Kayak Point Park, Snohomish County

CHAPTER 3

A Sustainable Environment

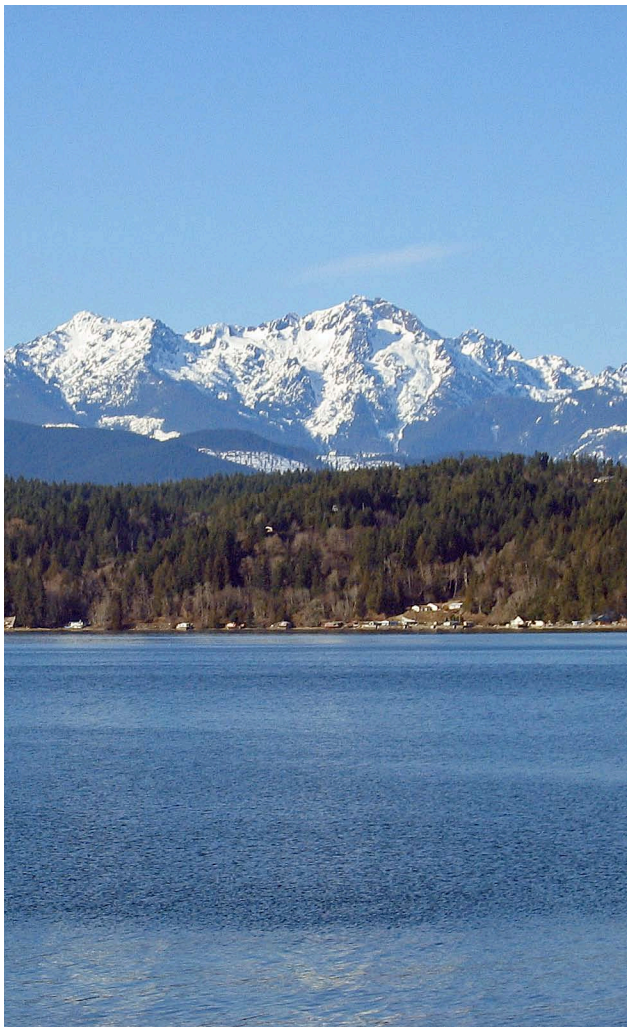
The geographic features that uniquely define central Puget Sound, located between the Cascade and Olympic mountain ranges and bisected by its namesake saltwater estuary, create an outstanding natural setting and support a richly diverse ecology. The region's forests, wetlands, maritime waterways and fisheries are not only natural economic resources but also attractions for people whose daily lives are closely linked to vistas and access to mountains, beaches, rivers and lakes. The region's environment serves as a key foundation for growing clusters of the regional economy, making nurturing and sustaining the environment an economic priority vital to sustaining a high quality of life.

The region's topography also limits lands suitable for development and imposes complex and often expensive infrastructure requirements. Cities and towns are reshaping aging infrastructure to transform urban environments into more livable places, and are building new centers for additional job and employment growth.

This complex and rich environment shapes Transportation 2040. The plan is designed to keep the region's air and water healthy, sustain the region's overall ecology, assist in coordinated efforts of the Puget Sound Partnership to protect and restore the health of the region's watersheds, and lead in the development of emerging federal and state initiatives to reduce overall greenhouse gas emissions to address global climate change.

Transportation 2040 commits to supporting a heightened awareness of the relationship between transportation and the environment, consistent with the regional environmental sustainability framework established by VISION 2040. The plan has been designed with a central focus of reducing the potential environmental impacts associated with both transportation infrastructure and operation. See Appendix C, MPP-En-2 and 3, MPP-En-8 through 15, MPP-En-17 through MPP-En-19, MPP-En-23, MPP-DP-27, and MPP-T-28.

Squire Creek Park, Snohomish County



Olympic Mountains and Hood Canal

Environmental Review

Alternative approaches to developing a regional transportation system were evaluated in the ***Environmental Impact Statement for Transportation 2040*** *(EIS). Preparation of the EIS included extensive agency coordination and public comment over many months, and has been guided by PSRC's Transportation Policy Board and Growth Management Policy Board. The Transportation 2040 Environmental Impact Statement contained information that allowed regional decision-makers to craft a transportation plan that addresses critical regional policy objectives, including improved air quality, reduced greenhouse gases, improved water quality, public health and mobility, and support for the VISION 2040 Regional Growth Strategy. The EIS identifies specific potential measures to mitigate impacts associated with the implementation of Transportation 2040. For full documentation of the environmental analysis supporting Transportation 2040, see www.psrc.org.*

Maintain and Improve Air Quality

The region has made great strides in improving air quality over the past several decades, even with growth in both population and vehicle miles traveled. However, emissions of certain pollutants have been on the rise in recent years, and there are new and continuing challenges ahead.

To protect human health and the environment, the Environmental Protection Agency has set National Ambient Air Quality Standards (NAAQS) for six "criteria" pollutants under the Clean Air Act. These pollutants are ground-level ozone, carbon monoxide, particle pollution (or particulate matter), sulfur oxides, nitrogen oxides, and lead. Levels of many of these pollutants have been declining in our region, but emissions of fine particulates and elements that form ground-level ozone are still a concern. While emissions of these pollutants come from a variety of sources, motor vehicles account for a significant share in the central Puget Sound region.

TRANSPORTATION CONFORMITY

Air quality is monitored and areas are designated according to whether or not they meet the air quality standards for each pollutant. Geographic regions that meet the standards are referred to as attainment areas; areas that do not meet the standards are designated nonattainment to that standard. Once designated nonattainment, the Clean Air Act requires the preparation of an attainment plan to demonstrate how an area will thereafter meet and maintain established standards. Once a nonattainment area has subsequently met the standards for a period of time, the area may be redesignated as a maintenance area. To demonstrate that the standards will continue to be met in the future, a maintenance plan is required for these areas.

Parts of the region are designated as maintenance areas for particulate matter less than 10 microns in diameter (PM_{10}) and carbon monoxide (CO). Under federal and state air quality statutes and regulations, there are special requirements in maintenance areas to ensure that proposed transportation activities — plans, programs and projects — do not

cause new, or contribute to existing, air quality problems. Compliance with these statutes and regulations (referred to as conformity) requires analyses that demonstrate compliance with existing air quality control plans and programs. A positive finding of conformity is required by the federal Clean Air Act and its amendments, the Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) and the Clean Air Washington Act. Positive conformity findings allow the region to proceed with implementation of transportation projects in a timely manner. In the absence of a positive conformity finding, only those projects which are exempt (such as safety or transit projects) will be allowed to proceed using federal transportation funds.

As shown in Figure 17, the projects and programs in Transportation 2040 are well within the established limits for the two pollutants for which conformity currently applies in the region, CO and PM_{10}. The formal conformity analysis and finding for Transportation 2040 is included as Appendix E.

FIGURE 17. Transportation Conformity Analysis Summary

	Motor Vehicle Emissions Budget*	Transportation 2040
CO (daily tons)	2,512.0	1,188.5
PM_{10} (daily pounds)		
Kent	231.5	84.4
Duwamish	844.4	287.8
Tacoma	460.8	240.1

* From the Central Puget Sound Region Maintenance Plans for each pollutant.

While the region is currently designated as being in attainment with the federal standards for the other criteria pollutants, the South Tacoma (Wapato Hills/Puyallup River Valley) area has violated the fine particulate matter standard ($PM_{2.5}$) and was designated nonattainment in December 2009. The Washington State Department of Ecology, in cooperation with the Puget Sound Clean Air Agency, is developing an attainment plan to demonstrate how the area will come back into compliance with the standard. The primary source of fine particulate matter emissions in this area is wintertime wood burning activities, but mobile sources also represent a portion of the emissions. The region is also facing a potential redesignation to the newly proposed ground-level ozone standard. In recent years the region had exceeded the existing standard, but had not yet officially violated the standard. On December 21, 2009, EPA released a proposed new ground-level ozone standard, which is more stringent than the existing standard. The new standard is expected to be finalized by August 2010, with area designations made by August 2011. Given the monitoring data in recent years, the region may be at risk of being designated nonattainment to the new standard.

The region is committed to maintaining the air quality standards in our region by continuing to reduce emissions of air pollutants through the use of cleaner fuels and vehicles, increasing alternatives to driving alone, and land use strategies. The region continues to monitor these air quality issues, and Transportation 2040 has been crafted to maintain compliance with all air quality and transportation conformity regulations.

Reduce Greenhouse Gas Emissions

Climate change has become a significant issue at the gobal, national, state, regional and local level. Washington state has taken numerous steps to begin addressing climate change, including the passage of legislation, which established goals for the reduction of greenhouse gases, and which sets benchmarks for the reduction of vehicle miles traveled (VMT) per capita (RCW 70.235.020, RCW 47.01.440).

Because the consequences of climate change are serious, the central Puget Sound region has committed to take aggressive action to reduce its transportation-related emissions. Throughout the process of creating Transportation 2040, climate change has been identified as one of the key issues needing to be addressed in the plan.

VISION 2040 calls for the region to reduce its overall production of harmful elements that contribute to climate change, and commits the region to comply with state directives. An evaluation of greenhouse gas emissions and vehicle miles traveled per capita was conducted in the process to develop Transportation 2040. The results of this analysis and additional research have produced a four-part greenhouse gas strategy that is a central part of Transportation 2040.

Climate Change

Climate change is defined as a significant change in the earth's long-term weather patterns. Increased levels of greenhouse gases in the atmosphere trap heat, causing the earth's surface to warm to a greater extent than usual; as temperatures rise, the climate changes. The burning of fossil fuels is a significant contributor to greenhouse gases.

Washington State Legislation

RCW 70.235.020 established the following limits for state greenhouse gas emissions:

- *To 1990 levels by 2020*
- *To 25 percent below 1990 levels by 2035*
- *To 50 percent below 1990 levels by 2050*

In addition, two key pieces of legislation were subsequently passed:

- *RCW 47.01.440 establishes statewide annual per capita reduction benchmarks for vehicle miles traveled. The legislation established the forecast baseline of statewide vehicle miles traveled of 75 billion by the year 2020, exempting trucks over 10,000 pounds.*
  - *By 2020, decrease by 18 percent*
  - *By 2035, decrease by 30 percent*
  - *By 2050, decrease by 50 percent*
- *RCW 36.70A.580 and 5801 aim to address the impacts of climate change through the Growth Management Act, and direct the Department of Commerce to work with the Department of Transportation to reduce vehicle miles traveled.*

In 2009, the Governor signed Executive Order 09-05, which directs the state to continue work on a variety of important climate change activities, including working with the federal government on a climate program, reducing greenhouse gas emissions from stationary sources, reducing greenhouse gas emissions from transportation (including recommendations on vehicle miles traveled benchmarks and working with organizations such as PSRC), and adapting and preparing for unavoidable impacts.

Regional Policies

VISION 2040 established a wide variety of specific regional greenhouse gas reduction goals, policies, and actions committing the Puget Sound region to meet all state and federal targets for greenhouse gas emissions reductions. See Appendix C, MPP-En-3, MPP-En-16 through MPP-En-25, MPP-DP-45, MPP-Ec-15, MPP-T-5, MPP-T-6, MPP-T-22, MPP-T-23, MPP-T-25, MPP-PS-1, MPP-PS-12 and MPP-PS-13. See also En-Action-6, DP-Action-9 and T-Action-14.

In the United States, the transportation sector contributes 28 percent of all greenhouse gas emissions. In Washington state, transportation is responsible for 45 percent of greenhouse gas emissions, and in the Puget Sound region, the figure increases to approximately 50 percent. This difference among sectors can be explained in part due to our heavy use of hydropower for electricity, as opposed to coal and other fossil fuels in the rest of the country.

Within the transportation sector, passenger vehicles are responsible for roughly half of all emissions. While motor gasoline is the largest contributor to emissions among fuel types, the shares from diesel and jet fuel have grown over the last several decades. Reducing emissions from the transportation sector involves three components: (1) the type of fuel used, (2) travel behavior (especially as it relates to vehicle miles traveled), and (3) energy efficiency. However, analyses show that the growth in vehicle miles traveled due to population growth over the next four decades will outpace the improvements from the recently adopted fuel economy standards (a 35.5 mile per gallon fleet average by 2016). Even with more aggressive fuel economy improvements, the established greenhouse emission reduction goals will not be reached without some reduction in overall travel.

FOUR-PART GREENHOUSE GAS REDUCTION STRATEGY

The analysis for Transportation 2040 included research into the potential impacts to emissions from various levels of pricing, system management and demand management strategies, as well as strategic expansion of all modes including roadways, transit, and bicycle and pedestrian facilities.

The realization that it will require a variety of strategies and tools to effectively reduce emissions from the transportation sector led to the development of a four-part greenhouse gas strategy:

- *Land Use:* Build upon the VISION 2040 Regional Growth Strategy to further the goal of providing an improved jobs-housing balance, and pursue additional refinements through strategies such as transit-oriented development.
- *User Fees:* Recognize the critical role of price in reducing vehicle miles traveled and emissions, transition the region over time to a user fee/roadway pricing system.

- *Choices:* Provide travelers options to single-occupant vehicles, and continue to research the costs and benefits of various strategies.
- *Technology:* Recognize that improvements to vehicles and fuels will play a crucial role in reducing emissions. PSRC has undertaken research with the Department of Ecology on the potential technological advances that may be likely in our region by the year 2040.

Transportation 2040 includes programs and investments that encompass all four of these strategies, including land use actions, roadway pricing, providing more transportation choices, and vehicle and fuel technology. Transportation 2040 supports the following specific actions:

Land Use. In order to achieve the greenhouse gas reduction benefit from land use, the region must achieve a growth pattern similar to the one adopted in the VISION 2040 Regional Growth Strategy. Analysis conducted for the development of VISION 2040 indicated that the increased shift to a more compact and concentrated growth pattern, and a better jobs/housing balance within the region's four counties, will reduce greenhouse gas emissions by about 6 percent from the trend.[3] A compact development pattern is a foundation of the region's greenhouse gas reduction strategy.

Pricing and Choices. Transportation 2040 embraces pricing strategies that would be phased in over the life of the plan, with the effect of reducing vehicle travel and associated greenhouse gas emissions. These pricing approaches, supported by the full plan's peak period 132 percent increase in local transit service (108 percent increase off-peak), the extension of regional light rail, and investments in walking and biking facilities, together result in a 9 percent reduction in regional greenhouse gas emissions from the trend.

Technology. Transportation 2040 makes assumptions about the market penetration of electric and other alternative fuel vehicles, less carbon-intensive fuels, and improved fuel efficiency of the overall passenger and freight fleets. In collaboration with the Washington State Department of Ecology, PSRC developed two technology scenarios: a "likely" scenario, which is probable given current trends and conservative assumptions about fuel prices and other incentives to change technology, and an "aggressive" scenario, which assumes a higher degree of concerted effort to transition the vehicle fleet to a more energy efficient approach. These scenarios, based on extensive national research and consultation with the Environmental Protection Agency, the Washington State Department of Transportation and the Puget Sound Clean Air Agency, are identified in Figure 17 below. The "likely" scenario results in an additional 25 percent reduction of greenhouse gas emissions, and the "aggressive" scenario results in an additional 43 percent reduction in emissions. Appendix L provides additional details on the technology assumptions contained in the Four-Part Greenhouse Gas Strategy.

Nissan LEAF electric vehicle

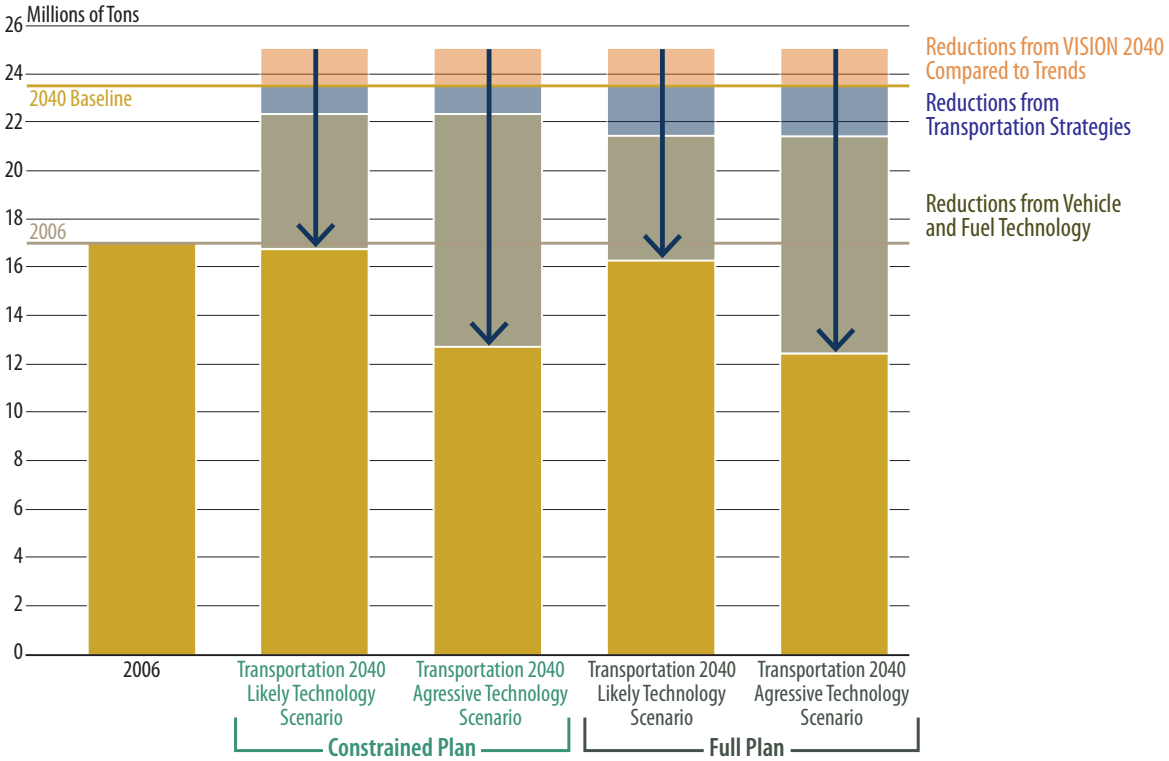
[3] Value obtained from the analyses conducted for the VISION 2040 Environmental Impact Statement. The alternatives analysis for VISION 2040 evaluated various growth patterns compared to the historic trend, using the investments contained in the existing long-range transportation plan, *Destination 2030*.

OUTCOMES

The results of the investments and strategies contained in Transportation 2040 are illustrated in Figure 18. The combination of the four-part strategy results in a range of emissions reductions (between 5 percent likely technology scenario and 28 percent aggressive technology scenario) below 2006 modeled emissions.[4] As compared to the 2040 Baseline trend, the preferred alternative results in emissions reductions between 31 percent and 48 percent.

PSRC's 2010 Action Strategy will include a strategy to work with WSDOT and local and regional jurisdictions by December 2011 to improve analysis methodologies and identify additional strategies to reduce greenhouse gas emissions, when WSDOT is required to report to the Governor on the status of regional transportation plans. When state targets are set for the transportation sector and regions, PSRC should revisit its greenhouse gas reduction strategy.

FIGURE 18. Greenhouse Gas Emissions (CO2 Emissions in Millions of Tons)



ADAPTATION

In addition to reducing the impacts from the transportation sector on climate change, it is also important for the region to address the impacts from climate change. This concept is referred to as "adaptation to climate change." Beyond transportation, a wide variety of impacts from long-term climate change may be expected in Washington state and the Puget Sound region. These include rising sea levels, increased flooding, and an increase in the frequency and severity of storms and other weather events, droughts, wildfires, impacts to water availability and quality, and impacts to crops. Specific to transportation, impacts could include the accelerated deterioration of roadways, issues related to flooding and increased stormwater, bridge damage, rail buckling, and reduced water levels in some water bodies that could affect the passage of ships and barges.

This is an emerging area of study, but the state and region are being proactive in planning for potential impacts on transportation. These activities include the state's work called for in Executive Order 09-05 and RCW 43.21M, which

[4] The Washington State greenhouse gas emissions reduction goals are set to a baseline 1990 level; PSRC does not at this time have a 1990 model year, so 2006 is used as a surrogate for comparison. The approximate increase in emissions from 1990 to 2006 are incorporated into findings.

direct the departments of Ecology, Health, Agriculture, Commerce, Fish and Wildlife, Natural Resources and Transportation to work with scientific experts and stakeholders to develop an integrated climate change strategy by December 2011. King County, in collaboration with the University of Washington and the International Council for Local Environmental Initiatives (ICLEI)-Local Governments for Sustainability, released "Preparing for Climate Change: A Guidebook for Local, Regional and State Governments." The King County Wastewater Division has also conducted an analysis of vulnerability of wastewater facilities to sea level rise.

PSRC has evaluated these potential impacts to transportation infrastructure in the Puget Sound region, including the port areas which would be most affected by rising sea levels. Appendix L contains a white paper on adaptation to climate change for transportation planning in the Puget Sound region.

Improve Water Quality

Maintaining and improving water quality is a regional priority. See Appendix C, MPP-En-13 and 14. The transportation system is a significant source of pollutants that affect water quality. The Puget Sound Partnership Action Agenda identified several sources of water pollution from the transportation system, including land-based vehicles, planes, and recreational and commercial ships. Roads and rail systems contribute pollutants from impervious road surfaces, brake pads, oil leaks, vehicle emissions, and maintenance of rights of way. Aviation contributes emissions, de-icing compounds, and oil/fuel leaks, and ships contribute anti-fouling compounds, oil/fuel leaks, personal care products, pathogens, sewage, and ballast water. Vehicles — including buses, trains, and ferries — are a source of greenhouse gas emissions and particulates. Although these initially enter the air, they can also settle in and contaminate surface waters.

In developing Transportation 2040, the potential impacts of different transportation systems to water quality were evaluated. A key finding was that as the region implements the system envisioned in Transportation 2040, it must do so in a way that avoids and mitigates harm to the region's precious water resources.

Transportation 2040 recommends that mitigation of transportation-related impacts to water quality can be accomplished in a number of ways:

Cleaner Transportation. Reducing vehicle miles traveled decreases the amount of pollutants generated by vehicles. The use of innovative technologies can also help control potential water pollution at the source, as could programs that promote cleaner fuels and vehicles. A combination of incentives and disincentives could be used to promote clean vehicles, such as higher taxes on dirty fuels or tax credits for clean fuels and vehicles. Transportation programs that are designed to address issues such as congestion, emissions, fuel use, or waste management can indirectly benefit water quality through reduction of pollutants entering the environment.

Treatment. The treatment and detention of stormwater runoff from operating the transportation system will be particularly important, due to increased new impervious surfaces associated with preservation of existing facilities and new capacity. Potential stormwater impacts should be mitigated by designs that minimize the amount of impervious surface and use low-impact materials such as pervious pavers to manage runoff volumes. Collection, treatment and reuse of stormwater and other runoff is recommended to maximize the use of scarce water resources. Other approaches include use of natural systems such as wetlands to manage water flow, and measures to restore buffers and natural channels for streams alongside transportation facilities.

Retrofit. Many existing facilities lack modern systems for water quantity or quality management. As projects replace, improve, or extend existing facilities, an opportunity exists to improve their environmental performance compared to today. For example, culverts and other drainage facilities associated with transportation infrastructure can be designed and operated to facilitate fish passage. Transportation 2040 supports the opportunity for the region to create innovative, low-impact, environmentally friendly transportation infrastructure, and to address and correct the harm we have already done.

Improve and Promote Health

Health and well-being factor prominently in VISION 2040. Multicounty planning policies call for improving opportunities for walking and biking, as well as for addressing health in regional and local planning and decision-making processes (MPP-DP-43 and MPP-DP-44). The region's transportation system is to be developed in a manner that minimizes impacts to human health (MPP-T-7). Transportation 2040 addresses public health from several perspectives, the most common of which are impacts to air and water quality and promotion of physical activity. As described above, Transportation 2040 has been designed to minimize impacts to air and water quality, which will yield positive health benefits.

Public health concerns have traditionally focused on preventing the spread of disease, protecting people from unsafe water, polluted air, hazardous waste, and helping people live healthy lives. In recent years, however, public health agencies, local land use planners, and transportation staff have begun to focus increased attention on the health implications of the built environment and the way people travel. Research findings from the Centers for Disease Control (CDC) link the country's obesity epidemic in part to both community design and travel choices. Physical inactivity is a growing health problem in the United States, contributing not only to obesity, but also to chronic disease, osteoporosis, depression, and premature death. Several CDC studies indicate that communities that feature a mix of land uses, are connected by pedestrian and bicycle infrastructure and transit, and rely less on driving are more conducive to physical activity.

Transportation 2040 promotes programs and investments that provide alternatives to driving, especially to improve the walkability and bikability of the region's communities. These alternatives can result in mobility choices that are healthier and safer. The region's built environment, including the design of communities, the completeness of sidewalk networks, and the provision of open space, affects not only physical well-being, but also mental well-being. Transportation 2040 holds that the region should take a "complete streets" approach to operating transportation rights-of-way. This involves making attractive, safe space for all system users, especially in dense urban areas. See Appendix C, MPP-T-14 and MPP-T-15.

OUTCOMES

Transportation 2040 supports the reintegration of public health into planning and implementation of transportation projects as a way to ensure the region's communities are more sustainable and truly provide opportunities for improved quality of life.

Projects and programs were selected to reduce emissions, minimize impacts to water bodies, emphasize investment in trails and walkways, complete local street networks, and minimize trip distances and congestion. As illustrated in Figure 19, modeling of Transportation 2040 showed increases in walk and bike trips at rates significantly higher than population growth, providing conditions that encourage physical activity.

FIGURE 19. Bike and Walk Activity