hwy, Multnomah County
8. Foster Rd. Bridge, Gresham
9. Giese Rd. Extension Bridge, Gresham
10. Butler Rd. Extension and Bridge, Gresham
11. 201st RR Bridge at I-84, Gresham (Gresham Fairview Trail)
12. 173rd Ave. Bronson to Cornell under crossing of US 26(Washington County, 2020 Transportation Plan)
13. N. Lombard at Columbia Slough Overcrossing, Portland (RTP 10217)

[170] Only projects that identified "bike", "pedestrian" and/or "trail" as the primary mode in the RTP project list were included in the comparison. Roadway and other projects that identified active transportation modes as secondary were not included in the comparison.
[171] 2035 RTP Appendix 1.1 of the 2035 RTP www.oregonmetro.gov/rtp
[172] 2035 RTP, Chapter 1, page 1-26

14. Grover Pedestrian Bridge, Naito to Barbur (RTP 10235)
15. 205th Ave Bridge over Beavercreek (RTP 10592)
16. Bridge at 231st/Century Blvd. Hillsboro (10818)
17. Separated grade crossing of TV Hwy by Westside Trail (RTP 11210)
18. Bridge crossing of Hwy. 26 by Westside Trail (RTP 11211)
19. Bridge crossing of Scholls Ferry Road by the Westside Trail (RTP 11213)
20. Grade separated crossings of major roads in Aloha connecting to the Westside Trail (RTP 11239)
21. Trolley Trail Bridge (RTP 10151)
22. Wildwood Bridge at West Burnside (RTP 10351)
23. 162nd RR Bridge at I-84, Gresham Fairview Trail (RTP 10492)
24. Kellogg Creek Ped/Bike bridge (RTP 10109)
25. SE 122nd at SE Morrison Ped Overcrossing (RTP 10223)
26. Ross Island Bridge Improvements (RTP 10259)
27. Pedestrian Overpass near Markham School, over SW Barbur and I-5 (RTP 10286)
28. Ped/bike bridges over 99 W, Sherwood (RTP 10707)
29. Pedestrian Bridge over the Tualatin River at SW 108th Ave (RTP 10742 – not on regional ped system)
30. Bike/ped undercrossing of I-5 R sw Sheridan, Portland (RTP 10247)
31. Killingsworth Bridge at I-5 (RTP 10296)
32. SE Tacoma Overcrossing, Portland (RTP 10297)

Analysis of Regional Pedestrian Network

An analysis of the regional pedestrian network using several factors was conducted to better understand, at a high level, the current conditions of walking in the regional pedestrian network. Presence of lighting, sidewalk width, a few feet of missing sidewalk, or a protected crossing for a trail determine whether a place is inviting, easy and safe to walk in. Pedestrian audits with block-by-block assessments of the pedestrian environment are needed to truly understand the opportunities and barriers to supporting walking.

The purpose of the regional pedestrian analysis is to map the current conditions of the regional pedestrian system in order to provide a tool for understanding challenges and opportunities to improve the system for pedestrians. The following areas were analyzed:

Regional Pedestrian Districts

A pedestrian district is a comprehensive plan designation or set of land use regulations designed to provide safe and convenient pedestrian circulation, with a mix of uses, density, and design that support high levels of pedestrian activity and transit use. The pedestrian district can be a concentrated area of pedestrian activity or a corridor. Pedestrian districts can be designated within the following 2040 Design Types: Central City, Regional and Town Centers, Corridors and Main Streets. Though focused on providing a safe and convenient walking environment, pedestrian districts also integrate efficient use of several modes within one area, e.g., auto, transit, and bike. A total of 74 districts and station communities were included in the analysis.

- 2040 mixed-use centers. For the analysis the tax lot boundaries identified in the March, 2012 Growth Concept Map are used.
- 2040 station communities. For the analysis a half-mile buffer from the station are used (station communities locations are conceptual and do not have exact geographic boundaries). For the station communities that reside in a center, the analysis will be completed for the center.

Regional Pedestrian Corridors

The 2035 RTP defines "Corridors - 2040 design type" as a type of land use that is typically located along regional transit routes and arterial streets, providing a place for somewhat higher densities than is found in 2040 centers. These land uses should feature a high-quality pedestrian environment and convenient access to transit. Typical new developments would include rowhouses, duplexes and one to three-story office and retail buildings, and average about 25 persons per acre. While some corridors may be continuous, narrow bands of higher-intensity development along arterial streets, others may be more nodal, that is a series of smaller centers at major intersections or other locations along the arterial that have high quality pedestrian environments, good connection to adjacent neighborhoods and transit service.

- 2040 corridors conceptual. For the analysis, the conceptual corridors were delineated into 82 discrete corridors. An effort was made to keep the number of corridors to a manageable number (under 100). This resulted in some fairly long corridors which can mask or wash out some of the diverse characteristics of the corridors. See Appendix 10.
- Additional high frequency and almost frequent bus routes not identified as a regional 2040 corridor. These roadways were also delineated. See attached list of corridor delineations.
- Regional trails.

Analysis Factors and Results

The following factors were analyzed and mapped. A summary table following the maps illustrates the level of intensity for each of the area and provides a tool for understanding the different conditions of each zone and corridor.

The analysis demonstrates the unique challenges and strengths of each district and corridor. Some districts and corridors are mixed, scoring high on some factors for "walkability" and low on other factors, while some come out as either primarily walkable or primarily not walkable.

Auto speed: For districts, measures the proportion of the roadways within the district that have auto speeds over 35 mph. For corridors, measures the proportion of the delineated corridor that has auto speeds over 35 mph. (The survival rate of a person hit by a car going 20 mph is eight percent, fifty-percent if the car is going 30 mph and twenty percent if the car is traveling 40 mph).

Auto volumes: For districts, measures the proportion of the roadways within the district that have auto volumes greater than 2,500 vehicles in PM 2-hr peak. For corridors, measures the proportion of the delineated corridor that has auto volumes greater than 2,500 vehicles in PM 2-hr peak

Auto lanes: For districts, measures the proportion of roadways with 3 or more lanes. For corridors, measures the proportion of the delineated corridor with 3 or more lanes.

Pedestrian and bicycle crashes: Measures the number of pedestrian and bicycle crashes resulting in a fatality or serious injury between 2007-2009, normalized by the length of the street segments in the corridors and districts analyzed.

Sidewalk completion: For districts, measures the proportion of roadways within the district that have 50% sidewalk completed on at least one side of the street. For corridors, measures the proportion of the delineated corridor that has 50% sidewalk completed on at least one side of the street.

Tree canopy: Measures the percentage of each district or corridor containing tree canopy.

Signalized crossings: For districts, measures the proportion of signalized crossings for every 1,000 feet of roadway. For delineated corridors, measures the proportion of signalized crossings for every 1,000 feet.
Connectivity: Measures the roadway and trail connectivity within a district and along corridors by calculating the ratio of intersections in the area of the district or length of corridor; includes regional and community trail connections, bridges, and pedestrian overcrossings.

People and Places Measures household and employment density and the density of land uses. Provides a density value for households and employment and a land use percentage within districts and along delineated corridors (with a ¼ mile buffer around corridors).

Results

Areas with high auto speeds, incomplete sidewalks, minimal crossing opportunities and low connectivity (score of 3 or less). These areas are particularly challenging for pedestrians. Low connectivity forces pedestrians onto the roadways with high speeds and lack of sidewalks and crossing opportunities.

- Districts: Merlo Road, Hillsdale, Park Ave Park and Ride, Gateway, 122nd Ave, 148th Ave., Rockwood, Troutdale, Happy Valley.
- Corridors: Hillsboro to Aloha, Aloha to Beaverton, Orenco Station to Tanasbourne, SW Cedar Hills Blvd., Beaverton to Tualatin (Hall Blvd.), SW Park Ave. to Wilsonville TC, SW Oleson Rd., Boones Ferry Rd., Country Club Rd., Highway 43 Portland to Oregon City, Beaverton to Barbur Blvd., Stark St., Powell Blvd., Portland to Damascus, Clackamas TC to Damascus, SE 172nd Ave., SE 222nd Ave., SE 242nd Ave., Clackamas Hwy., NW Portland to Sauvie Island.

Areas with good street connectivity but limited crossings and sidewalk completion. These areas could potentially benefit by leveraging the strength of good street/trail connectivity by completing sidewalks and adding street crossings.

- Districts: Washington Park, Gladstone.
- Corridors: SW Cedar Hills Blvd., Cedar Mill to Portland, Martin Luther King Jr. Blvd., Johnson Creek Blvd., OHSU Loop.

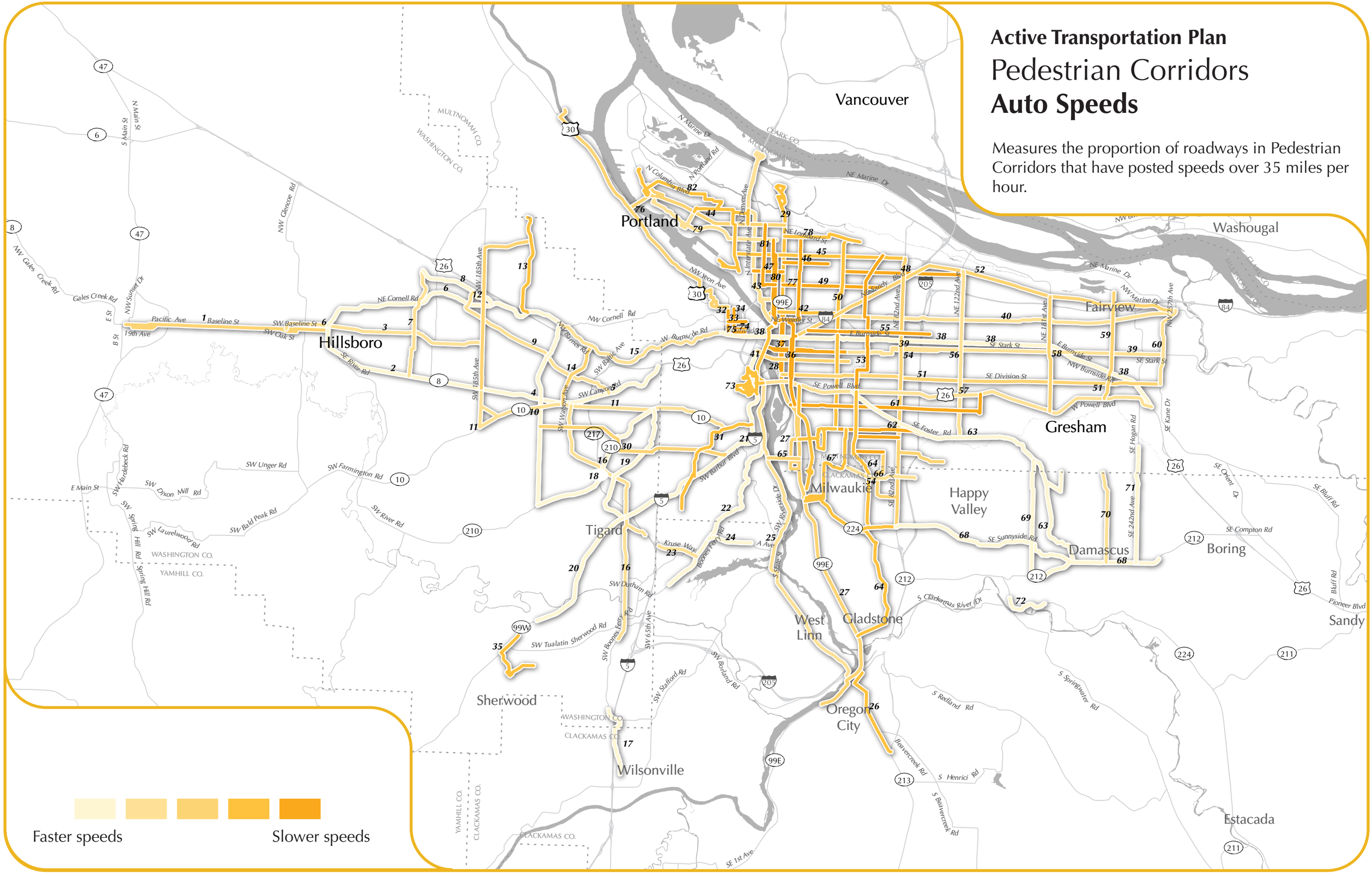
There are several districts and corridors that have high density (people and places score 4 and 5) but low street connectivity and signalized crossing scores. These places could potentially benefit from adding connecting paths and street crossings to increase access.

- Districts: Orenco, Tanasbourne, Willow Creek, Aloha, Beaverton, Cedar Mill, Sunset Transit Center, Tualatin, Wilsonville Town Center, Hayden Island, Mt. Hood Ave., Gateway, 122nd Ave,, Rockwood, Gresham, Fairview.
- Corridors: Aloha to Beaverton, Hillsboro to Cedar Mill, Orenco Station to Tanasbourne, Aloha to Hillsdale, Molalla Ave., Burnside – Portland to Gresham, Stark St., Division St., 122nd Ave., 181st and 182nd Ave., Tacoma St., Milwaukie to Clackamas Town Center.

Active Transportation Plan

Pedestrian Corridors
Auto Speeds

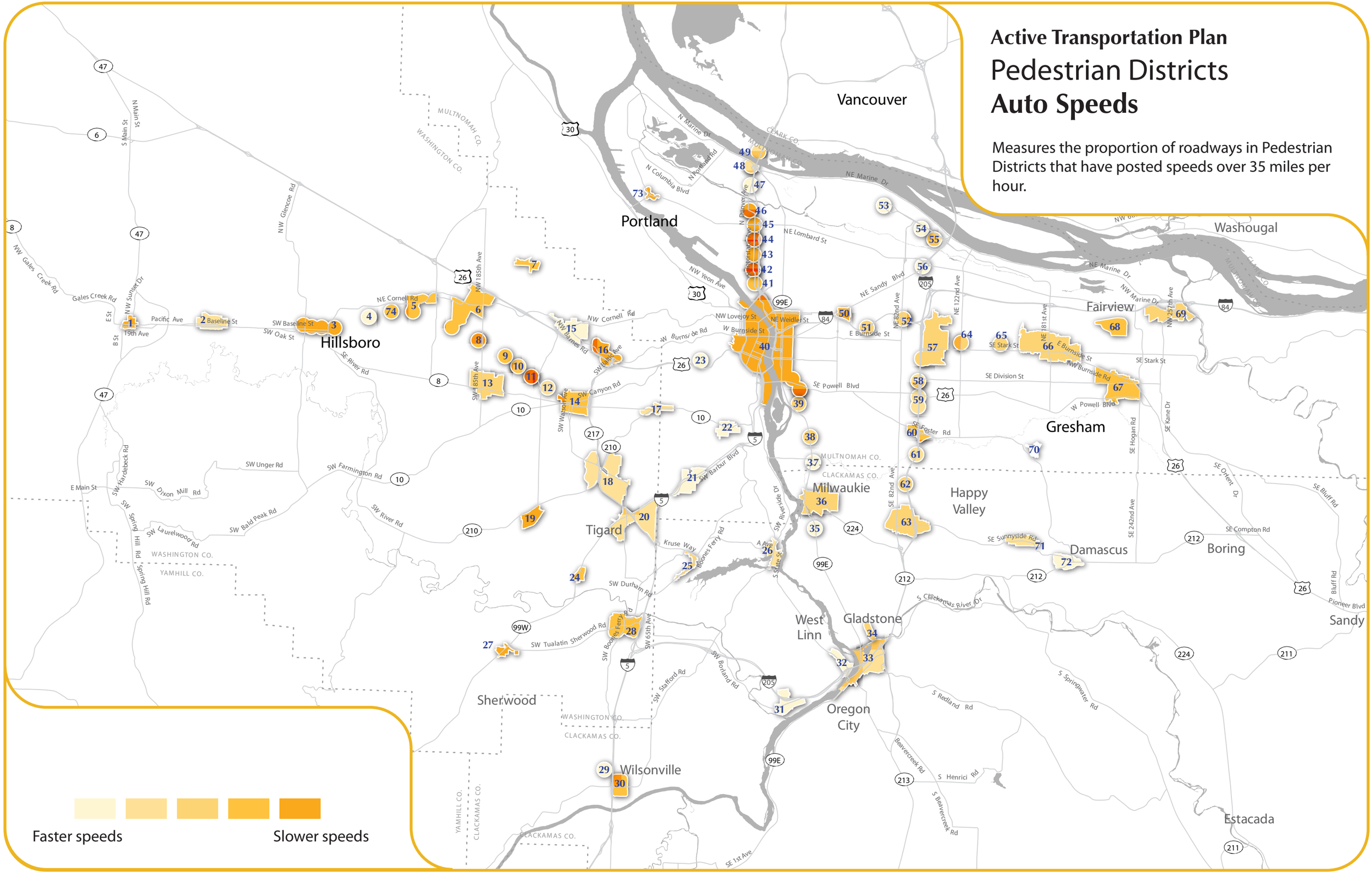
Measures the proportion of roadways in Pedestrian Corridors that have posted speeds over 35 miles per hour.



Active Transportation Plan

Pedestrian Districts
Auto Speeds

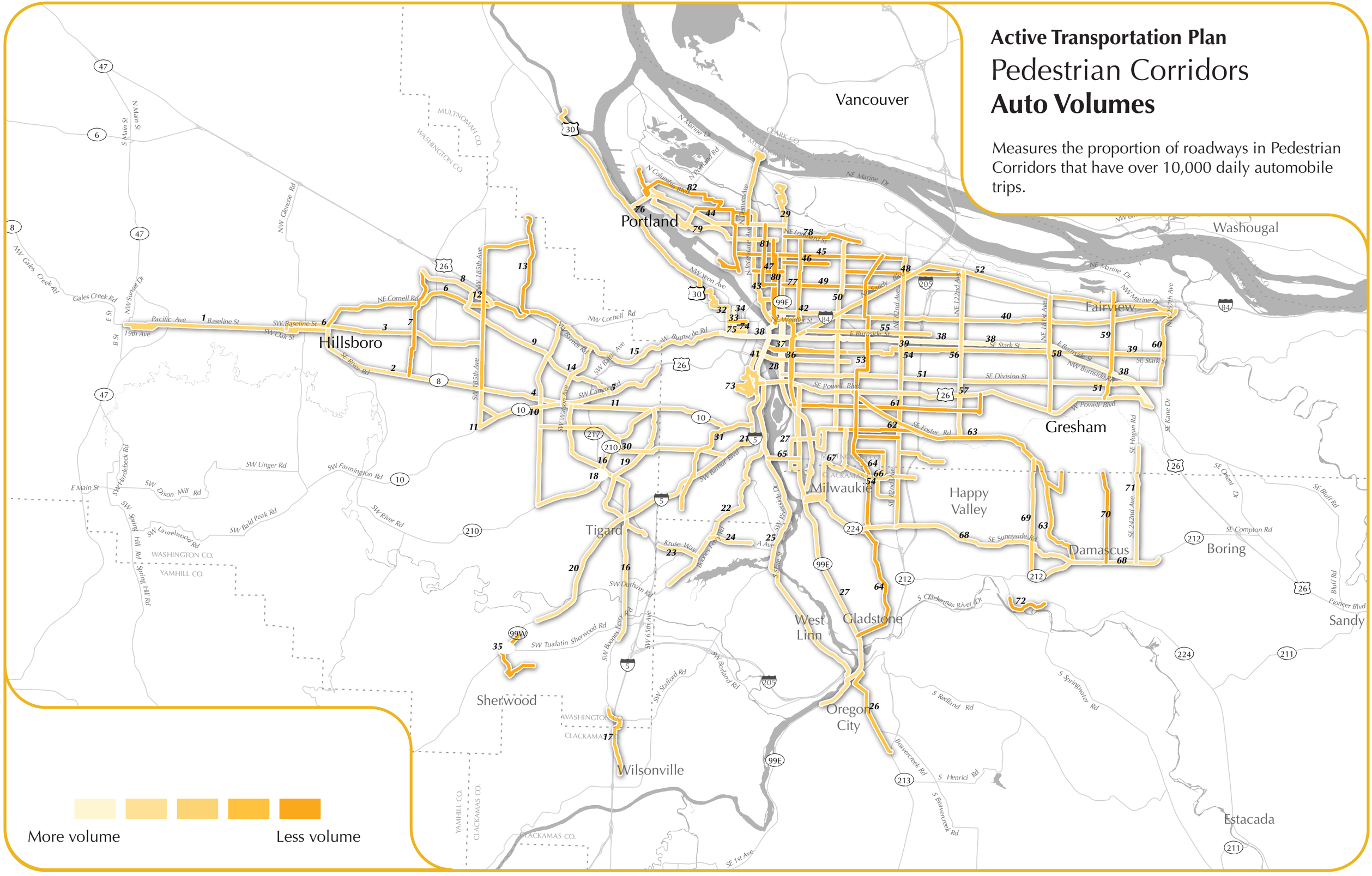
Measures the proportion of roadways in Pedestrian Districts that have posted speeds over 35 miles per hour.



Active Transportation Plan

Pedestrian Corridors
Auto Volumes

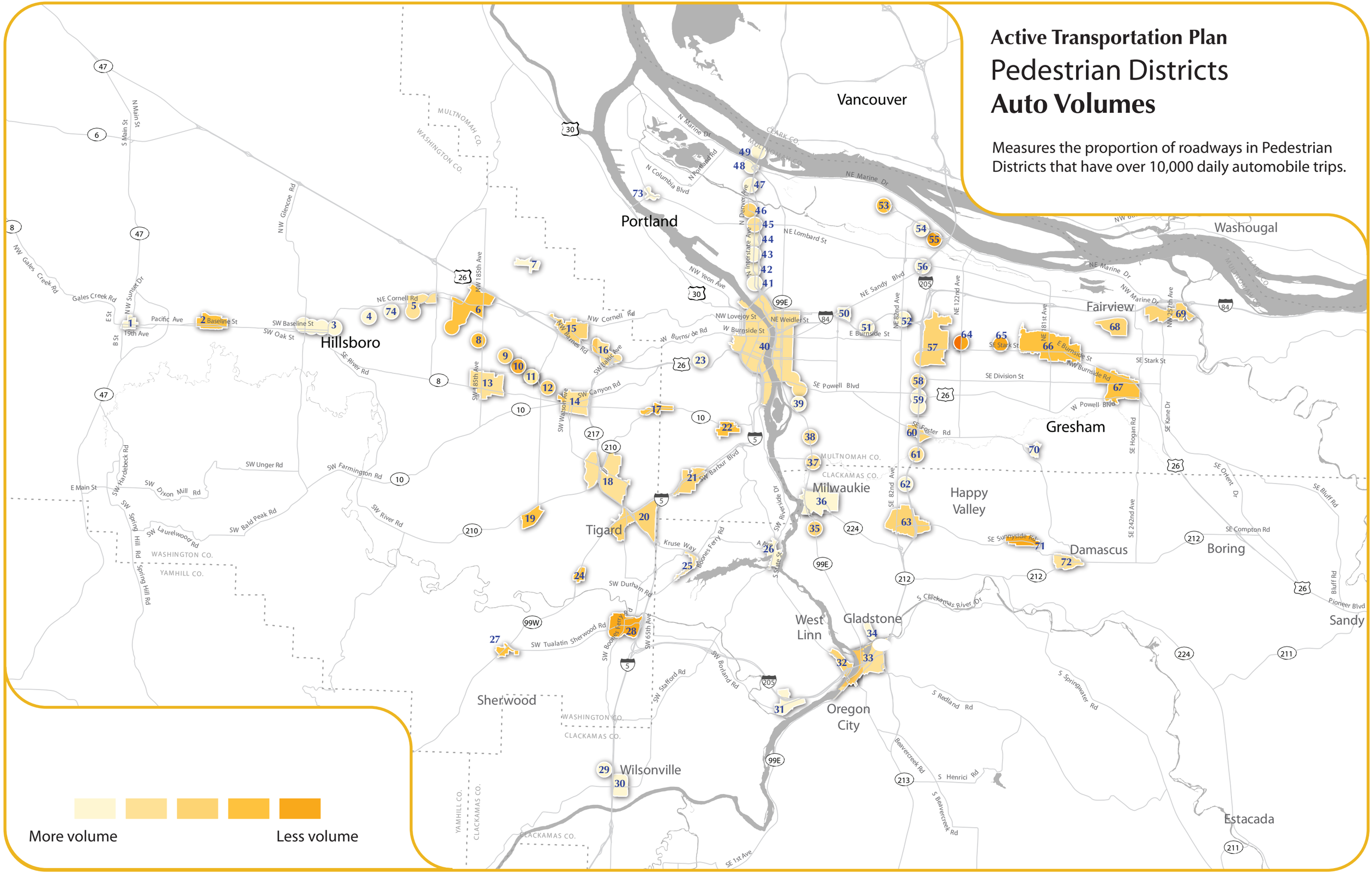
Measures the proportion of roadways in Pedestrian Corridors that have over 10,000 daily automobile trips.



Active Transportation Plan

Pedestrian Districts
Auto Volumes

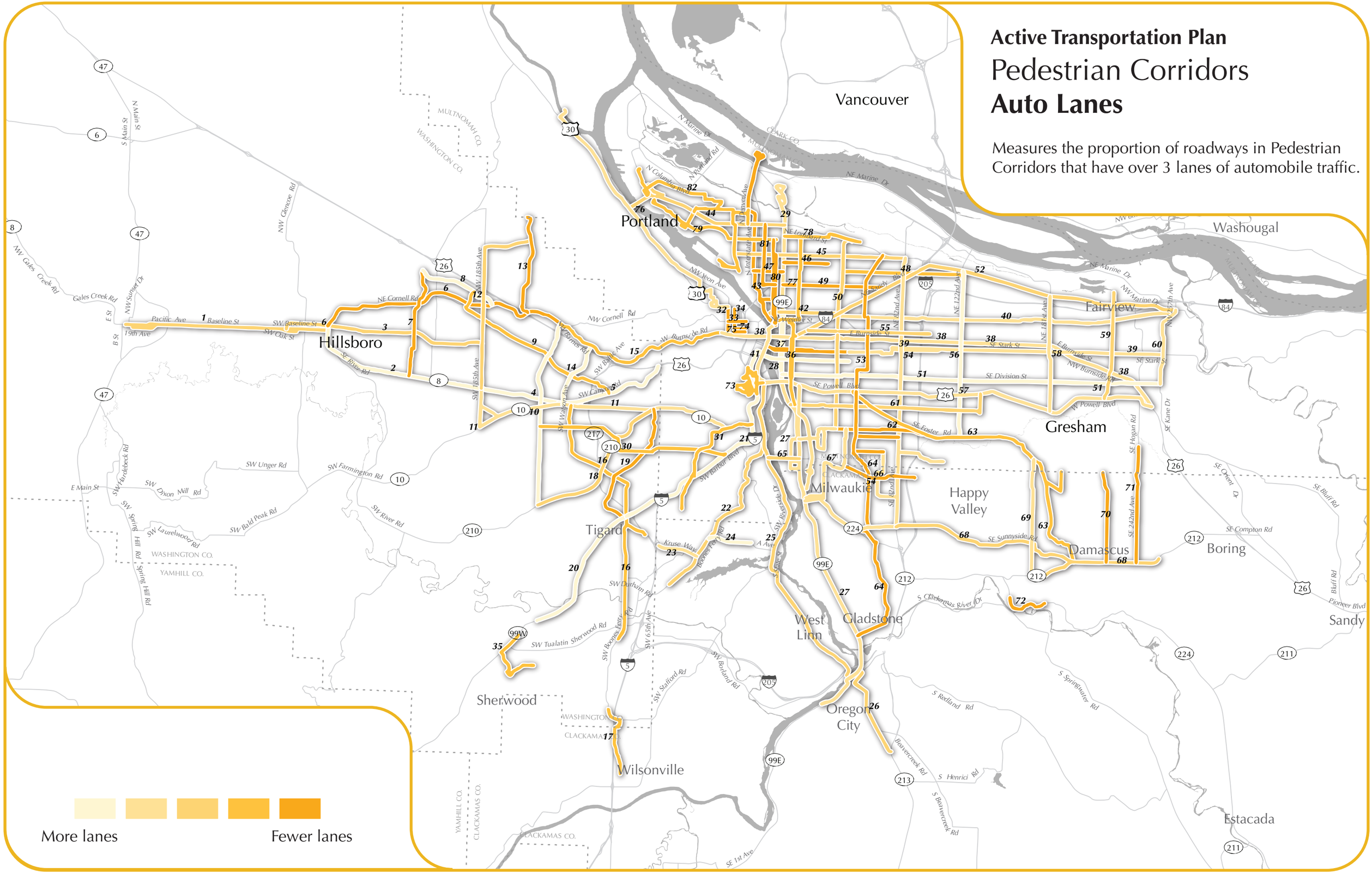
Measures the proportion of roadways in Pedestrian Districts that have over 10,000 daily automobile trips.



Active Transportation Plan

Pedestrian Corridors
Auto Lanes

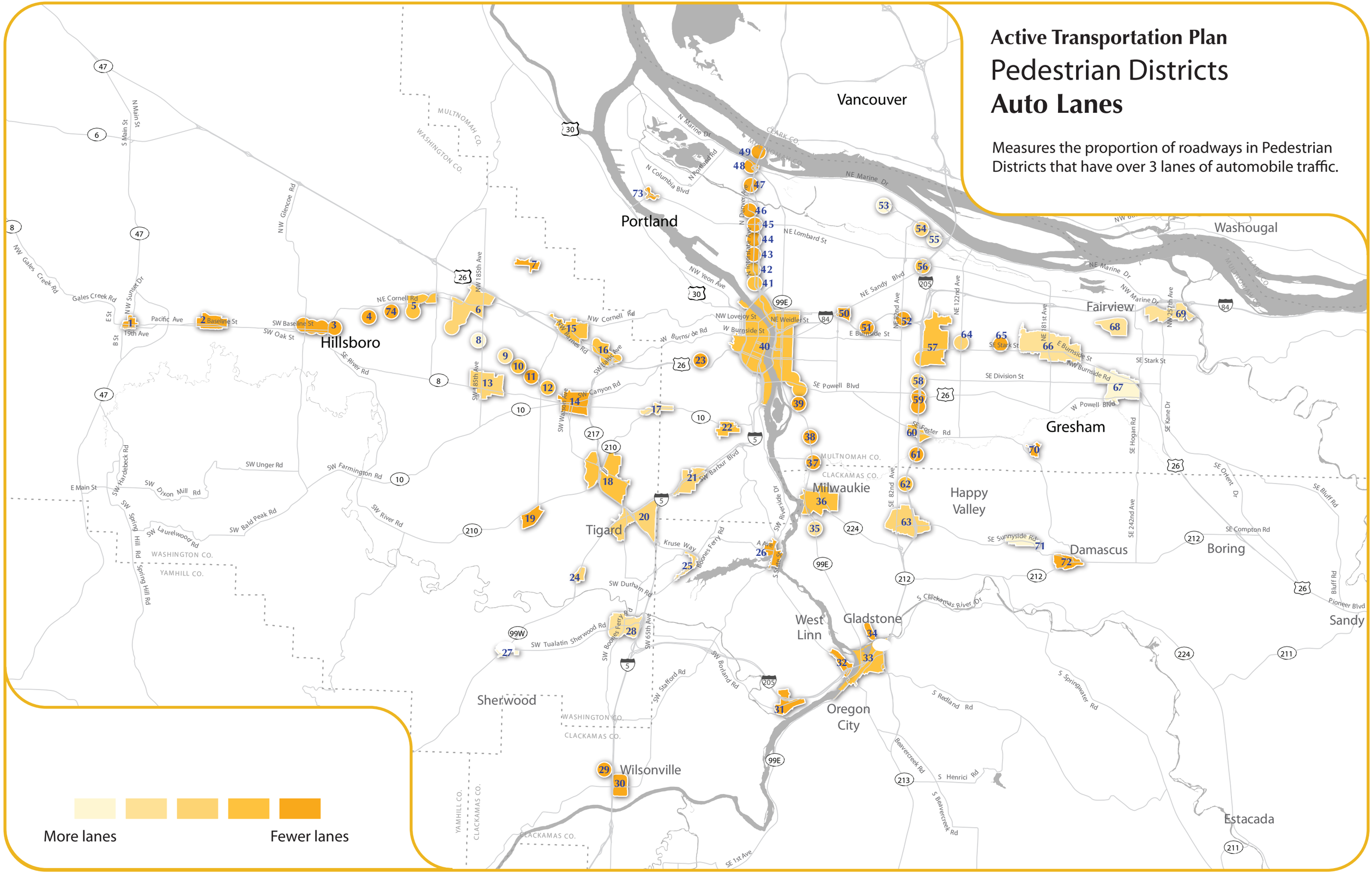
Measures the proportion of roadways in Pedestrian Corridors that have over 3 lanes of automobile traffic.



Active Transportation Plan

Pedestrian Districts
Auto Lanes

Measures the proportion of roadways in Pedestrian Districts that have over 3 lanes of automobile traffic.

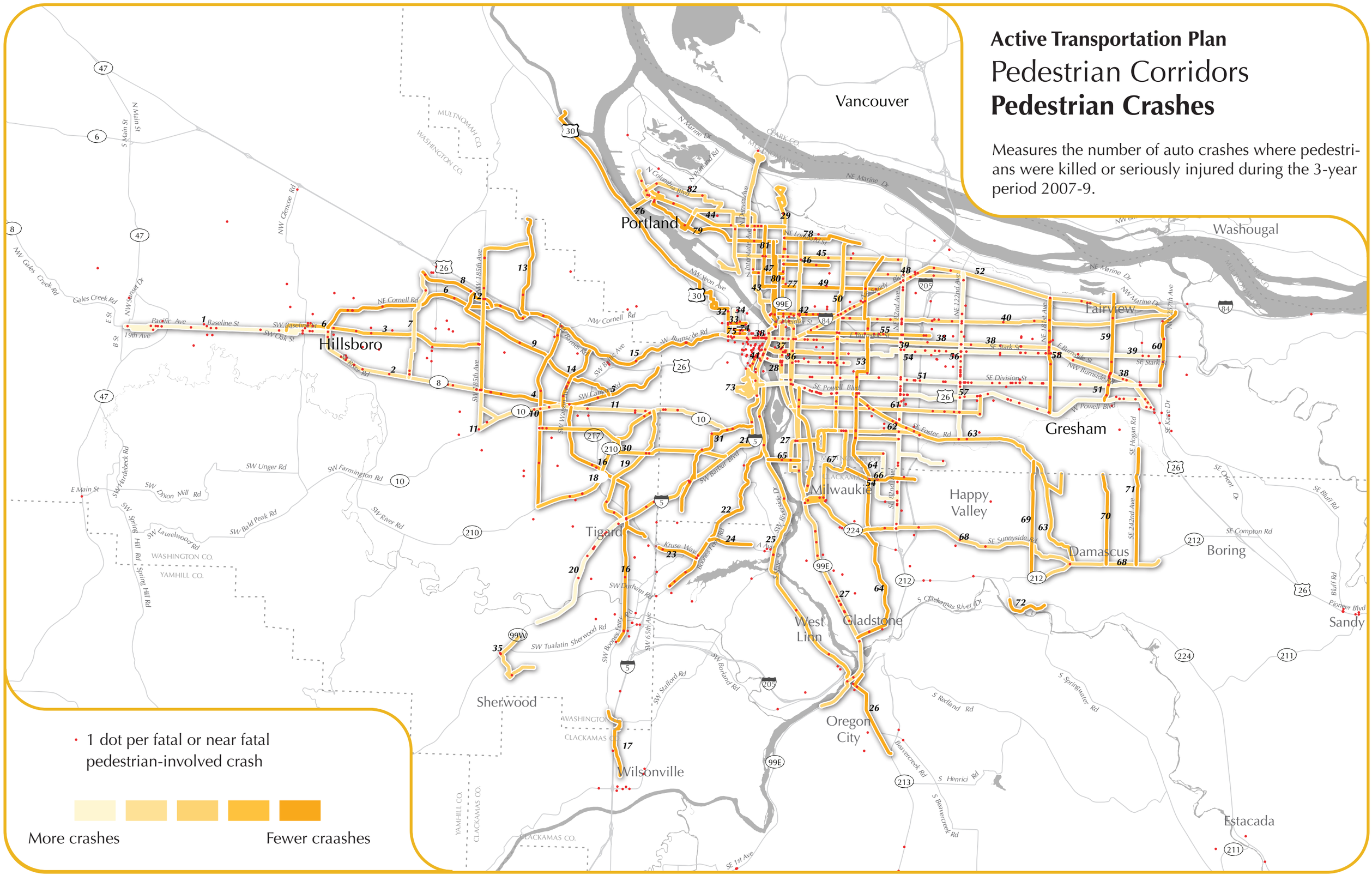


Active Transportation Plan

Pedestrian Corridors

Pedestrian Crashes

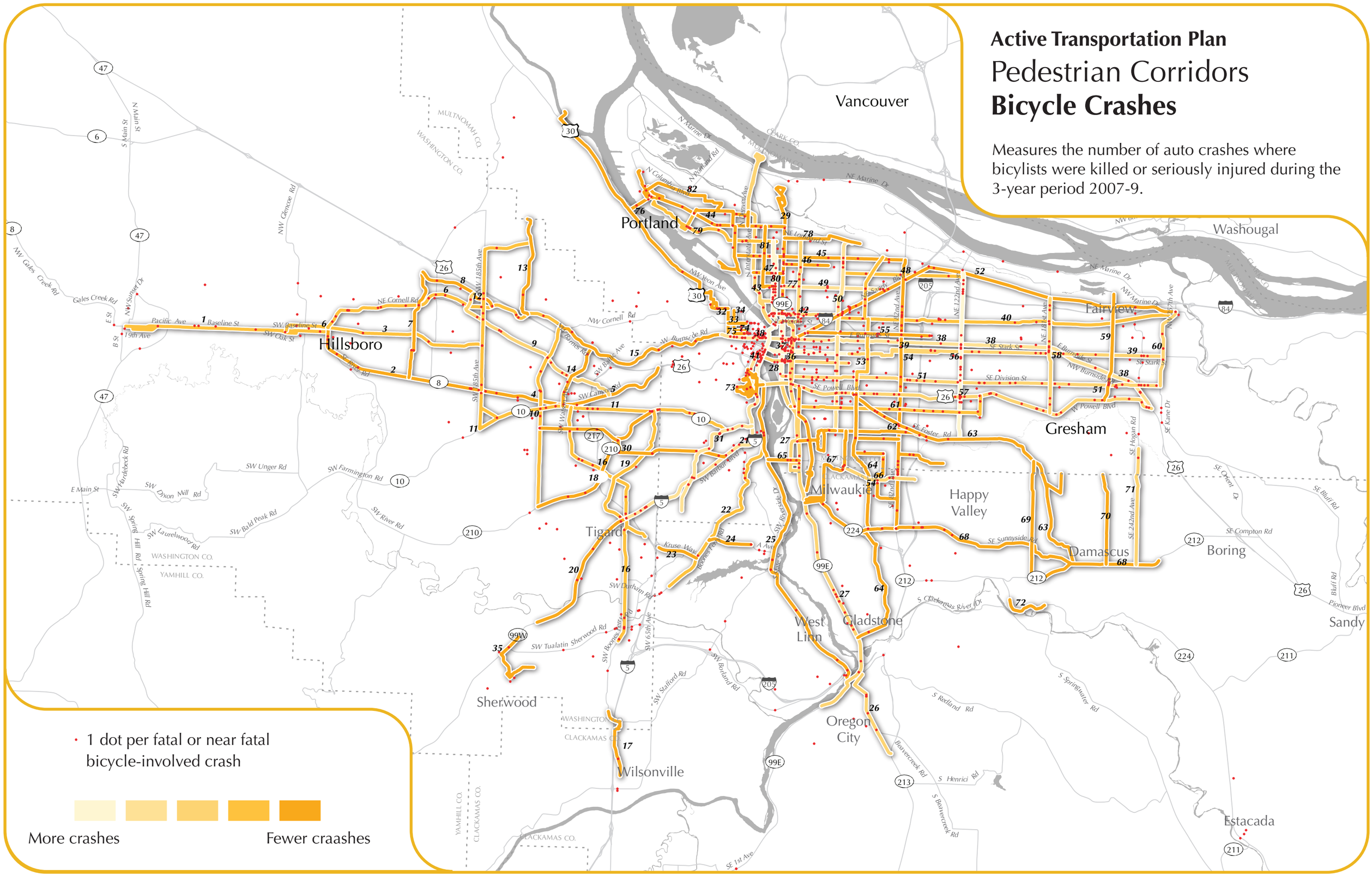
Measures the number of auto crashes where pedestrians were killed or seriously injured during the 3-year period 2007-9.



Active Transportation Plan

Pedestrian Corridors
Bicycle Crashes

Measures the number of auto crashes where bicylists were killed or seriously injured during the 3-year period 2007-9.

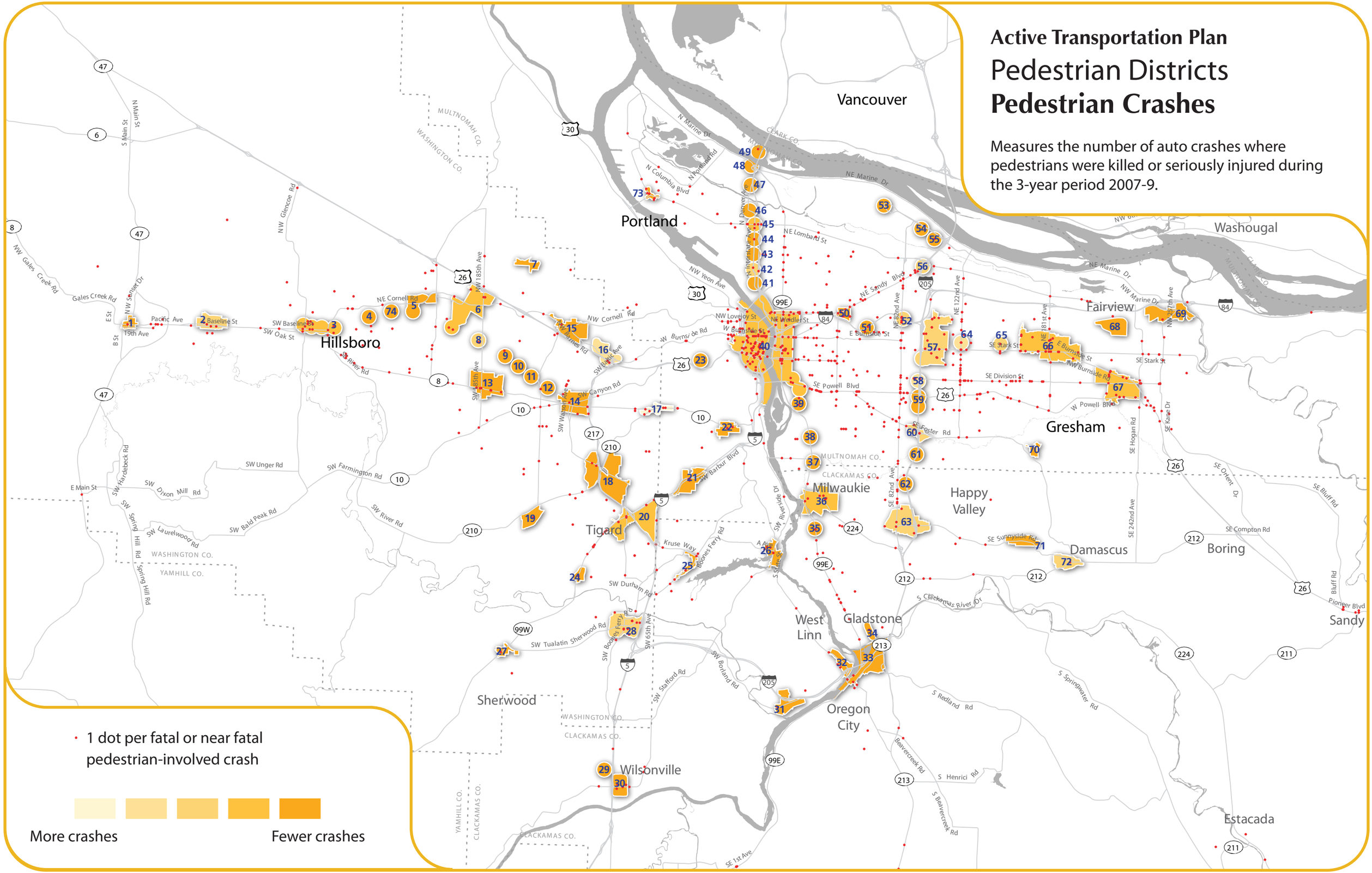


Active Transportation Plan

Pedestrian Districts

Pedestrian Crashes

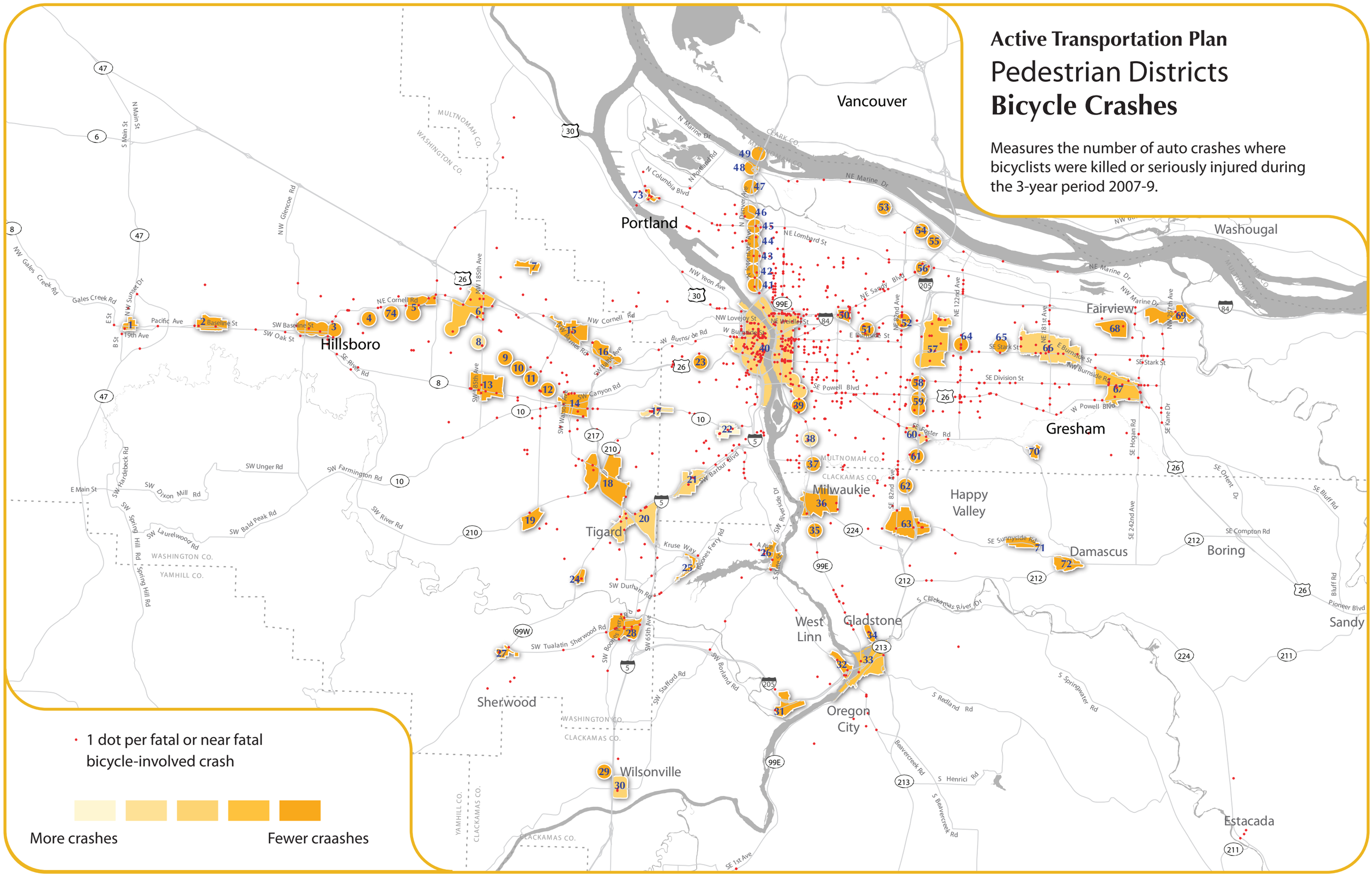
Measures the number of auto crashes where pedestrians were killed or seriously injured during the 3-year period 2007-9.



Active Transportation Plan

Pedestrian Districts
Bicycle Crashes

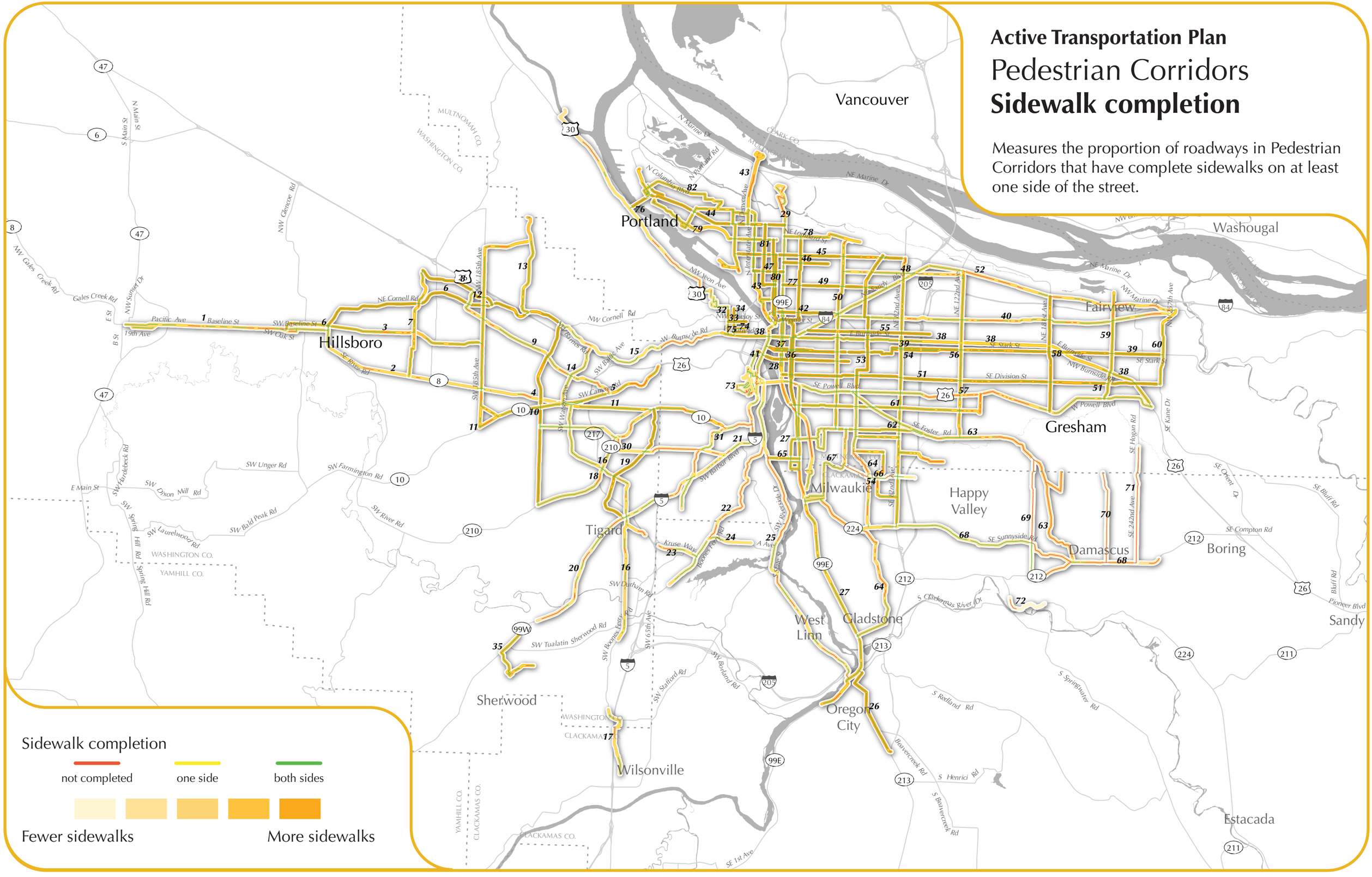
Measures the number of auto crashes where bicyclists were killed or seriously injured during the 3-year period 2007-9.



Active Transportation Plan

Pedestrian Corridors
Sidewalk completion

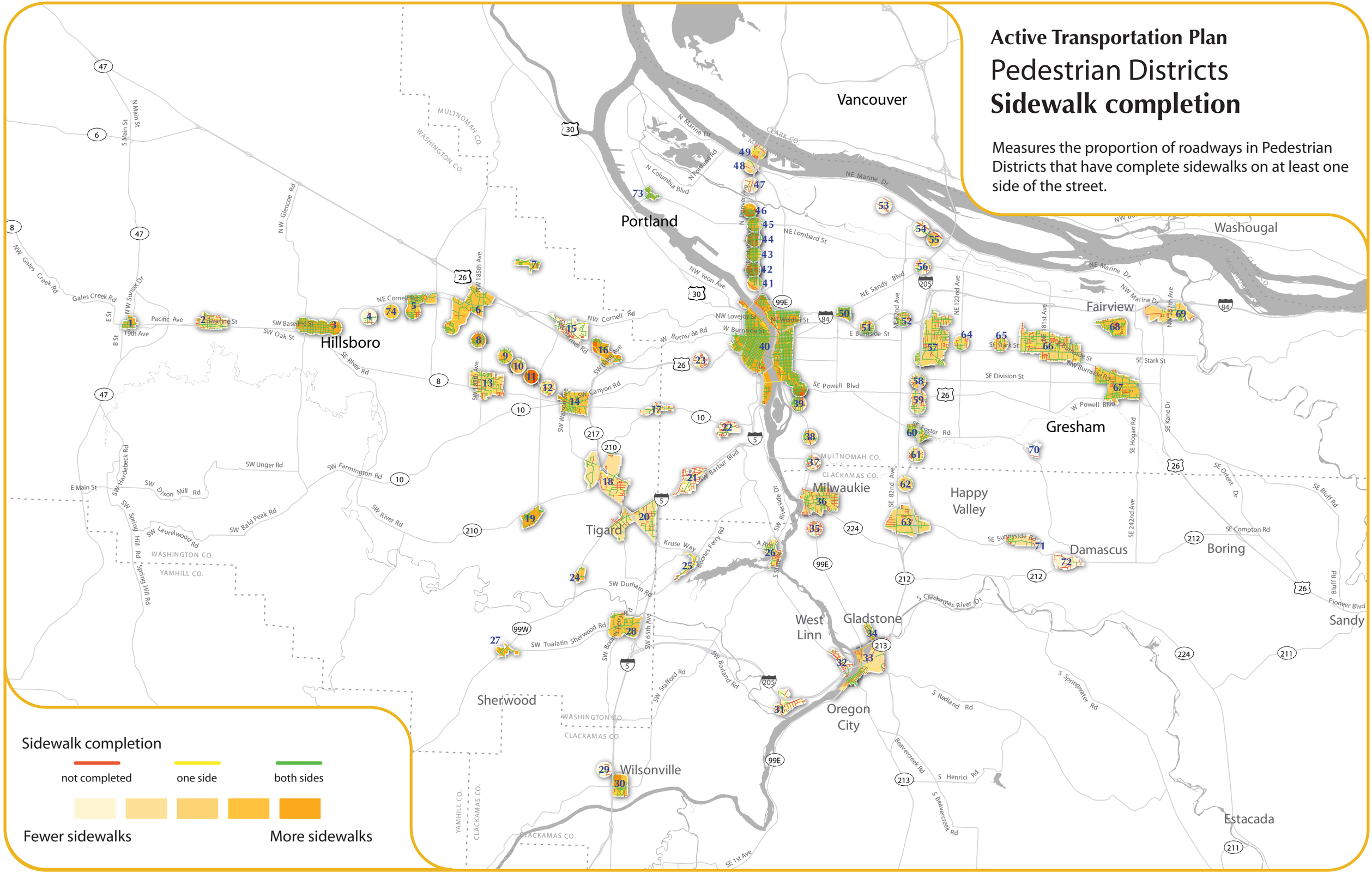
Measures the proportion of roadways in Pedestrian Corridors that have complete sidewalks on at least one side of the street.



Active Transportation Plan

Pedestrian Districts
Sidewalk completion

Measures the proportion of roadways in Pedestrian Districts that have complete sidewalks on at least one side of the street.

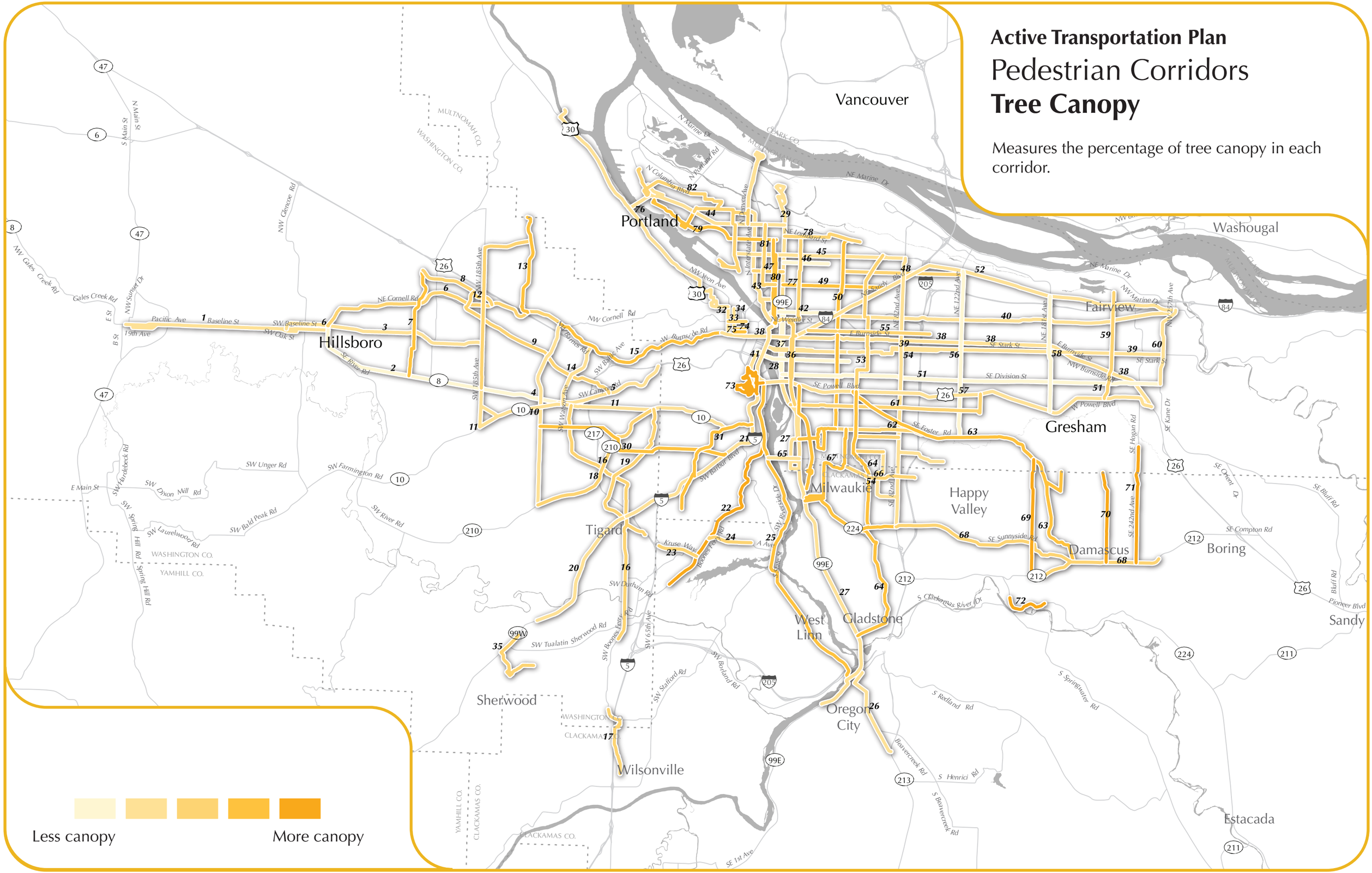


Active Transportation Plan

Pedestrian Corridors

Tree Canopy

Measures the percentage of tree canopy in each corridor.

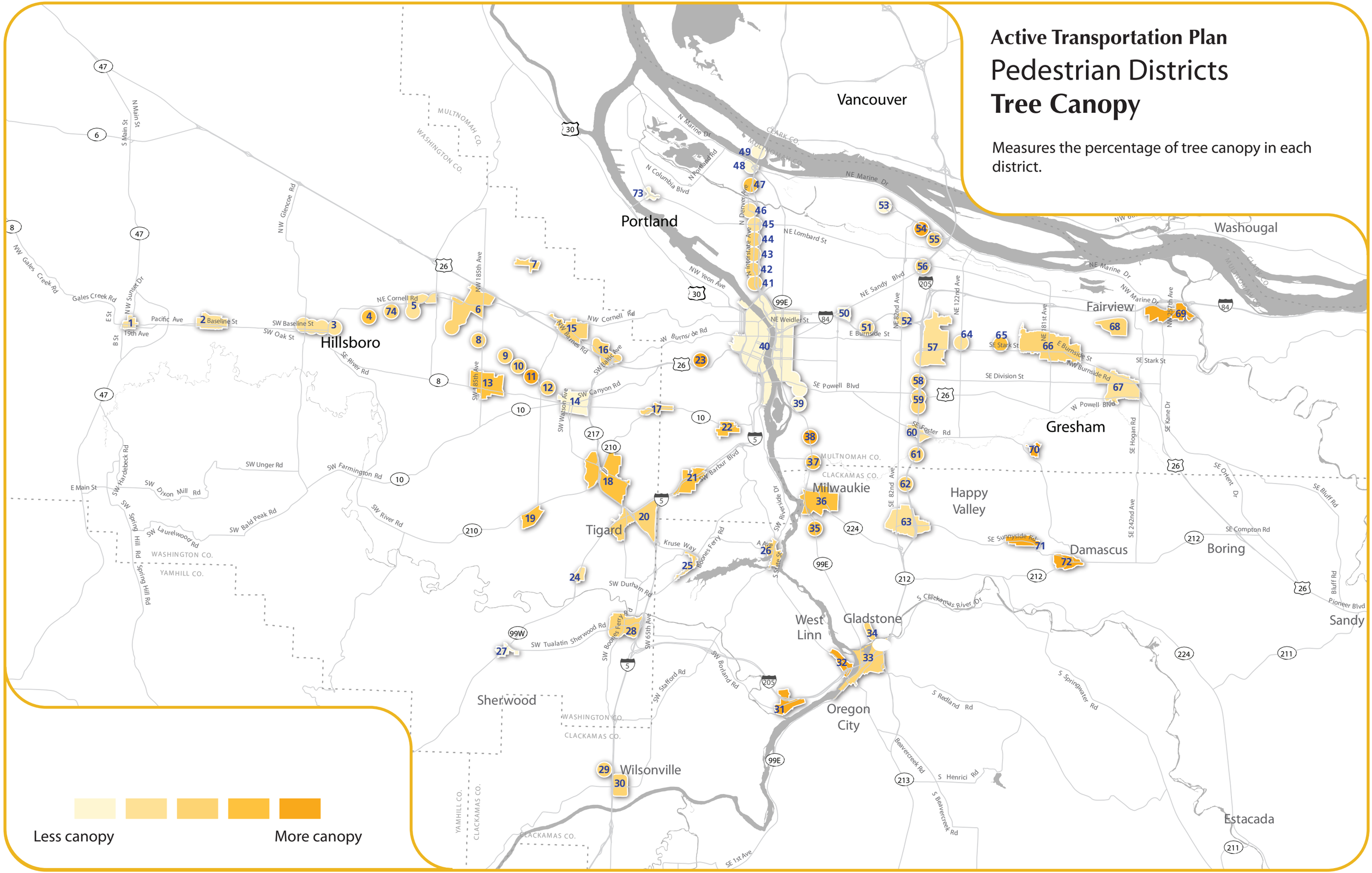


Active Transportation Plan

Pedestrian Districts

Tree Canopy

Measures the percentage of tree canopy in each district.

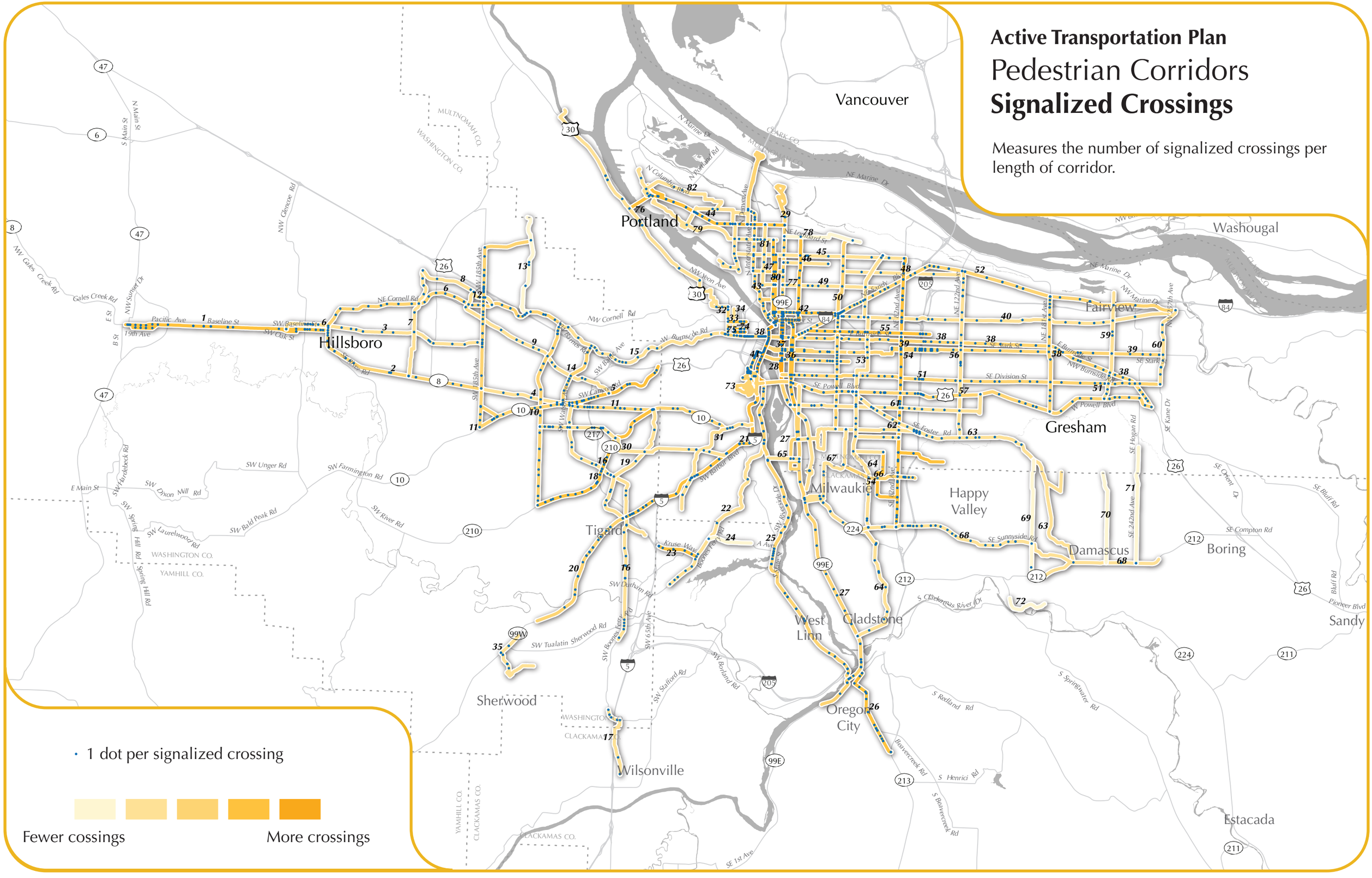


Active Transportation Plan

Pedestrian Corridors

Signalized Crossings

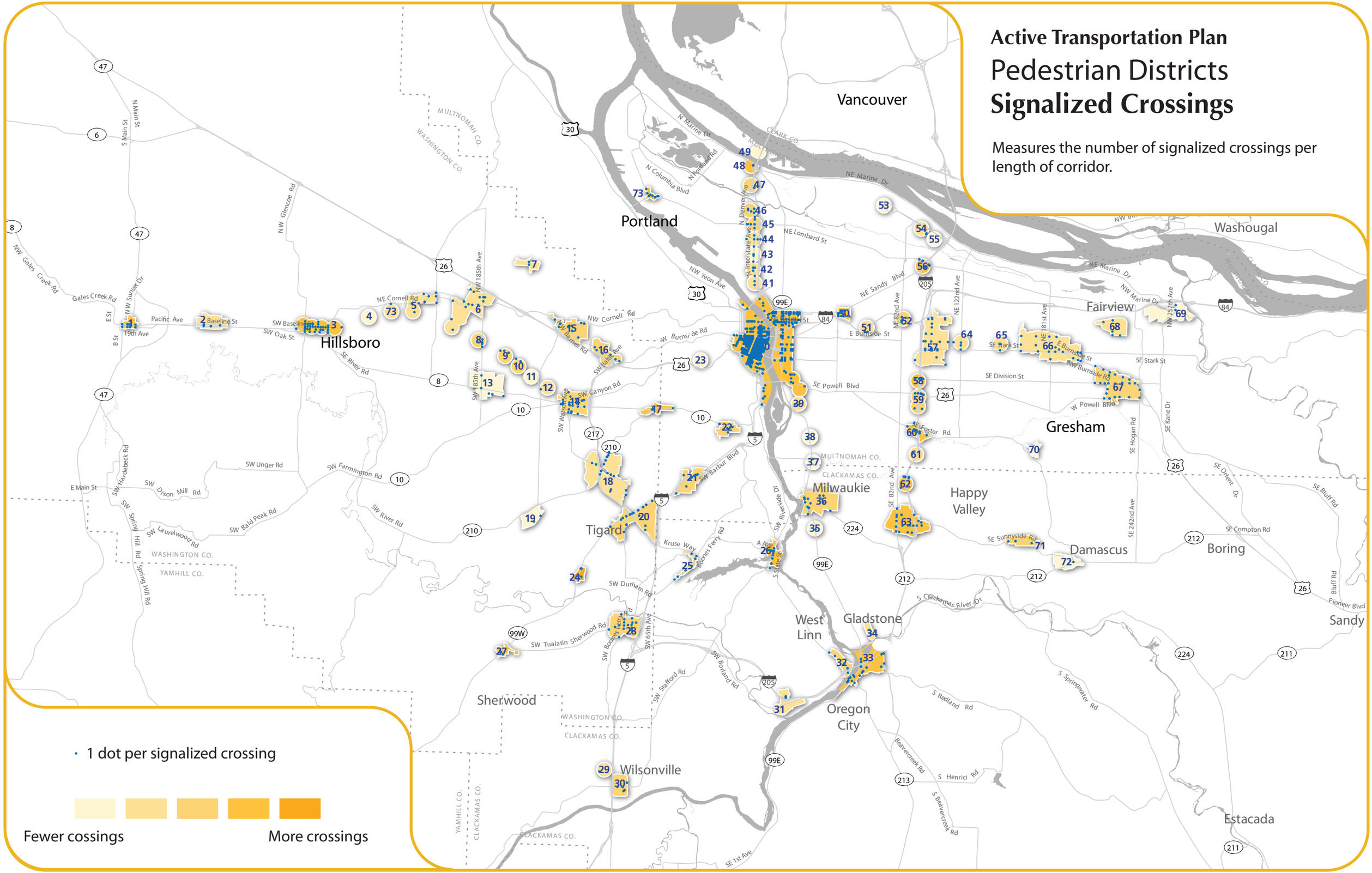
Measures the number of signalized crossings per length of corridor.



Active Transportation Plan

Pedestrian Districts
Signalized Crossings

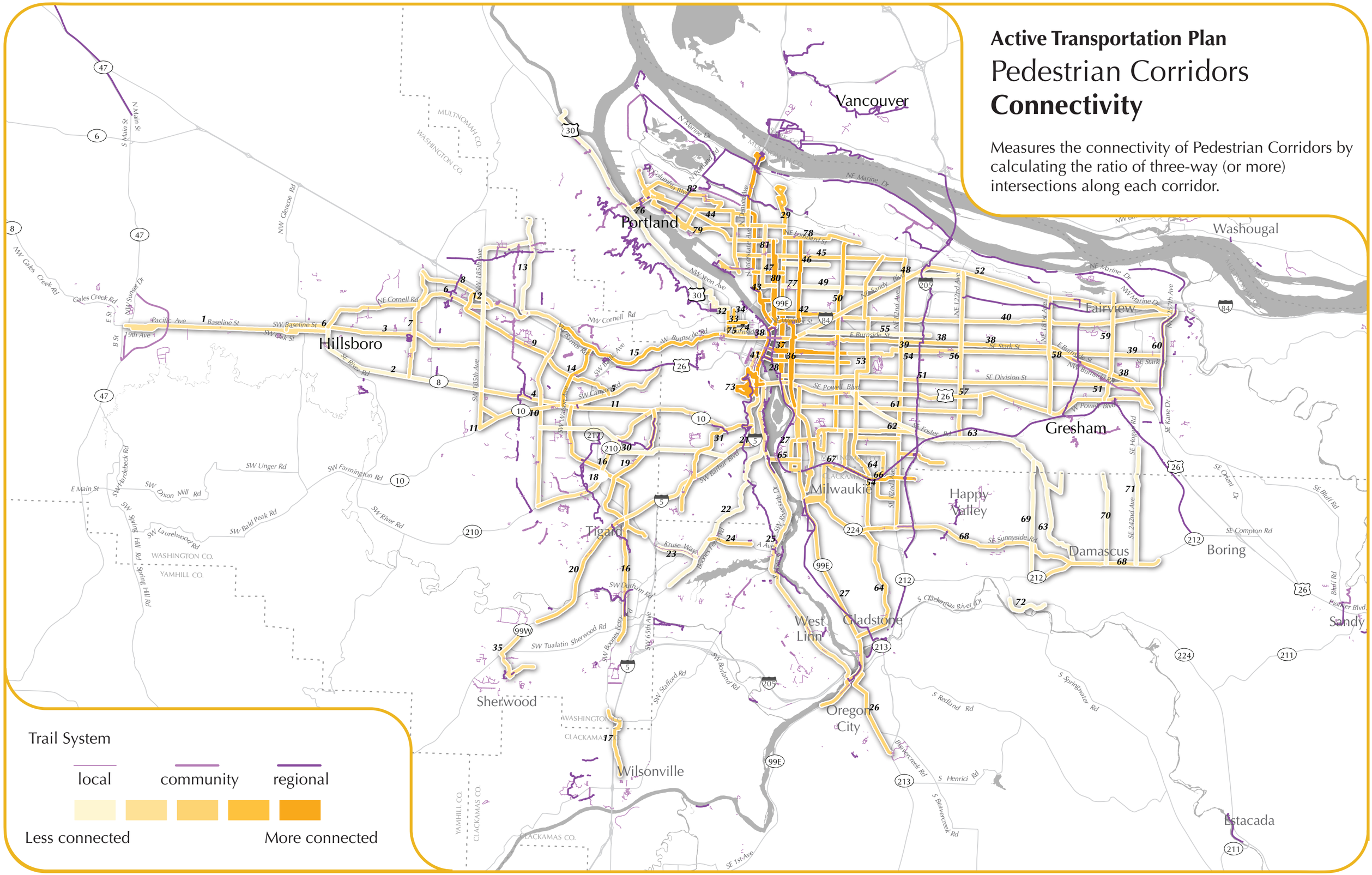
Measures the number of signalized crossings per length of corridor.



Active Transportation Plan

Pedestrian Corridors **Connectivity**

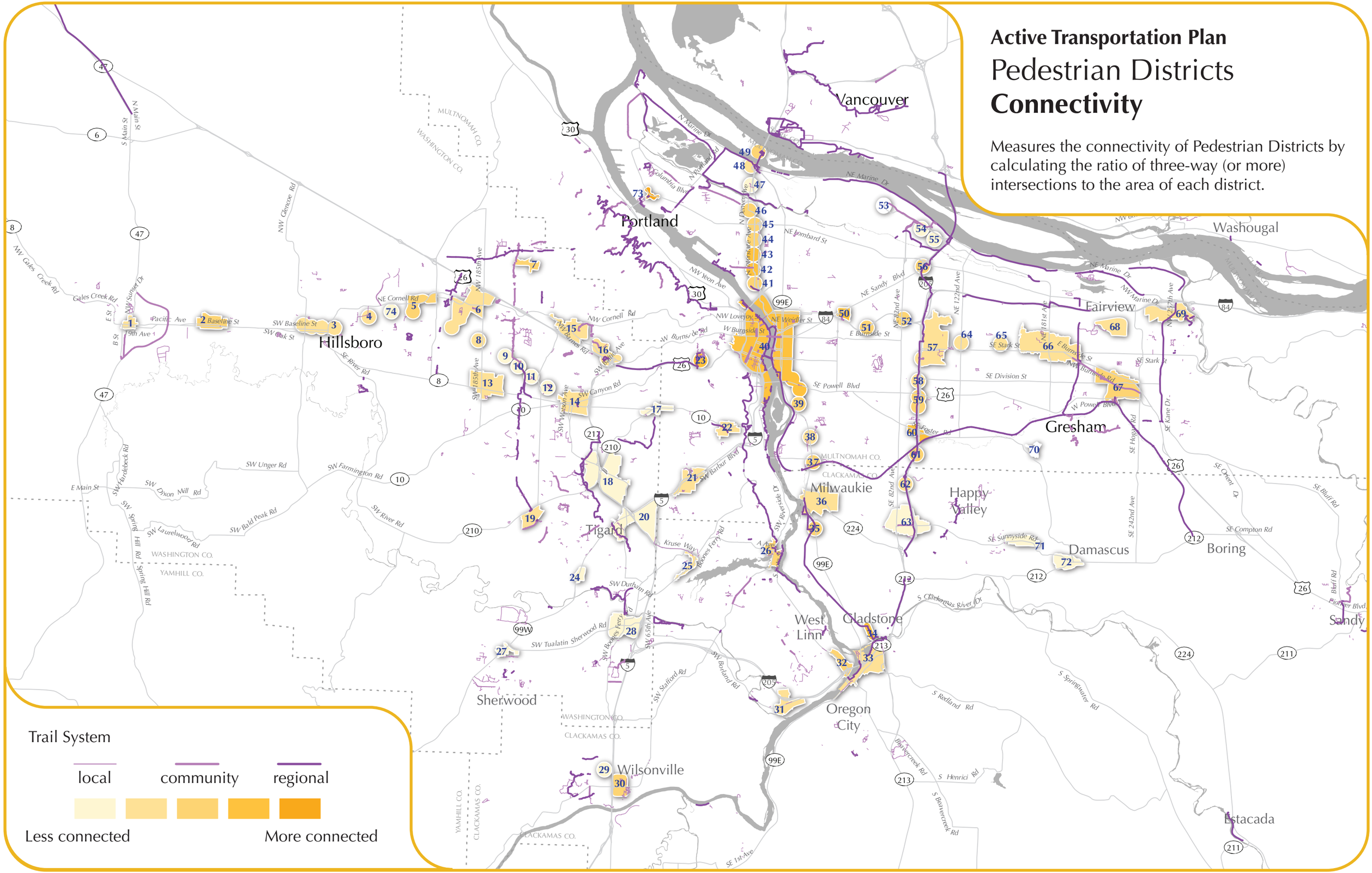
Measures the connectivity of Pedestrian Corridors by calculating the ratio of three-way (or more) intersections along each corridor.



Active Transportation Plan

Pedestrian Districts
Connectivity

Measures the connectivity of Pedestrian Districts by calculating the ratio of three-way (or more) intersections to the area of each district.

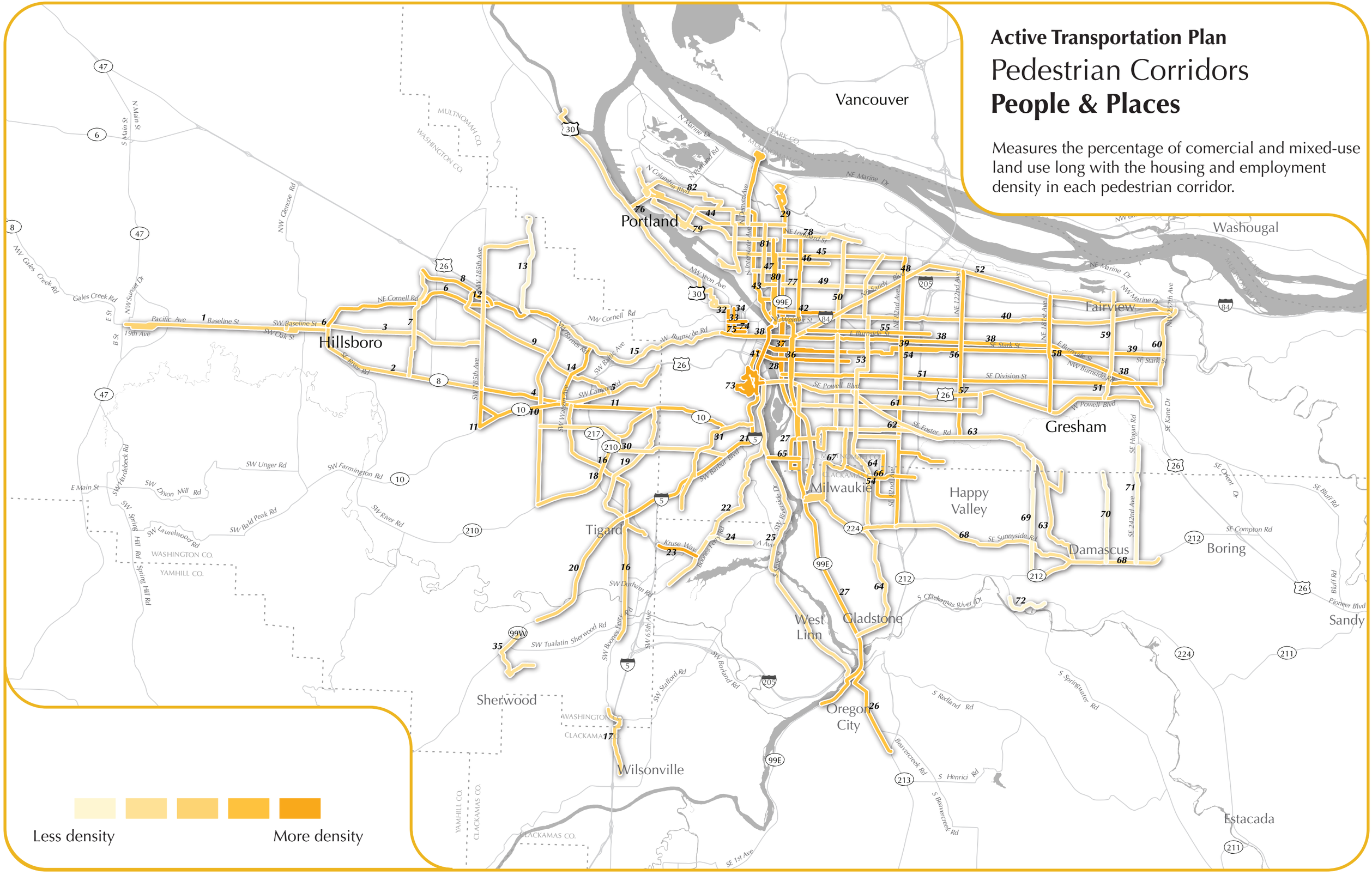


Active Transportation Plan

Pedestrian Corridors

People & Places

Measures the percentage of comercial and mixed-use land use long with the housing and employment density in each pedestrian corridor.

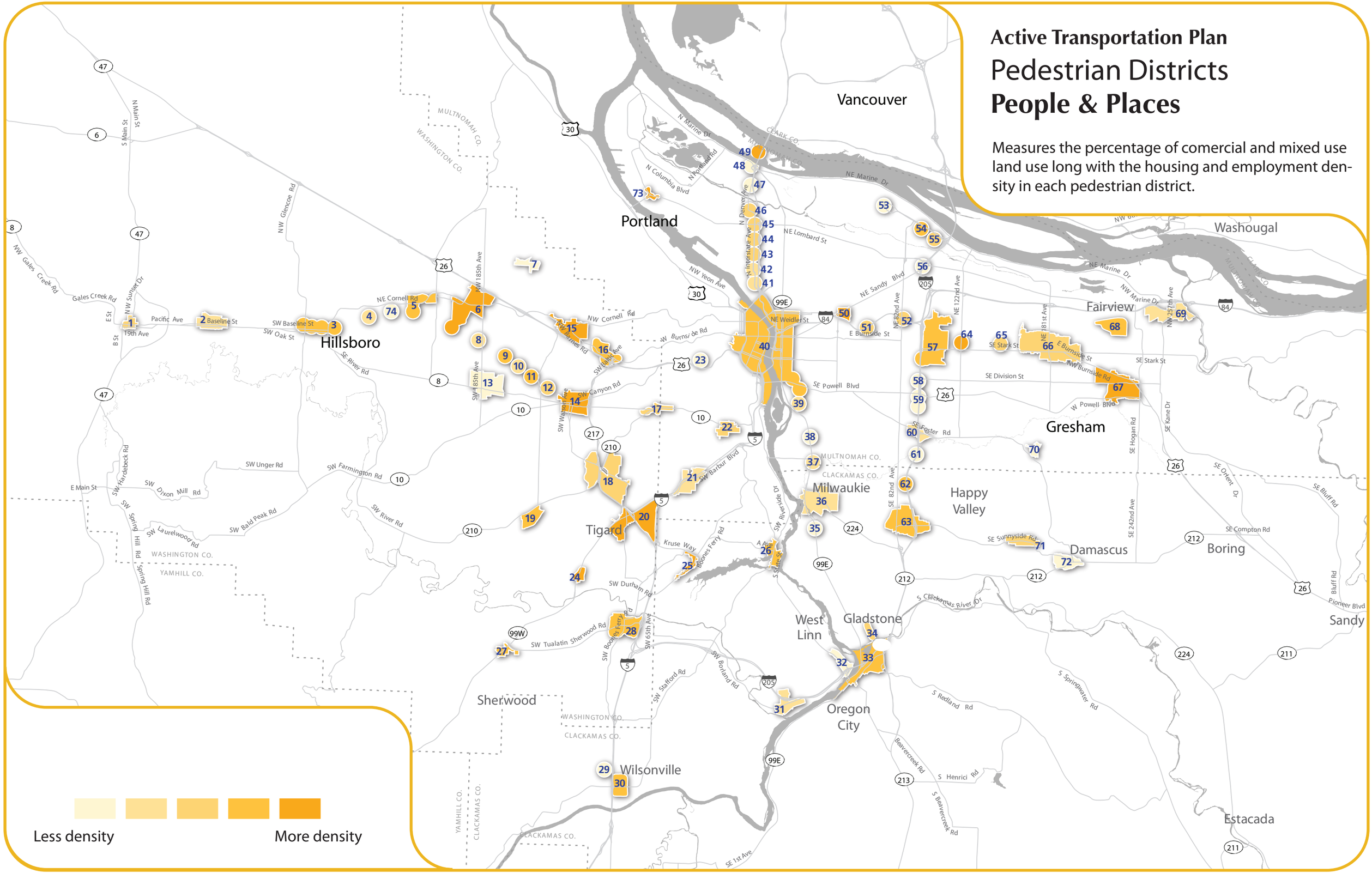


Active Transportation Plan

Pedestrian Districts

People & Places

Measures the percentage of comercial and mixed use land use long with the housing and employment density in each pedestrian district.



Active Transportation Plan

Pedestrian District Summary Matrix

District number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74
District Name	Forest Grove	Cornelius	Hillsboro	Hillsboro Airport	Orenco	Tanasbourne	Bethany	Willow Creek	Elmonica	Merlo Rd	Beaverton Creek	Millikan Way	Aloha	Beaverton	Cedar Mill	Sunset Transit	Raleigh Hills	Washington Square	Murray/Scholls	Tigard	West Portland	Hillsdale	Washington Park	King City	Lake Grove	Lake Oswego	Sherwood	Tualatin	Wilsonville	Wilsonville	West Linn	West Linn	Oregon City	Gladstone	Park Ave P&R	Milwaukie	Tacoma P&R	Bybee Blvd	Holgate	Portland	Overlook	Prescott	Killingsworth	Rosa Parks	Lombard	Kenton	Delta Park/Vanport	Expo Center	Hayden Island	Hollywood	60th Ave	82nd Ave	Portland Airport	Mt Hood Ave	Cascades	Parkrose	Gateway	Division St	Powell Blvd	Lents	Flavel St	Fuller Rd	Clackamas	22nd Ave	148th Ave	Rockwood	Gresham	Fairview	Troutdale	Pleasant Valley	Happy Valley	Damascus	St. Johns	Hawthorn Farm
Auto Speed	1	5	5	5	2	3	5	2	2	3	4	5	4	5	4	3	2	4	2	3	4	3	5	2	4	5	2	1	5	5	5	4	3	5	2	5	5	4	5	5	4	5	5	5	3	3	4	5	5	5	5	5	5	5	5	5	2	5	5	4	4	5	4	1	1	2	2	2	1	5	1	4	5	5
Auto Volume	5	2	5	5	4	2	5	2	3	3	5	3	4	4	3	4	2	4	2	3	3	2	5	2	4	5	2	1	5	5	5	3	4	5	3	5	4	4	5	4	5	5	5	5	4	3	5	5	5	5	5	5	2	5	1	5	3	4	5	3	4	5	3	1	1	2	2	3	3	5	1	4	5	5
Auto Lanes	5	5	5	5	4	3	5	1	1	4	5	4	3	5	4	4	2	4	5	3	3	4	5	3	3	5	1	2	5	5	5	5	3	5	2	4	5	5	5	4	4	4	5	5	5	5	5	5	5	5	5	5	1	3	1	4	4	3	4	4	5	4	2	3	5	2	1	2	2	5	1	5	5	5
Pedestrian Crashes	5	3	4	5	5	4	5	3	5	5	5	5	5	5	5	2	1	5	5	4	5	5	5	5	5	5	5	3	5	5	5	5	5	5	5	4	5	5	5	4	5	3	5	5	4	5	5	5	5	5	5	3	5	5	5	3	3	2	5	3	5	5	3	2	3	4	4	5	5	5	5	3	5	5
Bicycle Crashes	5	5	5	5	5	4	5	2	5	5	5	5	5	5	5	5	2	5	5	3	3	1	5	5	5	5	5	5	5	3	5	5	4	5	5	5	5	2	5	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	3	5	5	5	5	5	3	4	5	5	5	5	5	5	5
Sidewalk Completion	5	2	5	1	4	4	4	4	4	2	5	2	3	4	1	5	2	2	5	2	1	1	1	4	3	2	5	4	1	4	1	1	2	3	1	3	1	3	3	5	4	5	5	5	5	5	1	2	2	5	3	3	1	1	2	1	3	2	2	4	2	3	3	3	3	3	4	4	3	1	2	1	5	4
Tree Canopy	2	2	2	4	2	3	3	3	3	3	5	3	4	1	3	3	3	4	4	3	4	4	5	2	3	3	1	3	3	3	5	5	3	3	4	4	4	5	1	1	3	3	3	3	2	2	4	1	1	1	2	2	1	5	3	3	2	3	3	2	3	3	2	2	4	3	2	3	5	5	5	5	1	3
Signalized Crossing	4	2	4	1	2	2	2	3	3	3	1	2	1	3	3	3	4	2	1	3	3	3	1	5	3	4	4	3	2	3	2	3	4	2	1	3	1	1	2	4	2	2	1	2	3	3	3	4	1	4	2	3	1	2	1	4	2	4	3	4	2	4	4	2	2	2	3	2	1	1	3	1	4	2
Connectivity	2	3	2	2	3	2	3	2	1	1	1	1	2	2	2	2	1	1	2	1	2	2	4	1	2	3	1	1	1	3	2	3	2	4	3	2	3	2	3	4	3	4	4	3	3	3	1	2	3	4	3	3	1	1	1	3	2	2	3	4	3	2	1	2	2	2	3	2	2	1	1	1	5	1
People And Places	3	2	4	2	4	5	1	2	4	2	4	3	1	5	5	4	3	3	4	5	2	3	1	5	5	4	4	4	1	4	2	1	4	3	1	2	2	1	2	4	2	2	3	3	3	3	1	1	5	5	3	3	1	4	3	1	4	1	1	2	1	4	4	5	3	3	5	4	2	1	3	1	5	1

1	2	3	4	5

Less supportive of pedestrians ⟷ More supportive of pedestrians

Active Transportation Plan

Pedestrian Corridor Summary Matrix

Corridor Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Corridor Name	Forest Grove to Cornelius	Hillsboro to Aloha	Hillsboro TC to Willow Creek MAX	Aloha to Beaverton	Beaverton to Highway 26	Hillsboro to Cedar Mill	Highway 8 to Orenco Station	Orenco Station to Tanasbourne	Tanasbourne to Beaverton	Murray Scholls to Cedar Mill	Aloha to Hillsdale	SW 185th Ave. to PCC Rock Creek	NW Bethany Blvd.	SW Cedar Hills Blvd.	Cedar Mill to Portland	Beaverton to Tualatin (Hall Blvd.)	SW Parkway Ave. to Wilsonville TC	Murray Scholls to Raleigh Hill	SW Oleson Rd.	99W to Tigard	Barbur Blvd.	Boones Ferry Rd.	Kruse Way	Country Club Road	Highway 43 - Portland to Oregon City	Molalla Ave.	McLoughlin Blvd.
Auto Speed	3	1	2	1	1	1	2	1	2	1	2	3	4	3	2	2	1	1	1	1	1	1	2	1	2	4	3
Auto Volume	3	2	3	2	2	2	5	2	2	2	2	4	5	2	2	2	4	2	2	2	2	2	2	2	2	4	2
Auto Lanes	3	1	3	1	1	1	5	1	4	1	2	3	5	1	4	4	4	3	5	1	1	3	2	1	3	3	2
Pedestrian Crashes	1	2	4	5	5	5	2	5	5	5	2	4	5	5	5	5	5	4	4	1	4	5	5	5	4	5	3
Cyclist Crashes	4	5	4	5	5	4	5	5	3	4	4	4	5	5	5	4	5	5	4	5	2	4	5	5	5	3	3
Sidewalk Completion	3	3	4	3	4	5	4	5	3	5	4	4	4	3	2	3	3	3	5	2	2	2	2	2	2	5	4
Tree Canopy	2	1	2	1	2	3	4	3	3	2	2	3	4	2	4	3	3	3	3	2	2	5	3	3	4	2	2
Signalized Crossings	4	3	2	2	4	3	2	2	2	3	3	3	1	3	2	2	2	4	2	3	4	2	4	1	3	4	3
Street Connectivity	2	1	2	2	2	2	2	2	3	2	2	1	1	4	4	3	3	2	3	3	2	1	1	3	2	3	3
People and Places	3	3	2	4	3	4	2	4	3	3	4	2	1	4	2	3	3	3	2	3	4	2	5	1	2	4	4

Corridor Number	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55
Corridor Name	Grand Ave.	Martin Luther King Blvd.	Beaverton to Barbur Blvd.	Capitol Hwy.	NW 23rd Ave.	NW 22nd Ave.	NW Lovejoy St.	Sherwood	Hawthorne Blvd.	Belmont St.	Burnside - Portland to Gresham	Stark St.	Halsey St.	Naito Parkway	Weidler St.	Interstate Ave.	Lombard	Killingsworth St.	Alberta St.	Going St.	Prescott St.	Fremon St.	Cesar Chavez Blvd.	Division St.	Sandy Blvd.	Cully Blvd.	82nd Ave.	Glisan St.
Auto Speed	5	4	3	4	5	5	5	4	3	5	1	2	2	4	4	2	3	4	5	5	5	5	4	3	3	5	3	5
Auto Volume	1	3	2	3	2	1	4	5	2	4	1	3	3	1	2	3	2	5	5	5	5	5	2	2	3	5	3	3
Auto Lanes	1	2	4	4	5	5	5	4	1	5	2	2	2	2	3	5	3	3	5	5	4	5	3	1	3	5	2	3
Pedestrian Crashes	3	4	4	5	5	1	5	3	1	3	2	1	3	3	5	3	4	3	5	5	2	5	4	1	3	5	1	4
Cyclist Crashes	1	5	5	2	5	5	5	5	3	1	2	3	4	1	3	3	5	5	5	5	4	2	2	3	5	4	5	5
Sidewalk Completion	4	3	2	2	5	5	5	4	5	5	4	5	3	3	5	4	5	5	5	5	3	5	4	5	3	5	4	5
Tree Canopy	1	2	4	4	2	2	3	3	1	2	2	2	2	2	1	2	2	2	1	3	3	4	4	1	2	3	2	3
Signalized Crossings	5	3	2	2	3	2	4	2	3	3	3	3	2	5	4	3	4	2	2	3	2	2	3	3	3	2	4	4
Street Connectivity	5	4	1	3	4	4	4	2	4	5	3	2	2	5	4	5	3	3	1	4	1	1	4	2	2	3	3	1
People and Places	5	4	2	3	5	5	5	2	5	5	4	4	3	5	5	4	3	3	3	2	2	2	2	4	3	2	4	4

Corridor Number	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82
Corridor Name	122nd Ave.	Powell Blvd.	181st and 182nd Ave.	Fairview to Gresham	Troutdale to Gresham	Holgate Blvd.	Woodstock Blvd.	Portland to Damascus	Portland to Oregon City	Tacoma St.	Johnson Creek Blvd.	Milwaukie to Clackamas TC	Clackamas TC to Damascus	SE 172nd Ave.	SE 222nd Dr.	SE 242nd Ave.	Clackamas Highway	OHSU Loop	NW Everett St.	NW Glisan St.	NW Portland to Sauvie Island	12th and 11th couplet	N Lombard St.	N Rosa Parks Way	N Vancouver Ave. and N Williams Ave.	N Mississippi Ave. and N Albina Ave.	Swan Island to St. John's
Auto Speed	2	2	3	3	2	5	5	1	4	3	2	4	1	1	2	1	1	4	5	5	3	5	4	2	5	5	4
Auto Volume	2	2	3	4	3	5	5	4	5	3	3	4	2	3	5	2	5	3	3	3	3	4	5	2	5	5	5
Auto Lanes	1	2	2	3	2	3	5	4	5	3	5	4	3	2	5	5	5	4	5	5	2	4	4	4	5	5	4
Pedestrian Crashes	1	1	5	5	5	3	3	4	5	5	5	4	3	5	5	5	5	3	5	5	5	3	5	5	5	5	3
Cyclist Crashes	1	3	3	5	3	4	5	5	5	5	3	5	5	5	5	3	5	5	5	5	5	3	5	4	1	5	5
Sidewalk Completion	4	3	5	4	4	4	4	3	3	4	1	3	2	1	1	1	1	2	5	5	2	5	4	4	5	5	4
Tree Canopy	1	2	1	3	2	3	3	4	4	2	3	4	3	5	5	5	5	5	3	4	2	3	3	4	4	3	3
Signalized Crossings	2	3	3	2	2	2	2	2	2	2	3	2	2	1	1	1	1	3	4	5	2	4	1	2	4	2	2
Street Connectivity	2	2	2	2	2	2	2	1	3	3	4	3	2	1	1	1	1	5	2	2	1	5	3	3	5	2	3
People and Places	4	3	4	2	2	2	2	2	2	4	4	3	2	1	1	1	1	5	5	5	2	4	2	2	4	3	2

1	2	3	4	5

Less supportive of pedestrians ⟷ **More supportive of pedestrians**

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TriMet Pedestrian Network Analysis

TriMet's "Pedestrian Network Analysis" completed in 2011, evaluated the current barriers and opportunities for pedestrian access to transit within the region and identified focus areas for future investments.[173] Transit stops were analyzed to identify those that hold the most to increase actual and perceived safety, increase local pedestrian activity, and increase transit ridership. The figure below shows the top scoring clusters and the initial ten focus areas. The ten focus areas do not encompass all the stops with high scores, but they each have at least one high scoring stop within the area and they provide a strong place to begin. The figure below displays the ten focus areas.

Figure 16: Ten Focus Areas, TriMet Pedestrian Network Analysis

Below is a summarized version of TriMet's final recommendations for TSPs to increase access to transit

- Consider word choice.
- The quality of pedestrian/bicycle facility and transit service matters.
- Analysis. Data collection and system analysis for walking, bicycling, and transit require explicit and rigorous methods just as motor vehicles do.

[173] The report and technical memos is available on TriMet's website: http://trimet.org/projects/pedestrian-network.htm Wilsonville's SMART is currently updating its inventory of bus stops and adjacent infrastructure, evaluating access to transit and identifying any barriers to accessing the SMART transit network with regard to bicycling and walking.

- Prioritize specific locations and areas where people walk, bicycle, and take transit. Match funding sources with types of projects. Project lists should recognize jurisdiction and which entities are responsible for making desired improvements.
- Match ability with responsibility. Project lists should recognize jurisdiction and which entities are responsible for making desired improvements.
- Tie city or county's transit vision to actions, programs, and investments needed to make it feasible.
- Unbundle pedestrian and cycling needs from larger road projects.
- Strongly encourage broad participation.
- Conduct field visits and safety audits of select corridors on foot and bicycle.

Regional Cycle Zone Analysis

A Cycle Zone Analysis is an approach to analyzing, planning and investing in cycling networks that has been successfully utilized by the City of Portland and by Translink[174] in Vancouver, BC. This approach incorporates land use, landscape, existing infrastructure and other factors in the identification of zones that share similar cycling conditions. Academic research has shown that household and employment density, land use mix, route connectivity and slope are factors of the built environment that have an impact on levels of cycle transportation. Cycle Zone Analysis uses a GIS methodology that captures a snapshot of existing conditions and cycling potential within each zone.

The cycle zones provide an organizing principle that allows for a more nuanced discussion about cycling conditions in the metropolitan region. Analysis of each zone offers a more fine-grained understanding of how cycling conditions differ across the region and how network planning decisions and investments can be tailored to respond to those different conditions. It should be noted that the cycle zone analysis is just a tool for measuring strengths and needs of different areas of the region. As a broad tool applied at a regional scale it does not capture all the nuances that affect a cyclist's experience on the ground.

Drawing Cycle Zone Boundaries

In order to divide the region into geographically distinct cycle zones, data are collected that are consistent at a regional scale. The following regional data sources are used to help define Metro's cycle zone boundaries:

- Household density
- Intersection density
- Employment density
- Sidewalk density
- Elevation (slope > 10%)
- Existing bicycle infrastructure
- Highways, freeways, major arterials
- Rivers
- Railroads
- Transportation Analysis Zones (TAZ's)

Significant barriers to cycling permeability create initial boundaries including highways, freeways, rivers and rail yards. The density layers were composited such that their overlap presents a color shift toward a deeper color value and are visually apparent.[175]

[174] Translink is a very unique agency – a transportation authority that is responsible for the planning, financing and managing of all public transit in addition to major regional roads and bridges.

[175] This is accomplished by first stretching the density pixel values along an 8-bit scale to normalize them. The pixel values of the layers are added to each other to create a composite map. To preserve visual fidelity, this process takes place in Photoshop using the Multiply layer blending mode.

The density composite is layered with existing bicycle infrastructure (trails, bike lanes, bike boulevards) and steep slopes. Based on the visual characteristics of the density patterns coupled with the significant barriers, homogeneous zones are drawn with a "wide brush" and saved as a geo-referenced image. These rudimentary zones are brought into a GIS environment and digitized using the latest 2029 TAZ boundary file as primitive constructs within Metro's jurisdictional boundary. The zones are then refined based on knowledge of the areas The Cycle zones boundaries were reviewed by a workgroup of local cities and county staff and further refined based on their local knowledge**.**

Cycle Zone Analysis Factors

Metro's analysis used the same types of factors used in other analyses in Portland and Vancouver, though not the same methodologies in many cases. For example, due to data limitations Metro included a "Bikeway Comfort Index" (BCI) rather than a Bikeway Quality Index" (BQI). The BCI analyzed the auto volumes, auto speeds and number of auto lanes on bikeways within each Zone. Previous Cycle Zone Analyses used a Bikeway Quality Index (BQI)which included more data on the bikeways in addition to auto speed/volume/# of lanes, including factors as jogs, # of stop signs, pavement quality, on-street auto parking, signage and pavement markings, lighting, bike lane drops, difficult transitions, bike lane width, intersection quality, etc.

The following maps illustrate how different parts of the region have greatly varying conditions for road connectivity and density, topography, population and employment density and destinations, permeability, bike network connectivity, bike network density and bikeway comfort.

Cycle Zone Analysis Factors and Results

Road Network Connectivity: Measures the connectivity of the road network by calculating the ratio of three-way (or more) intersections to cul-de-sac/dead ends in the zone.

- As shown in the **Roadway Connectivity Map**, the areas with the highest level of street connectivity include portions of the inner eastside of Portland. This includes zones 11 (Portland-Downtown/Nob Hill/S. Waterfront), 30 (SE Portland – Inner), 31 (NE Portland – Inner), 33 (N. Portland – Central).

Road Network Density: Measures density of road network by calculating linear feet per area of the zone (sq ft*)*

- As shown in the **Roadway Density Map**, the areas with the densest road networks include downtown and the inner eastside of Portland.
  - This includes zones 11 (Portland – Downtown / Nob Hill / S.Waterfont), 28 (SE Portland – Brooklyn / Sellwoodo-Moreland), 29 (SE Portland – Eastmoreland / Woodstock / Foster-Powell), 30 (SE Portland – Inner), 31 (NE Portland – Inner), 33 (N. Portland – Central), 37 (SE Portland – Mt Tabor / Montavilla).

Topography: Measures the proportion of the road network within each cycle zone that is below a 5% slope.

- As shown in the **Topographical Conditions Map**, the flattest areas of the region include portions of the eastside of Portland, Aloha, Hillsboro and Cornelius. This includes zones 31 (NE Portland – Inner), 33 (N. Portland – Central), 35 (Rivergate Industrial Area /Smith & Bybee Lakes), 29 (SE Portland – Eastmoreland / Woodstock / Foster-Powell), 38 (Far East Portland / W. Gresham), 39 (SE Portland – Lents/ Powellhurst-Gilbert), 2 (Cornelius), 3 (Hillsboro-South), 4 (Hillsboro-Central), 5 (Hillsboro-North), 6 (Aloha-North).

Density and Destinations: Measures bike friendly land use by calculating the proportion of commercial and/or mixed-use zoning and combining that with population and employment density.

- As shown in the **Density and Destinations Map**, the areas with highest combination of density and mixed-use zoning is downtown Portland (Zone 11) and inner SE Portland (Zone 30).
- Other areas with high levels include much of Portland east of the Willamette River, northern and eastern Beaverton, northern Gresham, eastern Milwaukie, Clackamas Regional Center and Industrial areas, and Wilsonville.
    - This includes zones 28 (SE Portland – Brooklyn / Sellwood-Moreland), 29 (SE Portland – Eastmoreland / Woodstock / Foster-Powell), 31 (NE Portland – Inner), 32 (Swan Island), 37 (SE Portland – Mt Tabor / Montavilla), 38 (Far East Portland / W. Gresham), 45 (Central Gresham / Wood Village / Fairview), 27 (Milwaukie – North / Clackamas Regional Center), 41 (Clackamas Industrial Area), 5 (Hillsboro – North), 7 (Beaverton – North), 13 (Beaverton – East / Raleigh Hills / Washington Square RC), 20 (Wilsonville).

Permeability: Measures the ease of passage from one zone to the next by calculating access points per linear ft of the perimeter of the zone

- As shown in the **Cycle Zone Permeability Map**, the zones that are easiest to get in and out of include downtown and much of the inner eastside of Portland (west of I-205).
    - This includes zones 11 (Portland-Downtown), 29 (SE Portland – Eastmoreland/Woodstock/Foster-Powell, 30 (SE Portland-Inner), 31 (NE Portland –Inner), 37 (SE Portland-Mt Tabor/Montavilla).
- Areas that are hardest to get in and out of typically border rivers such as the Clackamas, Tualatin, Columbia and Willamette (outside of central Portland)
    - This includes zones 26 (Milwaukie – Downtown / Oak Grove / Gladstone), 34 (N.Portland – St Johns), 35 (Rivergate Industrial Area / Smith & Bybee Lakes), 48 (Columbia Corridor Industrial Area – East), 50 (Damascus-South), 21 (Stafford), 17 (Tualatin), 3 (Hillsboro-South), 2(Cornelius), 1 (Forest Grove).

Bike Network Density: Measures the density of all on-street and off-street bike facilities by calculating the linear ft of bike facilities per area of the zone (sq ft).

- As shown in the **Bikeway Density Map**, the area with the most bikeway density is downtown Portland (zone 11).
- Other areas with high bikeway density include much of inner and outer east Portland, northern Beaverton, Tualatin, Milwaukie, and much of Gresham.
    - This includes zones 30 (SE Portland – Inner), 31(NE Portland – Inner), 32 (Swan Island), 33 (N. Portland – Central), 49 (PDX Airport), 29 (SE Portland – Eastmoreland / Woodstock / Foster-Powell), 38 (Far East Portland / West Gresham), 49 (PDX Airport) 45 (Central Gresham / Wood Village /

Fairview), 48 (Columbia Corridor Industrial Area – East), 7 (Beaverton – North), 17 (Tualatin), 26 (Milwaukie-Downtown/Oak Grove/Gladstone)

Bike Network Connectivity: Measures the connectivity of all on-street and off-street bike facilities by measuring the ratio of three-way (or more) bikeway intersections per area of zone (sq ft)

- As shown in the **Bikeway Connectivity Map**, the area with the most bikeway connectivity is downtown Portland (zone 11).
- Other areas with high connectivity include portions of north and inner SE Portland.
  - This includes zones 30(SE Portland – Inner), 32 (Swan Island), 33 (N. Portland – Central).

Bikeway Comfort Index (BCI): *A composite that evaluates existing bikeways within a zone based on auto speeds, volumes, number of lanes.*

- As shown in the **Bicycle Comfort Index Map**, the area with the highest bikeway comfort include parts of the inner eastside of Portland, industrial North Portland, Bethany, Hillsboro, Stafford and Boring.
  - These areas include zones 28, (SE Portland – Brooklyn/Sellwood-Moreland), 35 (Rivergate Industrial Area /Smith & Bybee Lakes), 8 (Bethany), 9 (Northwest Heights / W. Sylvan), 3 (Hillsboro-South), 21 (Stafford), 43 (Boring).
- It is important to note that the BCI only evaluates the designated bikeways within a zone. For zones with little mileage of bikeways, the BCI is less meaningful. For example, zones 21 (Stafford), 9 (NW Heights/W. Sylvan) and 3 (Hillsboro-South) all score in the highest tier because the few bikeways that do exist are predominantly trails. This calculation does not evaluate all of the other streets in these zones that cyclists would need to use to access the trails.
- Additionally, the trails data does not include access points, thus zones with long trails rate relatively highly, even if trail access points are limited, e.g. the Springwater trail in zone 28 (Brooklyn/ Sellwood) is difficult to access from adjacent neighborhoods due to Hwy 99E and the Oaks bottom wildlife refuge.

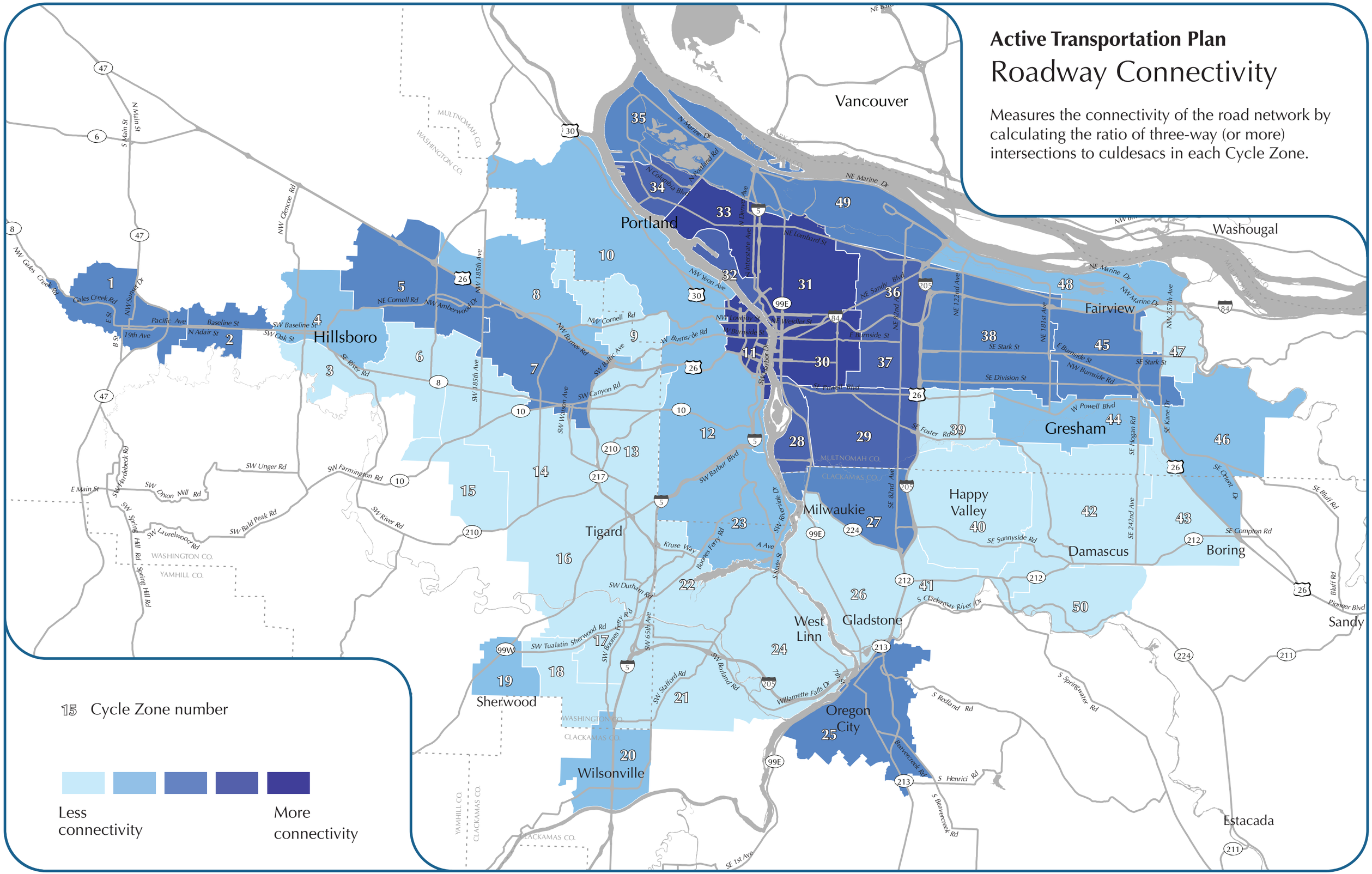
Existing Conditions Index: *Measures the overall bike conditions in the region.*

Cycling Potential*: identifies areas with good bones for cycling – high levels of road connectivity & density, flat topography, and a high level of population and employment density/destinations.* Areas with high cycling potential but low levels of existing bikeway conditions (bikeway connectivity, bikeway density, and/or bikeway comfort) are areas which may have high latent demand for cycling. Metro modeling staff can test this later during the ATP effort using Metro's new bike model tool.

Active Transportation Plan

Roadway Connectivity

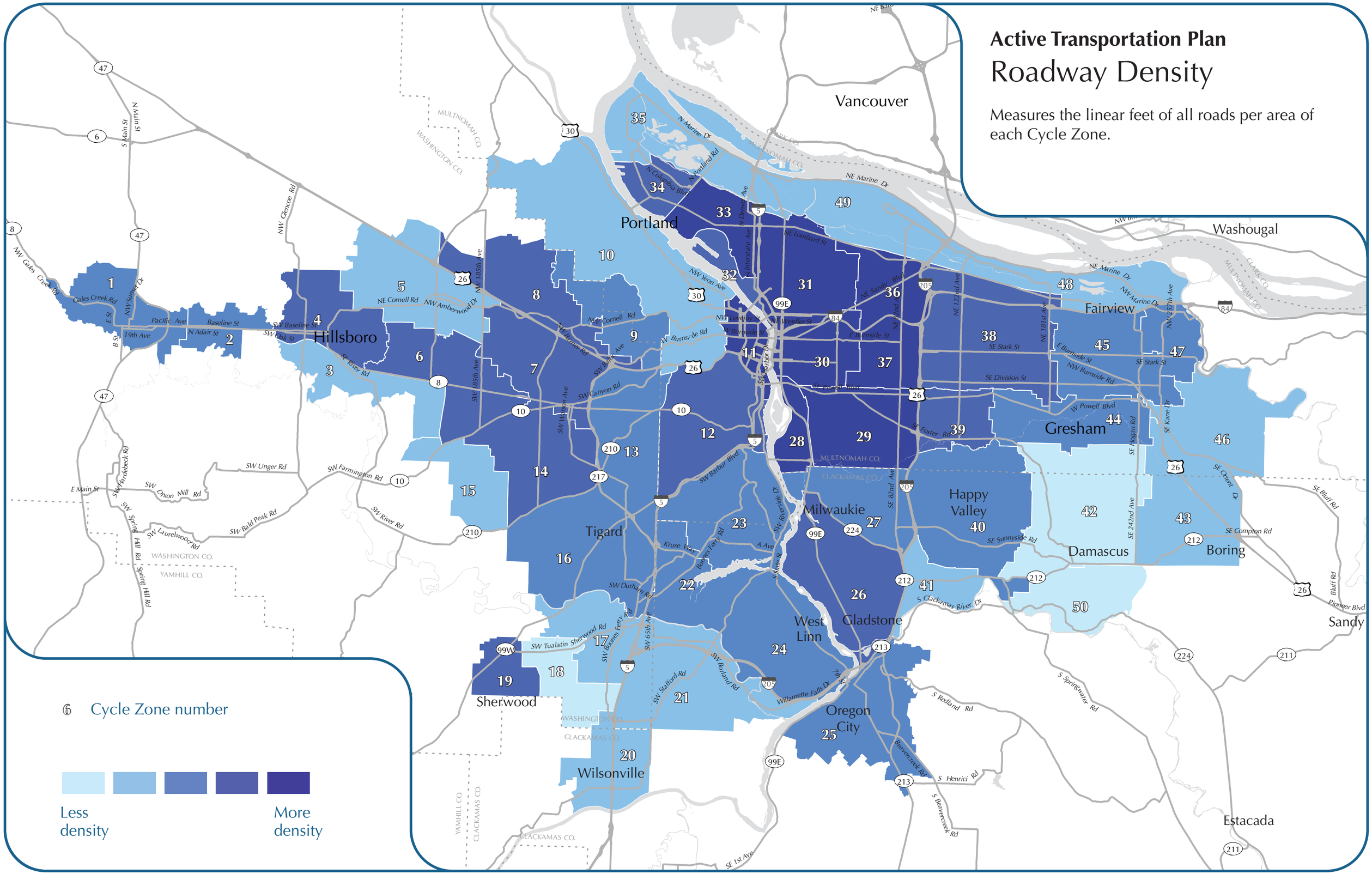
Measures the connectivity of the road network by calculating the ratio of three-way (or more) intersections to culdesacs in each Cycle Zone.



Active Transportation Plan

Roadway Density

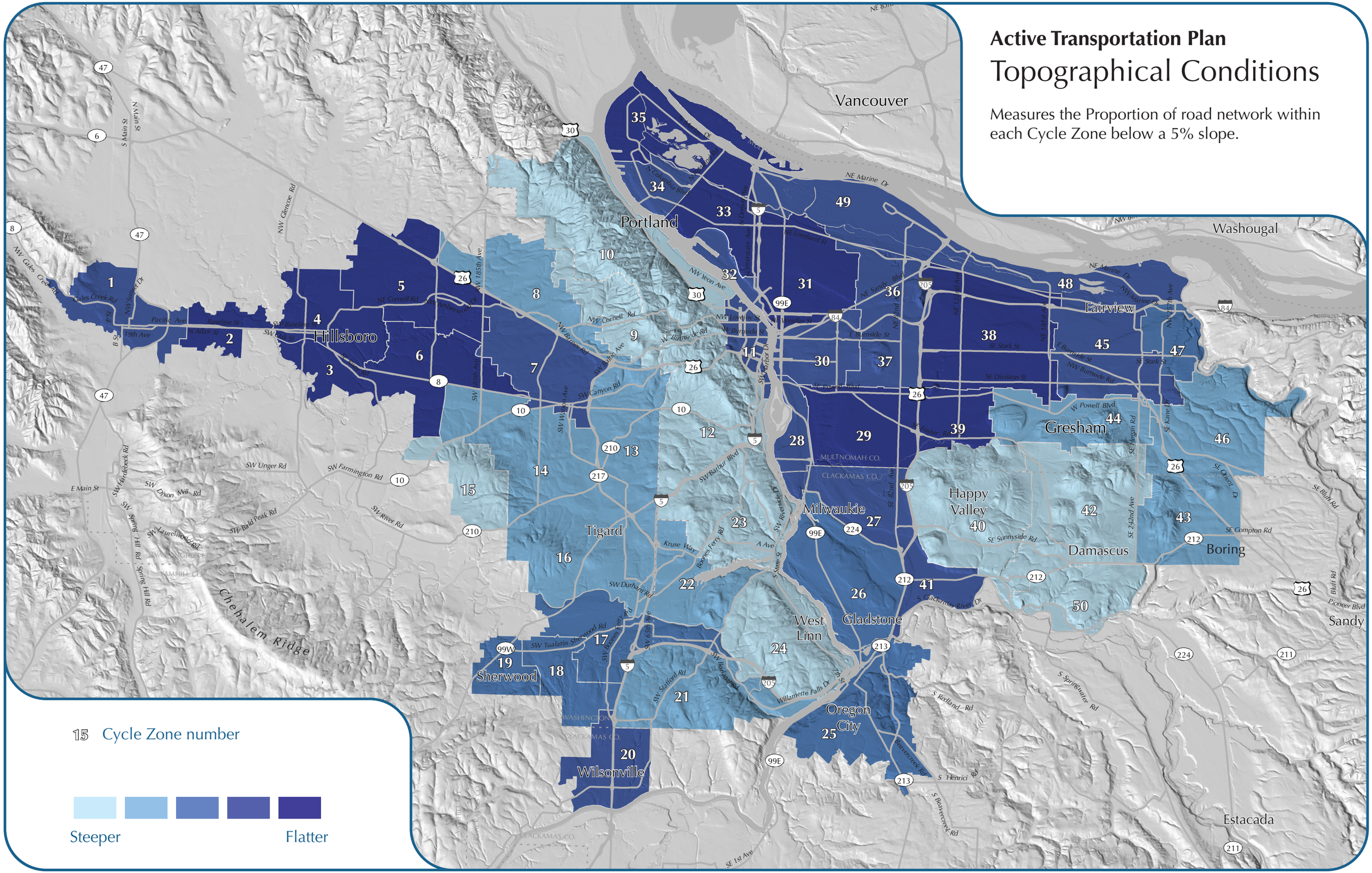
Measures the linear feet of all roads per area of each Cycle Zone.



Active Transportation Plan

Topographical Conditions

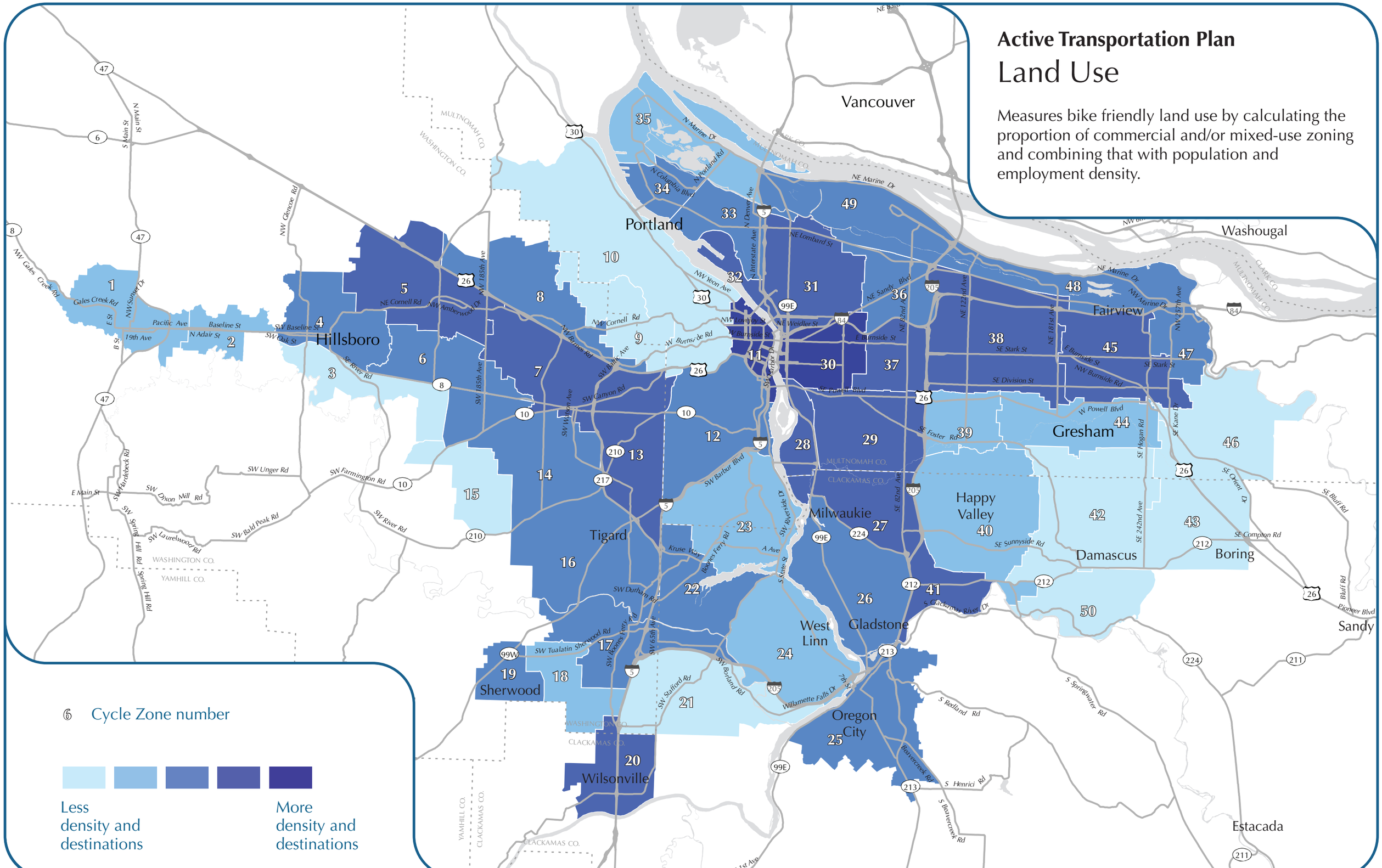
Measures the Proportion of road network within each Cycle Zone below a 5% slope.



Active Transportation Plan

Land Use

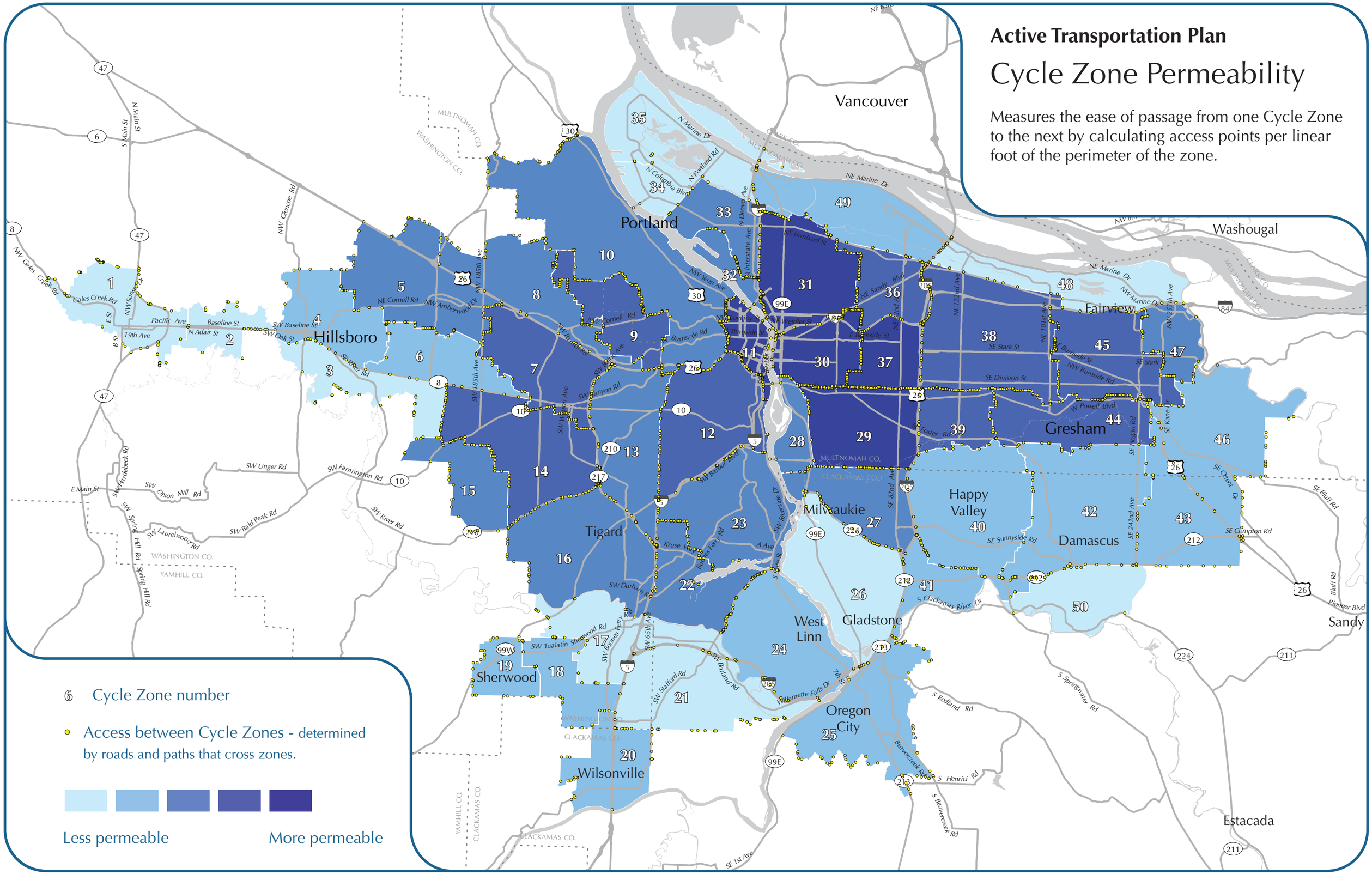
Measures bike friendly land use by calculating the proportion of commercial and/or mixed-use zoning and combining that with population and employment density.



Active Transportation Plan

Cycle Zone Permeability

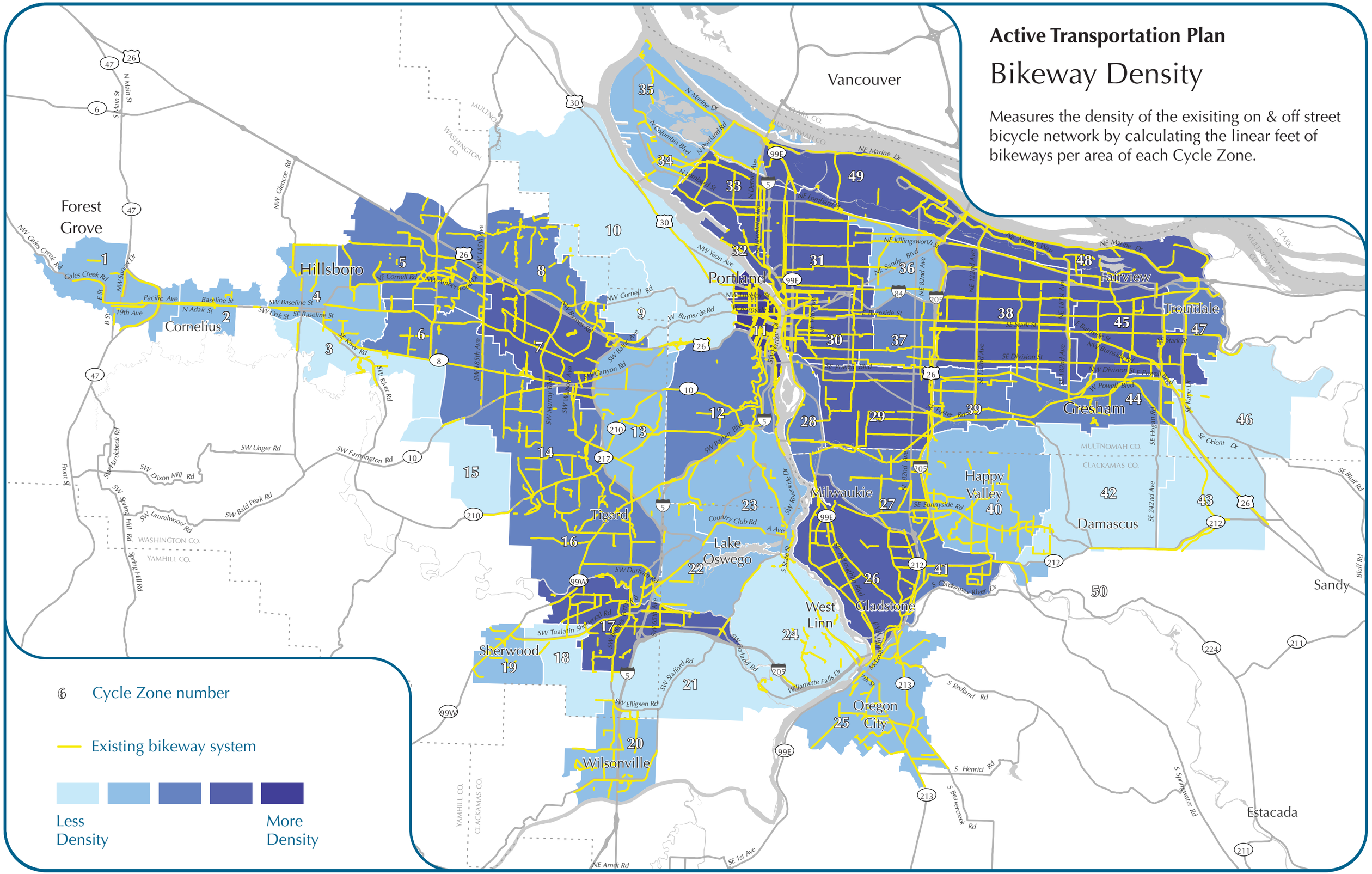
Measures the ease of passage from one Cycle Zone to the next by calculating access points per linear foot of the perimeter of the zone.



Active Transportation Plan

Bikeway Density

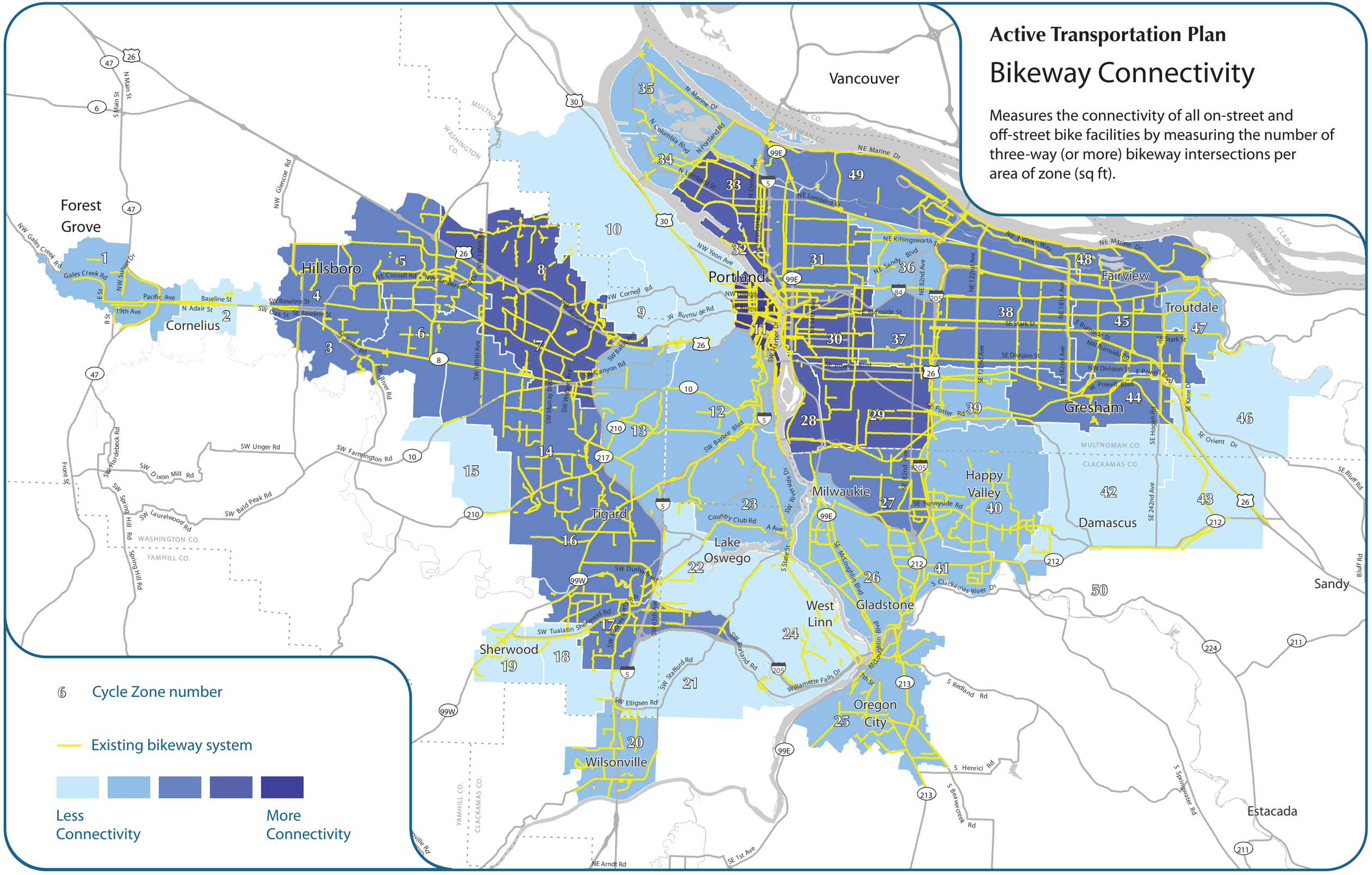
Measures the density of the exisiting on & off street bicycle network by calculating the linear feet of bikeways per area of each Cycle Zone.



Active Transportation Plan

Bikeway Connectivity

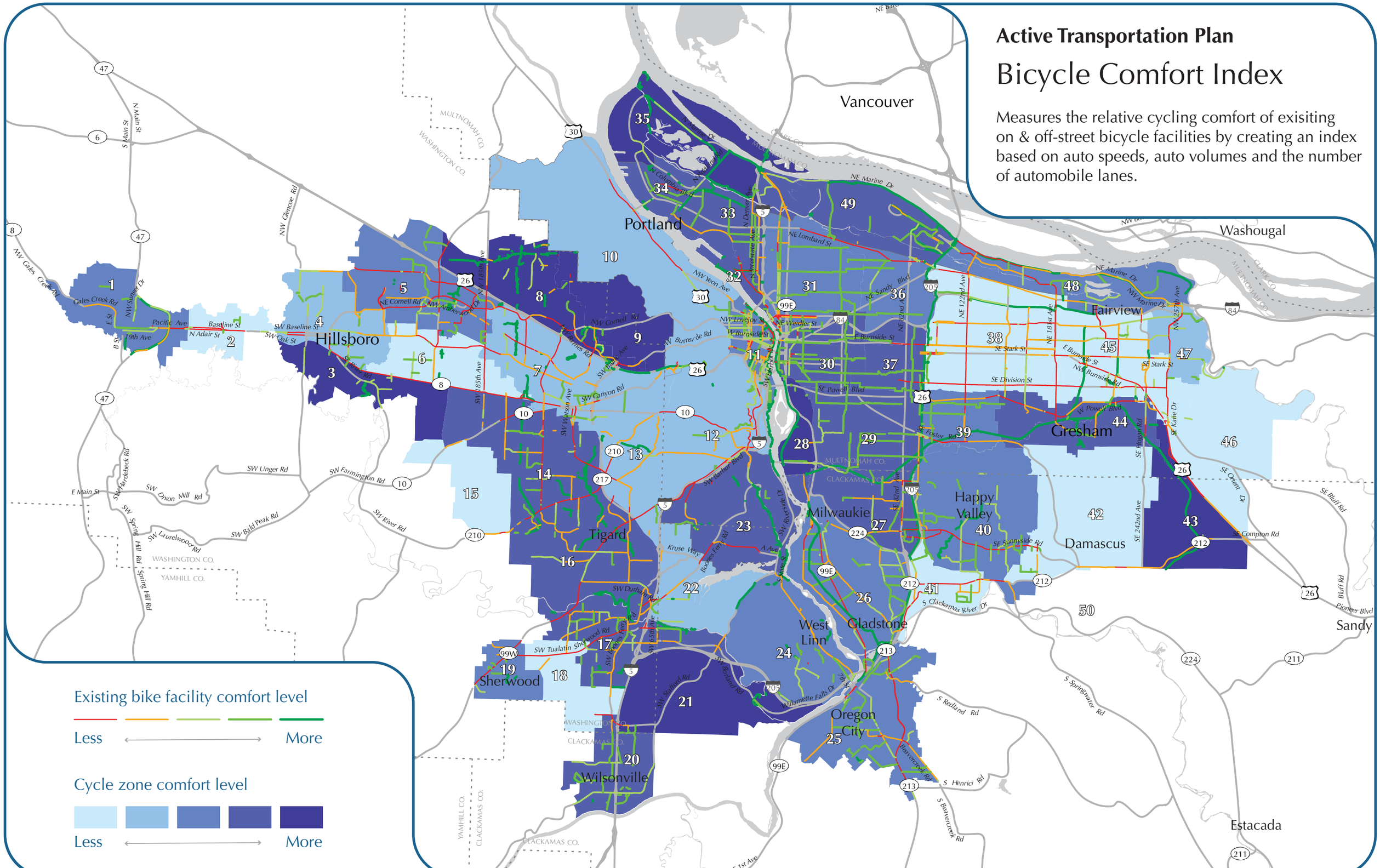
Measures the connectivity of all on-street and off-street bike facilities by measuring the number of three-way (or more) bikeway intersections per area of zone (sq ft).



Active Transportation Plan

Bicycle Comfort Index

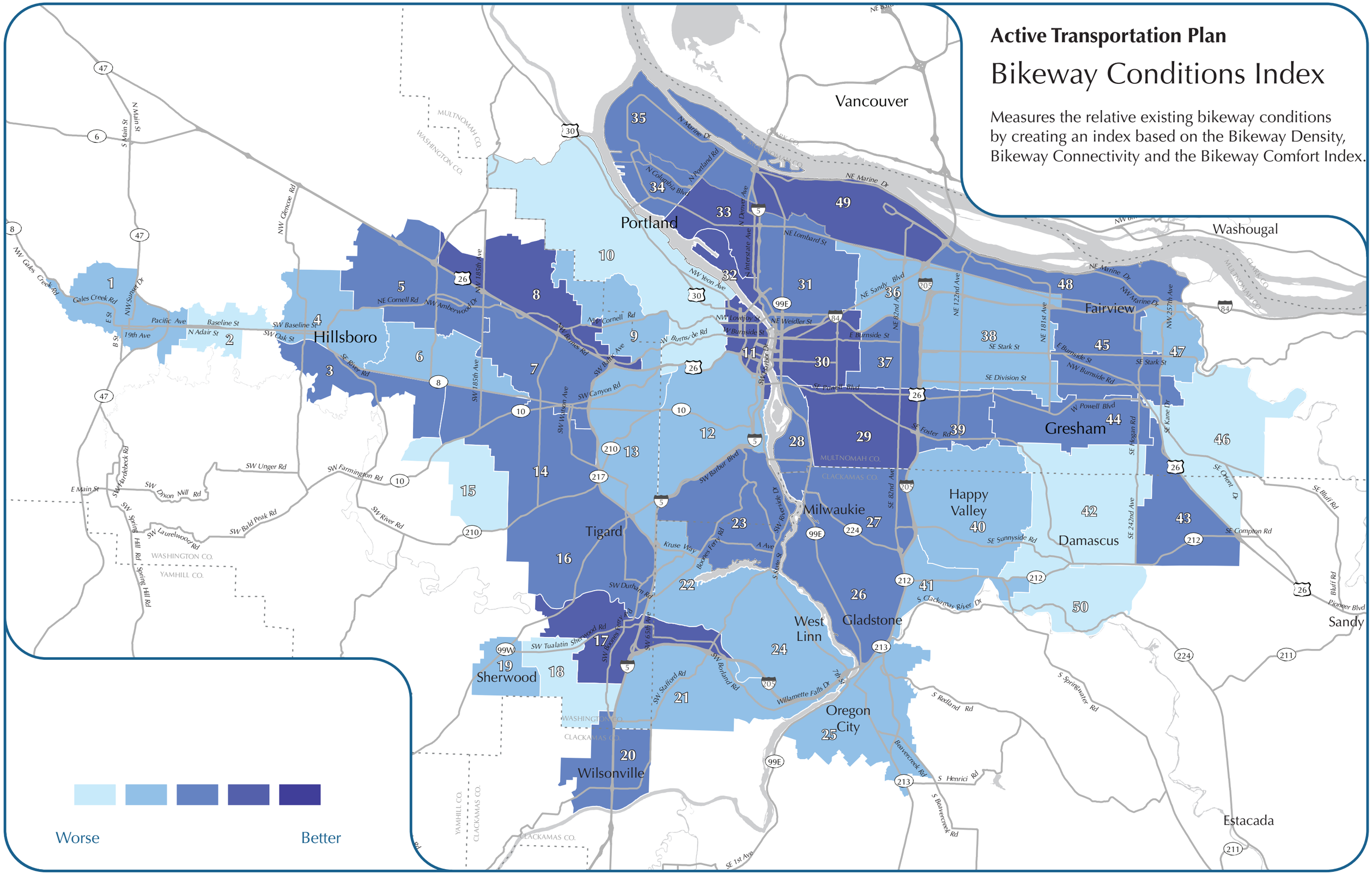
Measures the relative cycling comfort of exisiting on & off-street bicycle facilities by creating an index based on auto speeds, auto volumes and the number of automobile lanes.



Active Transportation Plan

Bikeway Conditions Index

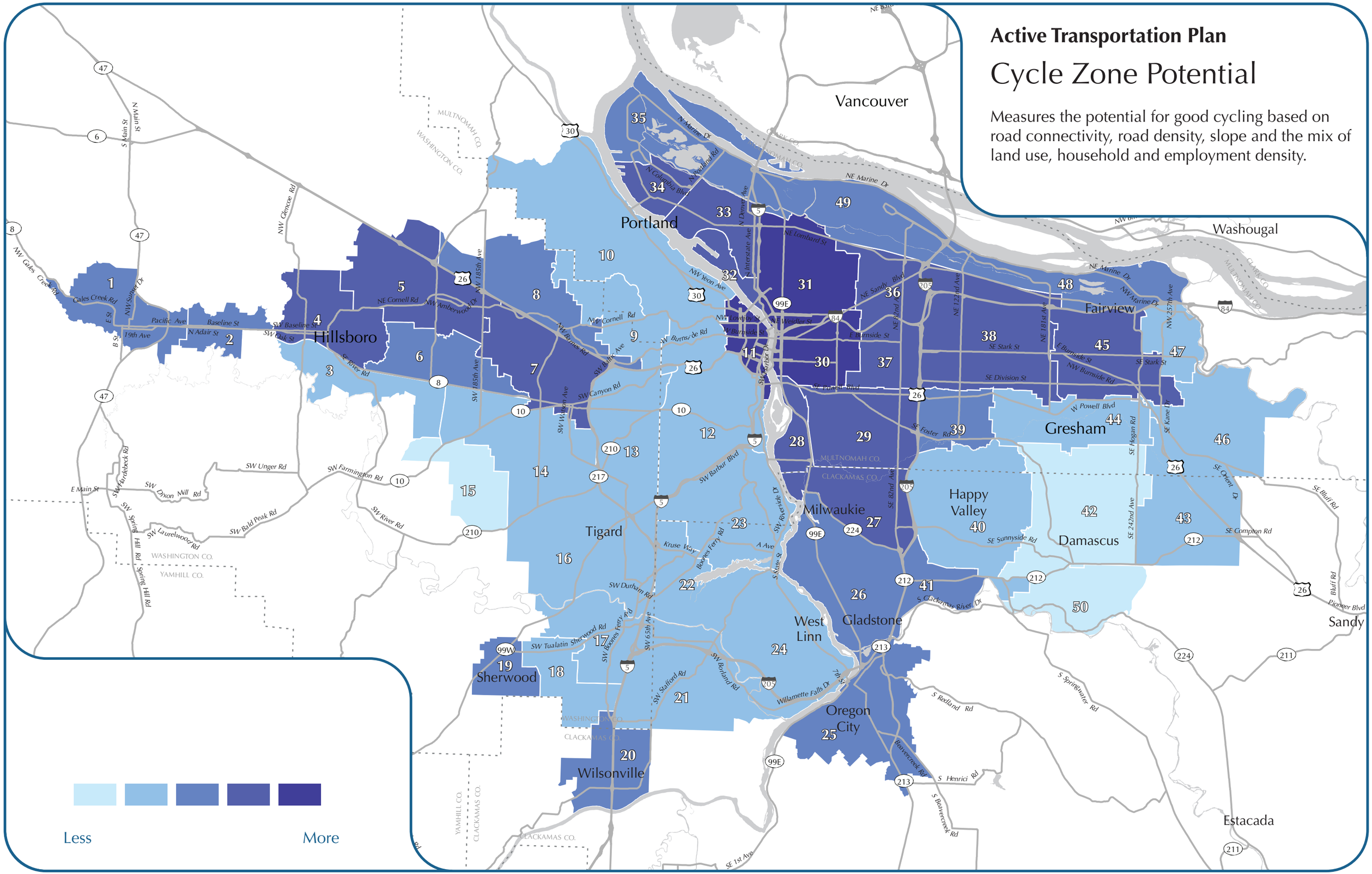
Measures the relative existing bikeway conditions by creating an index based on the Bikeway Density, Bikeway Connectivity and the Bikeway Comfort Index.



Active Transportation Plan

Cycle Zone Potential

Measures the potential for good cycling based on road connectivity, road density, slope and the mix of land use, household and employment density.



Active Transportation Plan

Cycle Zone Summary Matrix

Cycle Zone Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
Cycle Zone Name	Forest Grove	Cornelius	Hillsboro–South	Hillsboro- Central	Hillsboro- North	Aloha - North	Beaverton - North	Bethany	Northwest Heights/ W.Sylvan	Forest Park	Portland – Downtown/ NobHill/ S.Waterfont	SW Portland – Hillsdale/Multnomah Village	Beaverton – East / RaleighHills/ WashingtonSquare RC	Beaverton – South / Aloha - South	CooperMt	Tigard	Tualatin	Sherwood – Industrial / Tualatin - Industrial	Sherwood - Central	Wilsonville	Stafford	Lake Oswego/ Rivergrove	Lake Oswego– North / Downtown/ Dunthorpe	West Linn	OregonCity	Milwaukie– Downtown/ OakGrove/ Gladstone	Milwaukie– North / ClackamasRegionalCenter	SE Portland – Brooklyn/ Sellwood-Moreland	SE Portland – Eastmoreland / Woodstock/ Foster-Powell	SE Portland - Inner	NE Portland - Inner	Swan Island	N. Portland - Central	N. Portland – St Johns	Rivergate Industrial Area /Smith & Bybee Lakes	NE Portland – Cully/ Rose City Park / RockyButte	SE Portland – Mt Tabor / Montavilla	Outer East Portland / W. Gresham	SE Portland – Lents/ Powellhurst-Gilbert	HappyValley	ClackamasIndustrial Area	Damascus	Boring	Pleasant Valley/ Powell Butte / GreshamButte	Central Gresham/ WoodVillage/ Fairview	Gresham– Powell Valley/ Kelly Creek	Troutdale	ColumbiaCorridorIndustrial Area - East	PDXAirport	Damascus- South
Road Connectivity	3	3	1	2	3	1	3	2	1	2	5	2	1	1	1	1	1	1	2	2	1	1	2	1	3	1	3	4	4	5	5	4	5	4	3	4	4	3	1	1	1	1	1	2	3	2	1	2	3	1
Road Density	3	3	2	4	2	4	4	4	3	2	5	4	3	4	2	3	2	1	4	2	2	3	3	3	3	4	3	5	5	5	5	4	5	4	2	5	5	4	4	3	2	1	2	3	3	2	3	2	2	1
Topography	4	5	5	5	5	5	4	2	1	1	4	1	2	2	1	2	3	3	3	4	2	2	1	1	3	3	4	4	5	4	5	4	5	4	5	4	4	5	5	1	4	1	2	2	4	2	3	4	4	1
Land Use	2	2	1	3	4	3	4	3	1	1	5	3	4	3	1	3	3	2	3	4	1	3	2	2	3	3	4	4	4	5	4	4	3	3	2	3	4	4	2	2	4	1	1	2	4	1	3	3	3	1
Permeability	1	1	1	2	3	2	4	3	4	3	5	4	3	4	3	3	1	2	2	2	1	3	3	2	2	1	3	3	5	5	5	3	3	1	1	4	5	4	4	2	2	2	2	4	4	2	3	1	2	1
Bikeway Connectivity	1	1	2	1	3	2	3	3	1	1	5	2	1	3	1	2	3	1	2	2	1	2	2	1	2	3	3	2	3	4	3	4	4	2	2	2	2	2	2	2	2	1	2	3	3	1	2	2	3	1
Bikeway Density	2	2	1	2	3	3	4	3	1	1	5	3	2	3	1	3	4	1	2	2	1	2	2	1	2	4	3	3	4	4	4	4	4	2	2	2	3	4	3	2	3	1	1	3	4	1	3	4	4	1
Bike Comfort	3	1	5	2	3	1	2	5	5	2	3	2	2	4	1	4	4	1	3	4	5	2	4	3	3	3	4	5	4	4	3	4	4	4	5	3	4	1	3	3	1	1	5	4	1	1	2	3	4	1
Biking Potential	3	3	2	4	4	3	4	3	2	2	5	2	2	2	1	2	2	2	3	3	2	2	2	2	3	3	4	4	4	5	5	4	4	4	3	4	4	4	3	2	3	1	2	2	4	2	2	3	3	1
Bikeway Conditions	2	1	3	2	3	2	3	4	2	1	4	2	2	3	1	3	4	1	2	3	2	2	3	2	2	3	3	3	4	4	3	4	4	3	3	2	3	2	3	2	2	1	3	3	3	1	2	3	4	1

1 2 3 4 5

Less supportive of bicycling ⟷ **More supportive of bicycling**

CHAPTER 7: EXISTING PROGRAMS AND EDUCATION

While safe, comfortable and connected pedestrian and bicycle infrastructure is fundamental to providing transportation options and achieving the region's transportation targets, on-the-ground investments in trails, access to transit, bike lanes and sidewalks are much more successful when they are supported by school-related programs such as Safe Routes to School, transportation demand management programs focused on increasing active transportation and reducing drive alone trips, and transportation system management that help the overall transportation function more smoothly and efficiently. For example, in 2009, one in five Portland residents reduced trips made by auto in response to the Drive Less. Save More. campaign and SmartTrips and TravelSmart projects have yielded a reduction of 9-13% in drive-alone auto trips by all area residents with a corresponding increase in walking, bicycling, and transit mode shares in the SmartTrips areas.[176], [177]

Transportation System Management and Operations

Transportation System Management and Operations (TSMO) integrates transportation system management and transportation demand management. Historically, system management has been viewed as a tool primarily to manage the automobile system to make it operate more efficiently. Today, it is being applied much more broadly as a way to prioritize use of the transportation system for all modes. For example, TSMO can be used to allow bicycles and pedestrians to have priority treatment at key intersections. The Regional TSMO Plan is a modal plan of the RTP and guides transportation management solutions for the next 10 years. The plan focuses on the following areas of investment:

- Multi-modal traffic management
- Traveler information
- Traffic incident management
- Transportation demand management

The Regional TSMO Plan identifies the following transportation system management activities, projects and strategies that are important to active transportation: [178]

- Supports "green wave" bicycling where traffic lights are timed to allow bicyclists to travel without stopping;
- Provide pedestrian and bicycle prioritized signals for safer crossings of streets and to reduce waiting times;
- Counting pedestrian and bicycle activity;
- Reduces idling and pollution (pedestrians and bicyclists are more vulnerable to pollution from autos);
- Data and tools for multi-modal trip planning;

[176] Pedestrian and Bicycling Information Center (PBIC). http://www.walkinginfo.org/library/details.cfm?id=3961
[177] Drive Less. Save more. http://www.drivelesssavemore.com/pages/faqs#impact
[178] Metro, Regional Transportation System Management and Operations Plan. These activities and strategies are included in the plan and described in greater detail.

- Parking management increases attractiveness of bicycling, walking and other modes;
- Bicycle sharing
- Bicycle parking, storage facilities and stations
- Provision of bicycle and pedestrian coordinators to implement plans and facilitate programs

Transportation demand management (TDM) refers to actions and sets of strategies designed to influence the intensity, timing and distribution of travel in order to make more efficient use of transportation infrastructure and services. Methods include but are not limited to offering other modes of travel such as walking, bicycling, ride-sharing and vanpool programs, auto sharing, providing opportunities to link or "chain" trips together, individualized marketing, and trip-reduction ordinances.

Regional TDM activities are coordinated through Metro's Regional Transportation Options Program (www.oregonmetro.gov/rto) Public and private partners of the Regional Travel Options (RTO) Program implement TDM, including government and transit agencies, transportation management associations, and businesses. TDM measures and parking restrictions are vital strategies for reducing auto trips, achieving desired mode split targets, and helping the other parts of the transportation system operate more efficiently. Metro is currently seeking funding to develop a Regional Parking Strategy.

The *2012-2017 RTO Strategic Plan* describes the proposed activities for regional travel options for the next five years. The plan includes guiding principles, goals and objectives that link to the ATP. The RTO program allocates grants to implement TDM actions in the region.

Transportation management associations (TMAs) are nonprofit coalitions of local businesses and/or public agencies that develop partnerships with businesses to reduce traffic congestion and pollution by improving commuting options for their employees. TMAs promote shared ride and the use of transit, walking, biking, work schedule changes and telecommuting and help employers comply with the ECO rule mandate for reducing drive alone commute trips by 10 percent over three years. [179]

Transportation management associations in the region:

- Westside Transportation Alliance (WTA)
- Swan Island Transportation Management Association
- Lloyd District Transportation Management Association
- Gresham Regional Center Transportation Management Association (GRCTMA)
- South Waterfront Transportation Management Association

[179] The Oregon Department of Environmental Quality's Employee Commute Options (ECO) rules applies to employers that have more than 100 employees at a single work site. Employers must provide commute options to employees designed to reduce the number of autos driven to work in Portland and surrounding areas.

Safe Routes to School

Safe Routes to School (SRTS) is a local, national and international movement to create safe, convenient, and fun opportunities for children to bicycle and walk to and from schools. The program has been designed to reverse the decline in children walking and bicycling to schools.

Since 1969, the percentage of school-aged children in the U.S. who walk or bicycle to school has dropped by more than half, and the portion of children traveling to school by auto has tripled. Today, half of all children travel to school by auto. Distance and community design contribute to the change in proportions. Approximately half of students in 1969, compared to a quarter of students in 2001, lived within a mile of their schools. [180] In the region, nearly 50% of school children, pre-K-12 grade travel to school by auto. 16.4% walk or ride a bike to school. 35.3% of the trips are made by transit and school bus which in most cases involve a walking or bike trip as well.

Oregon formed the Oregon Walk + Bike committee in 2000 and passed House Bill 3712 (known as the 'Safe Routes to School Bill') in 2001. Since then the Portland region has maintained a robust network of Safe Routes to School Programs that has continued to expand. Hundreds of schools in the region participate in some form of the program. Some jurisdictions have developed full programs supported by staff, while other jurisdictions seek funding for safe routes to school projects which are often managed by transportation, planning staff and volunteers.

A snapshot of some of the programs in the region is provided below. Additional information is needed, including the total number of schools participating, the estimated number of students, the number of Action Plans completed in the region (the first and baseline step for all schools participating in Safe Routes), number of schools that registered for national walk or bike to school days and the Bicycle Transportation Alliance's (BTA) Bike and Walk to School challenge, and total funding spent last year on Safe Routes programs.

Safe Routes to School Programs in the Region

Portland partners with schools, neighborhoods, community organizations and agencies on its Safe Routes to School (SR2S) program, formalized in 2001.Subsequent to this, the city partnered with five schools in Portland that received $2,000 in state grants and delivered all school traffic safety services under the umbrella concept of 'Safe Routes to School'. In 2003, the Portland Community and School Traffic Safety Partnership was established. In 2005-06 Portland Safe Routes to School initiated the 5-E (Education, Encouragement, Engineering, Enforcement, and Evaluation) pilot project, with partnerships in eight schools. The program has grown over the years and now serves almost every elementary and K-8 school in the City, providing direct service to over 80 schools. Of those, engineering plans have been completed at 28 schools and 40 schools receive education services.

[180] Booz Allen Hamilton (July 2011). *Transportation and Health: Policy Interventions for Safer, Healthier People and Communities.*

Twenty of the forty schools in the *Beaverton* school district participate in some form of a Safe Routes to School Program. The program has developed with grant assistance. The program has had success in encouraging walking and biking to school. In 2009-10 Findley Middle School went from 800+ cars a day dropping off and picking up students to 400 cars as a result of the program. However, the program does not have funding secured for 2012-13.

Multnomah County works with Reynolds School District to encourage biking and walking to schools serving Fairview, Troutdale and Wood Village elementary and middle school students. Troutdale Elementary School was selected for the County's first Safe Routes to School Action Plan. As part of this process, a School Team was assembled that includes parents, community members, and staff from the Reynolds School District, City of Troutdale Engineering Department and Police. Multnomah County Transportation Planning staff will begin work with other schools to develop their action plans.

Gresham seeks funding to develop programs with schools in the Gresham school district.

Clackamas County does not have an official program but secured funds in 2010-11 to complete a SRTS Action Plan for Sunnyside Elementary School, and intends to use progress made there as a template for SRTS programs with other schools elsewhere in the county.

The *Oregon Department of Transportation* administers the Oregon Safe Routes to School Program and grants.[181] Oregon has funded 112 local Safe Routes to School projects totaling more than 16 million. Safe Routes to School projects require no local matching funds.[182]

Oregon's Walk + Bike program is coordinated by the BTA. The program focuses on encouraging children, youth, and families to use safe, active transportation to get to and from school and throughout their communities throughout the year. The BTA builds on existing Safe Routes to School partnerships to reach schools. Two statewide Walk + Bike events take place each year, with many more events and activities occurring at the local and regional level

[181] Oregon's Safe Routes to School Program http://www.oregonsaferoutes.org/
[182] Safe Routes to School National Partnership. http://www.saferoutespartnership.org/state/srts-in-your-state/oregon

CHAPTER 8: EXISTING PRINCIPLES AND CRITERIA

Criteria are standards, rules or principles for evaluating or testing something. Criteria are developed and defined based upon commonly agreed upon visions, principles, goals and objectives, and are used to help communities make decisions that will achieve the desired outcomes. Criteria used for prioritizing and funding projects in the region have developed over time, continually being updated and revised to reflect the values and needs of the community. Criteria currently being used for regional and local prioritization were gathered in this report to provide a starting place for development of regional active transportation criteria.

Appendix 13 provides a brief summary of criteria developed for the programs and projects listed below. Common themes in the criteria include filling gaps and increasing connectivity; increasing access to essential destinations and transit; equity; feasibility and cost; health and safety.

- Local Pedestrian and Bicycle Plans in TSPs
- Portland Bicycle Plan for 2030
- Multnomah County Capital Improvement Plan and Program, April 2012
- TriMet Pedestrian Network Analysis , pedestrian focus area selections
- Metro Regional Flexible Funds project selection criteria, 2014-15 allocation
- Metro Active Transportation Demonstration Projects evaluation criteria and principles
- ODOT Transportation Enhancement/OBPAC, notice of intent evaluation factors
- Willamette Pedestrian Coalition, Getting Around on Foot Plan, findings

Analyzing Equity and Justice

Equity and justice are important criteria for prioritizing projects and investments. Equity refers to fairness with which benefits and costs are distributed in society. There is a lack of equity when individuals or groups of people bear more of the burdens and receive less of the benefits. Justice refers to acknowledging historical injustices related to equity and including the historical perspective in the planning process. [183]

There are areas of the region that are underserved by active transportation, especially access to transit, have less access to essential services and have higher environmental justice and underserved

[183] Metro employs the terms Environmental Justice (EJ) and underserved to describe populations that have historically experienced a lack of consideration in the planning and decision-making process. EJ populations are people protected under Title VI of the Civil Rights Act of 1964 prohibiting discrimination based on race, income, or national origin. The Environmental Protection Agency describes EJ as "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies." Underserved community is used to describe the communities of concern that are not specifically called out in the definition of Environmental Justice. These populations are the elderly, persons with disabilities, children and any other population of people whose needs have not always been fully met or considered in the planning process.

communities, including communities in East Multnomah County, Portland east of I-205, areas of North Portland, areas along McLoughlin Blvd. and 82nd Avenue, areas of unincorporated Clackamas County, including the North Clackamas Revitalization Area, Forest Grove, Cornelius, Aloha and Beaverton. [184]

The final ATP will include a definition of equity and equity related criteria and proposed methodology for measuring equity. To support that process there are many resources to draw from:

- Metropolitan Transportation Improvement Program, 2014-15 Regional Flexible Fund Allocation Transportation Equity Analysis, Metro[185] Appendix 24 includes the methodology and maps from the analysis
- Regional Opportunity Mapping project, Coalition for a Livable Future and Metro (upcoming, October 2012)
- Regional Equity Atlas, Coalition for a Livable Future[186]
- Washington County 2010-15 Consolidated Plan, Opportunity Mapping[187]
- Washington County Pedestrian and Bicycle Prioritization Project includes suitability mapping, including equity[188]
- Community Cycling Center, Barriers to Bicycling Report, final report 2012[189]
- Multnomah County's Equity Atlas
- Equity analysis of the Portland Bicycle Master Plan[190]

[184] Metro, Metropolitan Transportation Improvement Program, 2014-15 Regional Flexible Fund Allocation Transportation Equity Analysis (January 2012, available at www.oregonmetro.gov/mtip)
[185] Metro, Transportation Equity Analysis
[186] http://www.equityatlas.org/
[187] http://www.co.washington.or.us/CommunityDevelopment/Planning/upload/Consolidated-Plan-Ch-5.pdf
[188] http://www.co.washington.or.us/LUT/Divisions/LongRangePlanning/PlanningPrograms/TransportationPlanning/bikeandped/suitability-mapping.cfm
[189] http://www.communitycyclingcenter.org/wp-content/uploads/2012/07/Understanding-Barriers-Final-Report.pdf
[190] Jennifer Dill and Brendan Haggerty, Sept. 24, 2009, Portland State University, Equity Analysis of Portland's draft Bicycle Master Plan – findings. http://www.portlandoregon.gov/transportation/article/264747

CHAPTER 9: CURRENT FUNDING

Comparing spending on different modes is useful to the extent that spending can be seen representing the translation of strategies into action through investment. Level of spending, or investment, provide an indication of the strategies. Successful implementation of the regional principal active transportation network depends on political will, strong policies and funding. Over time, levels of investment in active transportation have increased as recognition of the value of active transportation has increased. But, the level of funding is not consistent with demand or need. Over 17% of the trips made in the region are made walking or bicycling, while approximately 3% of capital transportation funding has been dedicated to stand-alone pedestrian and bicycle projects.[191] Metro's allocation of regional flexible funds has accounted for approximately 22% of the funding for active transportation in the region, and 44% of the funding for trails, making it an extremely important source of funding. A major funding issue and road block to developing the system is lack of a dedicated funding program for active transportation.

Current Cost of the Regional Active Transportation System

The current cost of the regional active transportation system is included in the RTP. Projects in the RTP are identified by a primary mode (pedestrian, bike, trail, freight, programs, transit, ITS, roads/bridges, etc) and a secondary mode. Many of the road/bridges projects have pedestrian, bicycle and trail listed as a secondary mode. The project list, in Excel format, is available on Metro's website.[192] The total cost of all projects in the federal and state lists is nearly $20 billion. Of this total, $1.4 billion is for bike, pedestrian and trail projects.[193] Stand alone bicycle and pedestrian infrastructure projects comprise roughly a third of the total projects.

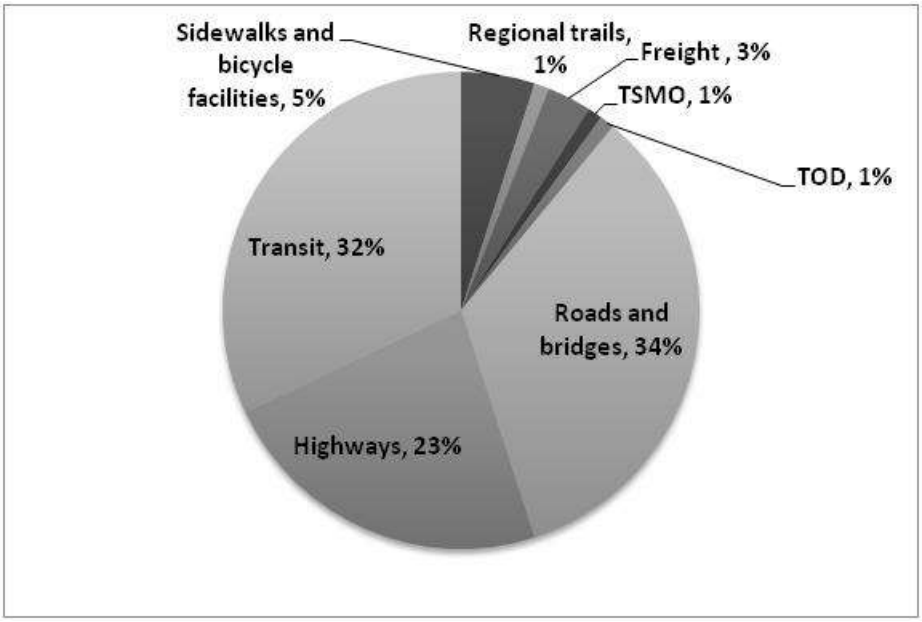
Table 30: RTP Investments by Mode and Share of Total Cost

Mode	Federal System Cost by Mode	% of Total Federal Project Cost	State System Cost by Mode	% of Total State Project Cost
Sidewalks and bike facilities	$690,074,444	5%	$359,589,458	6%
Freight	$622,518,839	5%	$76,108,300	1%
ITS/TDM	$19,379,271	0%	$195,144,006	3%
Regional Programs/Other	$195,861,000	1%	$14,000,000	0%
Regional trails	$258,217,886	2%	$25,513,725	0%
Roads and bridges	$4,338,259,413	32%	$2,349,101,909	37%
Throughways	$3,882,748,243	29%	$648,037,000	10%
Transit	$3,407,248,319	25%	$2,835,697,516	45%
TOTAL	$13,414,307,415	100%	$6,352,066,834	100%

Source: 2035 RTP

[191] It can be challenging to determine expenditures by mode. The levels of spending defined here represent the minimum spent on active transportation in the region and do not represent exact amounts.
[192] http://www.oregonmetro.gov/index.cfm/go/by.web/id=25038#files This is the financially constrained project list.
[193] The RTP includes two project lists: the "Federal" and the "State". The federal list is often referred to as the financially constrained list. It is the list of projects that the region has determined that it will have adequate revenues to fund through 2035. The state list contains additional projects ($6.4 billion in additional projects); additional revenue sources would need to be secured to fund projects in the state list.

Figure 17: RTP Investments by Mode and Share of Total Cost



Source: 2035 RTP

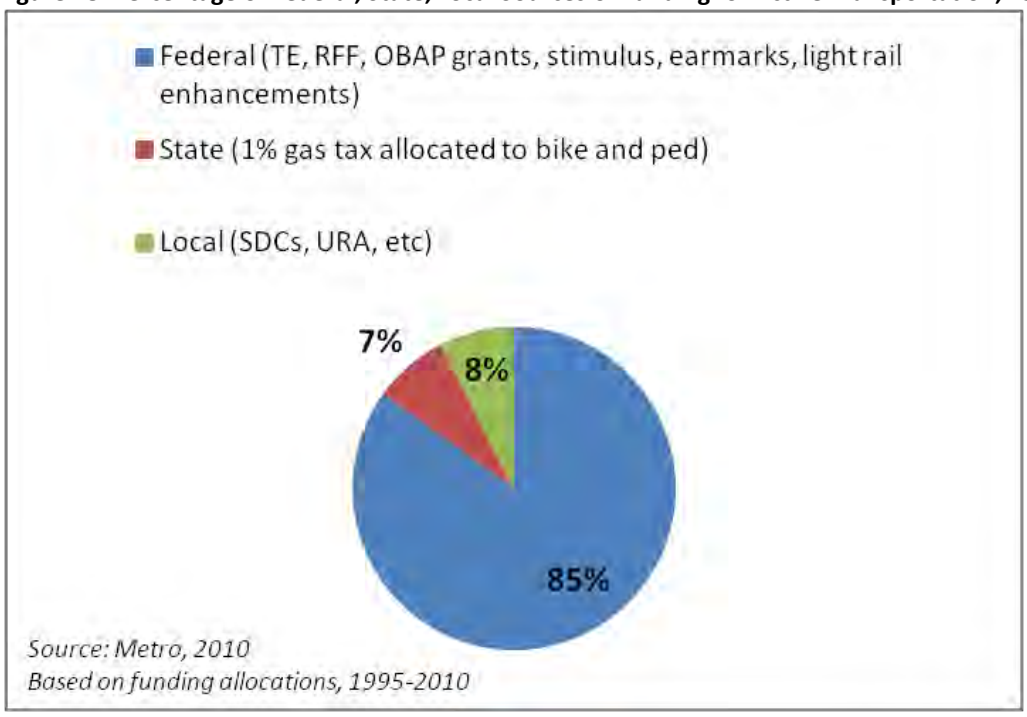
There are many costs associated with developing the active transportation system. Different funding sources may or may not cover these different costs. Piecing together funding to develop a project from concept to construction is one of the most challenging aspects of completing the regional active transportation system. See Appendix 16 for typical costs associated with developing active transportation projects.

Current Funding Sources for Active Transportation

This section describes existing federal, state and local funding and programs that are available for the active transportation system in the Metro region.[194] Two major recent changes to federal and state funding programs drastically alter the "funding landscape" for active transportation: a new federal transportation bill, Map-21, and changes to the way in which ODOT allocates its funding (from both federal and state sources). The implications and outcomes of these changes are not yet clear. The new programs are described below.

[194] Federal funding sources for active transportation are described in Bicycle and Pedestrian Legislation in Title 23 United States Code (U.S.C.) http://www.fhwa.dot.gov/environment/bicycle_pedestrian/legislation/sec217.cfm

Figure 18: Percentage of Federal, State, Local Sources of Funding for Active Transportation, 1995-2010



The majority of active transportation funding in the region is from federal sources.

Revenue for transportation projects and programs are generated by taxes and fees levied by government agencies; typical revenue sources for transportation include taxes on gasoline, property taxes, tolls, vehicle registration fees, and system development charges. Examples include the national tax on gasoline which provides the majority of funding for the federal transportation program and Metro's Natural Areas bond measure which in part funds trail acquisition.

The agency that collects the revenues distributes them through a variety of programs and through other agencies. So, for example, Transportation Alternatives is a new federal program of the federal transportation bill. In Oregon, the Portland region will receive approximately 40% of half of the funds (determined by population), to be allocated by Metro through its Regional Flexible Funds program, and ODOT will receive half, to distribute via the Enhancement program.

Current Regional Agreement Outlined in the 2035 RTP

1. Increase the state vehicle registration fee (or equivalent) $2 per year, or $50 in current year dollars over the 25 year period for regionally significant highway, road and street improvement, including bike and pedestrian retrofits.
2. Establish a local/regional vehicle registration fee (or equivalent) of $1 per year increase, or $25 over the 25 year period in current year dollars for regionally significant road and street improvement, including bike and pedestrian retrofits.
3. Increase local SDCs up to at least the regional average to meet the local needs for growth.

4. Implement local street utility fees (or equivalent) to meet local operations, maintenance and preservation needs.
5. Increase the TriMet payroll tax .2% (or another source an equivalent amount) for increases in bus and rail service and to meet routine capital needs, including bus replacements and expansion

Federal Funding Sources

Section 217 of Title 23 of the U.S. Code calls for the integration of bicycling and walking into the transportation mainstream. A bicycle transportation facility is "a new or improved lane, path, or shoulder for use by bicyclists and a traffic control device, shelter, or parking facility for bicycles." The definition of a pedestrian includes not only a person traveling by foot but also "any mobility impaired person using a wheelchair." 23 USC Section 217 (j)(1)

Map-21 - On June 29, 2012 the U.S. Congress passed a new 27-month, $118 billion federal transportation bill, Moving Ahead for Progress in the 21st Century Act - MAP-21.[195] While some pedestrian and bicycle projects are eligible under several of the programs, the bill reduces the amount of money dedicated to trails, walking and bicycling by nearly 30%, and provides an opt-out provision that states can invoke for up to half of the money in the Transportation Alternatives program[196]. The bill does not provide funding for the Bicycle and Pedestrian Information Center, The Safe Routes to School National Center, or the National Transportation Clearinghouse. The U.S. DOT may be able to fund these programs.

Congress provides MAP-21 funding to the Portland region through the Federal Highway Administration (FHWA) to the Oregon Department of Transportation (ODOT) and then to Metro and the region's local cities and counties. The original source of these funds is primarily the federal gas tax, various truck taxes and funding from the federal general fund. Allocation and distribution of federal funds, other than routine maintenance, are accounted for in the Metropolitan Transportation Improvement Program (MTIP). Some of these revenues are limited by FHWA to a particular purpose, such as highway bridge replacement and rehabilitation. Most of the funds, however, are flexible in that they can be spent on highways, streets, bikeways, sidewalks, transit capital, transportation system management (TSM), transportation demand management (TDM) and air quality mitigation programs.

MAP-21 is composed of the following authorizations and programs. The programs that can fund active transportation in the region are described with additional detail below.

- Congestion Mitigation and Air Quality (CMAQ) Improvement Program *(Transportation Alternatives is part of the CMAQ program; Metro's Regional Flexible Funds are from this program*)
- Transportation Mobility *(some active transportation projects eligible)*
- National Highway Performance Program *(some active transportation projects eligible)*
- Highway Safety Improvement Program *(some active transportation projects eligible)*

[195] Moving Ahead for Progress in the 21st Century Act, http://www.fhwa.dot.gov/map21/summaryinfo.cfm
[196] Bike League of America and Rails to Trails Conservancy analysis of Map 21- http://www.americabikes.org/analysis_of_the_new_transportation_bill_map_21 and http://support.railstotrails.org/site/PageServer?pagename=20120701_Bill_Analysis&AddInterest=1481

- Transportation Infrastructure Finance and Innovation Program (TIFIA) *(active transportation projects may be included in overall projects)*
- National Freight Network Program *(not applicable to active transportation)*
- Projects of National and Regional Significance Program (*pedestrian and bicycle may be elements of larger projects, e.g. Columbia River Crossing)*
- Federal Lands and Tribal Transportation Highways Program *(not applicable for AT in the region)*
- Territorial and Puerto Rico Highways Program *(not applicable for AT in the region)*

In addition to the programs listed above MAP-21 includes:

- Administrative Expenses to administer the FHWA
- Emergency Relief to repair highways and bridges damaged by national disasters
- Highway Bridge and Tunnel Inventory and Inspection Standards *(unclear to what extent pedestrian and bicycle elements are considered in inventory/bridge completeness)*
- Performance Measures and Targets in Map-21 – the bill will track performance
- State and Metropolitan Transportation Planning, to incorporate more comprehensive performance-based approach to decision making. *This could benefit active transportation, which provides many benefits.*

Congestion Mitigation and Air Quality (CMAQ) Improvement Program - These funds are to assist urban areas to achieve or maintain air quality standards for ground-level ozone and carbon monoxide. Typically, CMAQ funds support biking, walking and transit projects, diesel emission reduction and system or demand management programs. The MAP-21 CMAQ program by includes particulate matter as one of the pollutants addressed, and requires a performance plan in large metropolitan areas to ensure that CMAQ funds are being used to improve air quality and congestion in those regions.

Transportation Alternatives Program - The transportation alternatives program is part of the CMAQ program. It merges the three core trail and active transportation programs from the previous transportation bill (SAFE-TEA LU) - Transportation Enhancements (TE), Safe Routes to School (SRTS) and the Regional Trails Program (RTP. The term Transportation Enhancements is replaced by "Transportation Alternatives."

- Eligible activities encompass most of what was allowed in the previous TE program. However, *pedestrian and bicycle safety and educational programs*, transportation museums, scenic or historic easements and scenic or historic highway programs, including tourist and welcome centers, *are no longer eligible*. Beautification is no longer part of the definition, so activities like street art are most likely not eligible, but wildflowers for erosion control still qualify under vegetation management.
- Safe Routes to School is an eligible activity, but the concept is broadened in the definition section to “safe routes for non-drivers.” The eligibilities that correlate to TE and SRTS are forced to compete for severely limited dollars against expensive new eligibilities, including some road projects (in the right-of-way of former Interstate System routes or other divided highways) and an expanded definition of environmental mitigation projects. Pending administrative guidance, SRTS

coordinators are apparently eligible but not required. It is not clear yet what the status of ODOT's SRTS program will be. Infrastructure and non-infrastructure projects are eligible. TE and SRTS activities are also treated as projects on a federal-aid highway, raising process concerns.

- The initial amount of funds available to the newly combined program is reduced overall by nearly 30% from current levels. However, the amount available nationally is based on a percentage (two percent) of the amounts authorized from the Highway Trust Fund (minus the Mass Transit Account), estimated at $808.76 million for fiscal year 2013. If the Trust Fund goes up, so does the funding for Transportation Alternatives. While the Senate bill had tied funding to a flat amount (fiscal year 2009 TE apportionment) that was higher than the final bill but lower than status quo for the three core programs, re-establishing a tie to Trust Fund levels could prove superior to the Senate approach over time.
- Half the funds in Transportation Alternatives are subject to geographic distribution within a state based on population (the Metro region has 39.2% of the state's population so will get that percentage of half of the state's share). Of that half, the portion that goes to larger communities (regions of 200,000+) is sub-allocated to metropolitan planning organizations (Metro) for project selection. Nationally, over 70 percent of the population lives in such communities, so about 35 percent of the overall funds will be sub-allocated. This will vary greatly by state. The portion of the geographic funds that are not sub-allocated is to be awarded through a competitive grant process administered by the state (ODOT) but focused on local needs. The same is true of the half of the Transportation Alternatives pot that is not subject to distribution by population. However, these funds may be subject to transfers by the state as noted above.
- The Transportation Alternatives program includes a dedicated $85 million off the top of the Transportation Alternatives funds for the Recreational Trails Program (RTP), based upon gas taxes paid by motorized trail users. This program supports both non-motorized and motorized trails. States can opt out of this activity.
- The bill greatly increases the ability of states to transfer funds away from these core programs. There are three ways that transfers out of Transportation Alternatives could happen:
    - States may transfer the half of the Transportation Alternatives pot that is not subject to distribution by population to a wide range of other highway programs.
    - Unobligated balances of more than one year of Transportation Alternatives funding may be flexed to the Congestion Mitigation and Air Quality program. This idea came from the Senate bill, but the trigger point for the balance was lowered in conference from 150 percent of reserved funding for the year to 100 percent. The name of the game is 'use it or lose it' unless your state would prefer to leave the money in Transportation Alternatives.
    - In a state of emergency, states can transfer Transportation Alternatives funding to rebuild highways, but it must be repaid if the state receives reimbursement.

Transportation Mobility Program– This program replaces the current Surface Transportation Program, but retains the same structure, goals and flexibility to allow states and metropolitan areas to invest in the projects that fit their unique needs and priorities. It also gives a broad eligibility of surface transportation projects that can be constructed. Activities that previously received dedicated funding in SAFETEA-LU, but

are being consolidated under MAP-21, will be retained as eligible activities under the Transportation Mobility Program.

National Highway Performance Program– This program consolidates existing programs (the Interstate Maintenance, National Highway System, and Highway Bridge programs) to create a single new program. Pedestrian and bicycle projects are eligible for some of the funds within this program. For example, funds from the highway bridge program may be used to widen a bridge to add bicycle facilities and there is a requirement that when replacing a bridge all users must be considered. But,

Highway Safety Improvement Program (HSIP)- This is an existing program. Walking and bicycling are eligible for funding under the Highway Safety Improvement Program. MAP-21 substantially increases the amount of funding for this program. Under HSIP, states must develop and implement a safety plan that identifies highway safety programs and a strategy to address them. ODOT has a highway safety plan, as does Metro.

Transportation Infrastructure Finance and Innovation Program (TIFIA) – The TIFIA program provides direct loans, loan guarantees, and lines of credit to surface transportation projects at favorable terms.

Projects of National and Regional Significance Program –This bill authorizes a program to fund major projects of national and regional significance which meet rigorous criteria and eligibility requirements. This program authorizes for appropriation $1 billion in Fiscal Year 2013.

TIGER Program **-** (Transportation Investment Generating Economic Recovery) Congress dedicated $1.5 billion for TIGER I, $600 million for TIGER II, and $526.944 million for the FY 2011 round of TIGER Grants to fund projects that have a significant impact on the Nation, a region or a metropolitan area. The Portland region has won several TIGER grants that have included active transportation elements.

State Funding Sources

The Oregon Department of Transportation (ODOT) uses *federal highway trust fund* money (described above) for transportation projects in the region. The funds are allocated through the State Transportation Improvement Program (STIP). The OTC and ODOT are changing how STIP is developed. The STIP will no longer be developed as a collection of programs tied to specific pools of funding dedicated to specific transportation modes or specialty programs. Beginning in the summer of 2012, the STIP will be divided into two broad categories: Fix-It and Enhance. Enhance projects are identified as activities that enhance, expand, or improve the transportation system. Fix-It projects are identified as activities that preserve the transportation system.

State revenues for transportation projects are distributed by the Oregon Transportation Commission (OTC), in accordance with state statutes, from the State Highway Trust Fund. The fund primarily derives its revenues from statewide gas taxes, vehicle registration fees, weight mile taxes on trucks.

- *Local Portion of State Highway Trust Fund – 1% for bicycle and pedestrian*. As noted, historically 40 percent of state trust fund revenues are distributed to the cities and counties of Oregon; although there is anticipation that 50 percent of new trust fund revenues would be distributed to cities and

counties by formula. Of the local portion of State Highway Trust Fund a minimum of 1% of the funds must be dedicated to pedestrian and bicycle projects and maintenance.

- *Urban Trail Fund*. Funded by the Highway Trust Fund this one time fund has been used to fund trails serving transportation and recreation function in urban areas.

Local Funding Sources

Many of the cities and counties in the metropolitan region raise other sources of revenue for the operation, maintenance and preservation (OMP) and new construction of the regional transportation system. The amount of revenue applied to the system is controlled by each jurisdiction and is spent within their boundaries. Based on historical trends and expected future growth, Metro has forecast how much revenue is expected to support the regionally significant transportation system from the following local revenue sources.

- *Local Gas Tax*. Multnomah County levies a three-cent per gallon gas tax and Washington County levies a one-cent per gallon gas tax. Both counties share these revenues with the cities within their boundaries. Recently gas taxes have been approved for the cities of Milwaukie and Tigard. These revenues may be used for road maintenance and road expansion.
- *Payroll Tax.* TriMet levies a payroll tax of 0.6176 percent on all employers in its district (except federal employees). Raising TriMet's payroll rate requires action by the state legislature. The most recent increase was in 2004, rising by .0001 each year, until reaching .007218 in 2014. In May 2009, the Oregon Legislature passed Senate Bill 34 that authorizes TriMet to increase the payroll tax up to 0.8 percent once the economy recovers. SMART is funded through a 0.3 percent payroll tax in the Wilsonville area. This revenue is used to support operations and maintenance of the transit systems.
- *TriMet Passenger Fares and Other Revenues.* TriMet passenger fare revenues also support operation of the transit system. SMART is a fareless transit system except for two routes operating to Salem and downtown Portland.
- *Street and Stormwater Utility Fee.* Wood Village approved a transportation utility fee to supplement State Highway Funds.

Development-Based Sources- Development-based sources of transportation and trails funding are fees collected by local governments based on the development of or use of land. The revenues are collected by the cities and counties in the region for use within their jurisdictions. These fees provide funding for transportation and other public investments as deemed appropriate by the local government that collects the fees and allocates the revenue. In some cases, the projects receiving these funds are transportation projects of regional significance and, therefore, a portion of these revenues estimated to be spent on regional projects is assumed in this forecast based on historical trends. The funds can also be used to provide matching funds for state and federal grants.

- Transportation system development charges (SDCs) levied on new development
- Traffic impact fees (TIFs) on commercial properties
- Park system development charges

- Urban renewal funding in designated districts
- Developer contributions
- Development extractions, such as frontage improvements including trails

Special Funds and Levies - A final source of transportation funding for the Metro region is special funds and levies. This category includes:

- *Property taxes.* General levies such as Washington County's Major Streets Transportation Improvement Program (MSTIP), which are approved by popular election. A portion of these funds is used for active transportation projects, including trails.
- *Bond Measures.* Tualatin Hills Park and Recreation District and Metro have levied bonds that have been used to acquire land for trail corridors and to construct trails.
- *Local improvement districts (LIDs).* Special districts, such as the Lloyd District in the City of Portland, where a group of commercial property owners agree to provide money, in addition to their regular taxes, for public improvements and services (including transportation projects) within the district. In the Portland Central Business District, a local improvement district contributed to construction of the Portland Streetcar project.
- *Vehicle parking fees*. This source generates revenues from the City of Portland public parking garages and on-street parking meters. These revenues will contribute to construction of the Portland Streetcar project.
- *Street Utility Fees.* The cities of Tualatin, Lake Oswego, Wilsonville, Hillsboro and Milwaukie have adopted street maintenance fees that are included in the local sewer and water bill. The fees are based upon the cost to maintain the street system and are used for maintenance activities within each respective jurisdiction.
- *Washington County Urban Road Maintenance District.* The County collects a $0.25 per $1,000 of assessed valuation fee in urban unincorporated Washington County for road maintenance within those areas.
- *Washington County Major Streets Transportation Improvement Program (MSTIP) Opportunity Fund.* The fund was recently created by the Board of County Commissioners to leverage other sources of funding to pay for non-auto transportation projects that would be likely to significantly reduce trips by auto. The fund has $5 million to be allocated over five years

Potential New Funding Sources

Numerous activities relating to transportation funding are going on throughout the region that will impact future funding for active transportation. Some of the efforts are driven by project-related activities as described in the first column below. In addition, broader, more comprehensive efforts are also being pursued as described in the second column below.

Project Based Activities that include funding implications	Finance Based Activities
• TIGER applications • Full Funding Grant Agreement for Portland-Milwaukie LRT • CRC TIFIA application • CRC OR/WA Legislative Oversight Committees • CRC OR/WA funding requests (2013) • East Metro Connections Plan • Southwest Corridor Study • Governor's 10-year Energy Plan • Active Transportation Plan • BRT application to start Alternatives Analysis • Tualatin/Sherwood/Wilsonville industrial access (SW 124th/Tonquin)	• Federal transportation bill – Map-21 • ODT Enhance and Fix-it programs • State non-Road Funding Task Force • Community Investment Initiative Transportation Task Force • Funding for jurisdictional transfers of District Highways • TriMet budget balancing (service cuts and labor cost) • Limit on local gas taxes sunsets Jan.2, 2014 • Limit on local VRF sunsets July 1, 2013 • Washington County MSTIP update • FY 2014-2018 MTIP process – starts Feb. 2013

Funding Practices and Challenges

Challenges:

- Operations and maintenance. The RTP (Chapter 3) includes information on operations and maintenance costs for roadways and transit.
- Below is information on O&M for bike, ped trails.)
- Matching needs with funding sources;
- Funding to support pipeline of projects
- Sidewalk improvements trigger stormwater drainage increase

Practices:

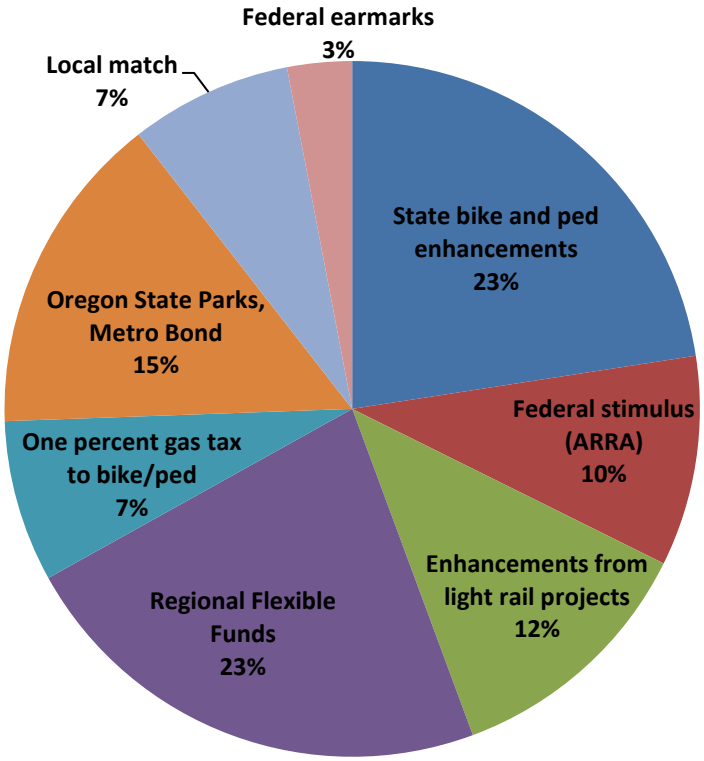
- Bundling bike/ped projects with roadway projects. this has positive implications (Street projects are multi-modal and planned and implemented as complete streets) and negative implications (Pedestrian or bicycle improvements made now deliver substantial benefits immediately, even if long-term future plans may include roadway widening that could require rebuilding some of the improvements. Stand-alone pedestrian and bicycling projects are cost-effective and provide substantial benefits in the near term, and roadway improvements are not necessarily driven by pedestrian and bicycle needs)

Historical Funding Levels for Active Transportation

Investments in active transportation have increased since the early 1990s. Nationally, in 1990, $6 million in federal funds spent on bicycling and walking projects. Pedestrian and bicycle infrastructure received $1.04 billion in 2010, which is 2% of the federal surface transportation budget nationwide.[197]

Federal and state capital transportation investments represent an important source of funding for active transportation. Refer to Appendix 17. From 1995 -2010 the region invested approximately $10 million/year in stand-alone pedestrian, bicycle and trails, or 3% of all federal and state capital transportation funds.

Figure 19: Breakdown of Average Annual Funding for Active Transportation in the Portland Region, 1995-2010[198]

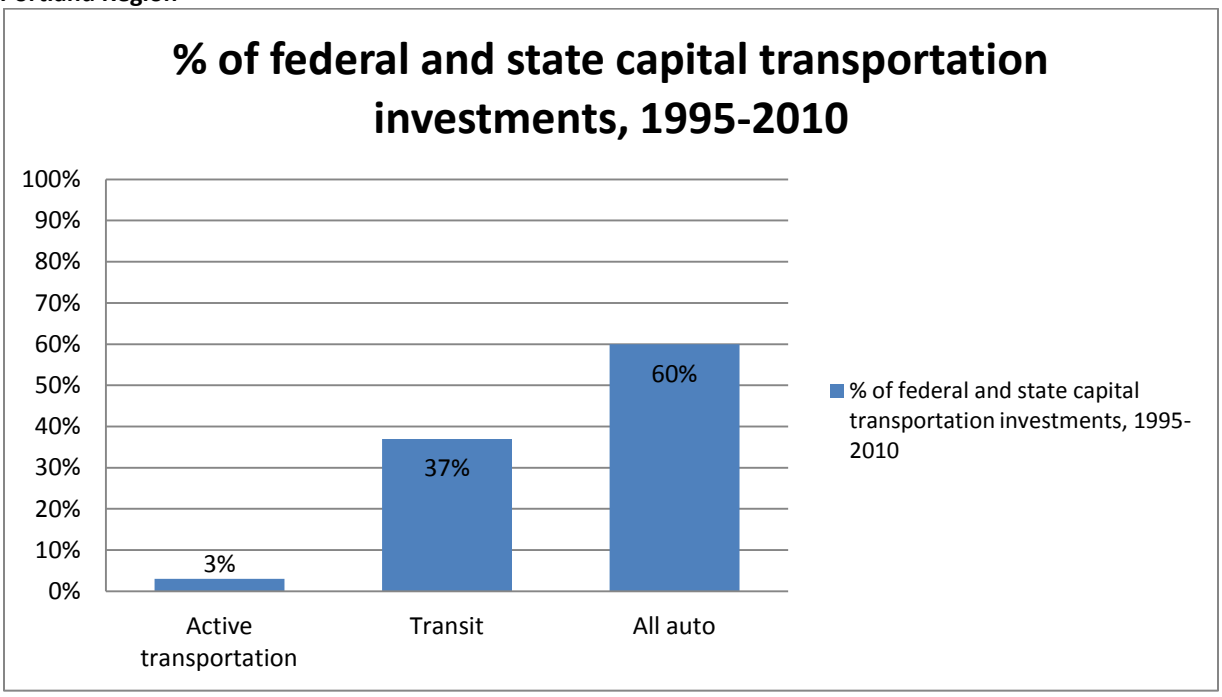


Source: Metro, 2010
Based on funding allocations 1995-2010

[197] Booz Allen Hamilton (July 2011). *Transportation and Health: Policy Interventions for Safer, Healthier People and Communities*.

[198] Not captured in the graph, ODOT allocates Safe Routes to School funding, provided through the Highway Trust Fund. Between 2007-2011 the Portland region received approximately $3.4 million in SRTS funding,

Figure 20: Average Percentage of Federal and State Capital Transportation Investments by Mode, 1995-2010, Portland Region



Source:Metro 2010, based on average federal and state capital transportation investments from 1995-2010 in capital (modernization) programs. ODOT safety, preservation, and bridge programs are not included. Transit operations and maintenance are not included. Local and regional revenue sources are not included.

CHAPTER 10: DATA NEEDS

Data on use, demand and facilities for active transportation are needed to track trends and performance and analyze barriers and opportunities. As the saying goes "what isn't counted, doesn't count". Knowing how many people are choosing to walk and bike can tell us something about that place. For example, observing dramatic increases in active transportation, such as the City of Portland's increase in bicycling from less than 1.2% to 6% between 1990 and 2006[199], gives an indication of what policies and investments create environments that make it easier for people to walk and bike.

With incomplete data or tools it is difficult to demonstrate the needs and opportunities. For example, census data is the most common data source for tracking levels of bicycling and walking. However, the data is collected only for work related travel and for bicycling only for cities with populations over 65,000. This data source leaves out a whole host of active trips – going to the grocery store, school, shopping, visiting friends, etc.

Data Needs

To accurately measure active transportation the following type of data are needed.

Types of Pedestrian and Bicycle Data	Currently available for regional analysis
Counts of pedestrians and bicycle activity; modeled activity levels	No
Width of sidewalk	No
Presence of sidewalk throughout	Yes
Width of landscaped buffer between walkway/bikeway and motorized traffic (planter, trees, etc)	No
# of driveways within one mile	No
Presence and type of bicycle facility, e.g. lane, cycle track	Yes - partial
On-street parking – Y/N	No
Cost of different design types	Yes
Presence of streetlight throughout	No
Location of crossings, including midblock crossings	No
Location of crossing treatments, e.g. signal, ped island	No
85th percentile traffic speed	No

[199] The City of Portland tracks bicycle use in the city in a variety of ways. The U.S. Census numbers see a rise from 2% to 8% between 1996 and 2006, bikes as a percentage of all vehicles on 4 central city bicycle friendly bridges saw bike use rise from just over 2% in 1991 to just under 14% in 2006; the City Auditor's office saw an increase of 12%-18% from 2004 to 2006 of bicycle use as primary and secondary mode, and from 2%-8% 1997-2006 as the primary mode.

Design speed	No
Posted speed limit	Yes – partial, on arterials
Type of development oriented to sidewalk	No
# of travel lanes	Yes - partial
Presence of two-way center lane	No
Width of outside travel lane	No
Presence/width of median (must be >6 ft. and separate two directions of traffic to be considered a median). Is it traffic separating, concrete, raised, planted	No
Average daily traffic (ADT)	Yes, on arterials
Density of intersections and signalized crossings	Yes – crossings on arterials
Location of bridges	Yes
Trails	Yes
Informal paths and accessways	No
Stairs, including bike gutters	Yes
Curb cuts/ADA	No
Safety information (e.g. crime rate, incidences on trails)	No
Crash data (location, contributing factors, vehicle movement, etc)	Yes
Trip purpose	Yes
Trip length	Yes
Tree canopy	Yes
Demographic data	Yes
Land use and zoning	Yes
Funded projects	Yes
Location of projects	Yes

APPENDICES

Appendix 1: Maps

A. Oregon Environmental Public Health Tracking maps: Age-adjusted mean BMI by block groups, Portland Oregon DMV records, 2006-2010, for the region compared to the rest of the state, for City of Portland, and for Portland inner SE neighborhoods
B. Percent Kaiser Adult Members with Co-Morbidity in the Portland Vancouver Metropolitan Area, April 2007
C. Percent Kaiser Adult Members with Diabetes in the Portland Vancouver Metropolitan Area, April 2007
D. Percent Kaiser Adult Members with Obesity in the Portland Vancouver Metropolitan Area, April 2007
E. Portland Air Toxics Solutions, 2017 modeling results: On-road vehicle emissions and total risk for the 4-county area
F. RTP Regional Pedestrian Network
G. RTP Regional Bicycle Network
H. RTP Regional Trails and Greenways
I. RTP Regional Transit Network
J. RTP Regional Design Classifications
K. RTP Bridges – Facility Type
L. Overlap of RTP Regional Pedestrian and Freight Network – highlighted areas indicate overlap
M. Overlap of RTP Regional Bicycle and Freight Network – highlighted areas indicate overlap
N. ORS 366. 215 Freight Routes, highlighted areas indicate overlap with Regional Pedestrian and Bicycle Networks
O. RTP Corridor Investments (four maps total)
P. Completed Miles and Gaps: Regional Bicycle and Pedestrian Networks **(to be added)**
Q. 2012 Regional Sidewalk Inventory, Metro
R. Equity Maps are found in Appendix 24, 2014-15 Metro RFFA Transportation Equity Analysis)
S. Safety and Crash related Maps are in Appendix 22, Metro State of Safety Report

Appendix 2: Pedestrian and Bicycle Commute Mode Share, Portland Region

Appendix 3: CDC Recommendations for Improving Health through Transportation Policy

Appendix 4: U.S. DOT Policy Statement on Bicycle/ Pedestrian Regulations and Recommendations

Appendix 5: Active Transportation Policy Framework

Appendix 6: Additional Regional Plans and Goals Relating to the ATP

Appendix 7: Complete Streets Policy Report Card, Willamette Pedestrian Coalition

Appendix 8: Best Practices Checklist for Bicycle and Pedestrian Plans

Appendix 9: Trails with an RTP Transportation Function

Appendix 10: List of Regional 2040Pedestrian Corridors and Districts

Appendix 11: Cycle Zone Names and Corresponding Numbers

Appendix 12: Cycle Zone Analysis Summary Table

Appendix 13: Current Prioritization Criteria

Appendix 14: Principles for Active Transportation

Appendix 15: Bicycle/Pedestrian Funding Programs and Eligibility

Appendix 16: Typical Project Costs

Appendix 17: Federal and State Capital Transportation Investments, Portland Region, 1995-2010

Appendix 18: Data Sources

Appendix 19: Sustainable Transportation Terminology

Appendix 20: Tools and Resources

Appendix 21: 2012 Regional Sidewalk Inventory Methodology

Appendix 22: Metro State of Safety Report, April 2012

Appendix 23: Regional Transportation Functional Plan (RTFP)

Appendix 24: 2014-15 Metro RFFA Transportation Equity Analysis

Appendix 25: Glossary of Terms

Appendix is available at www.oregonmetro.gov/activetransport