Chapter 7
Environmental Considerations

Environmental Considerations

This chapter highlights some of the central environmental issues raised by projects included in the Regional Transportation Plan (RTP). Consideration of the environmental impacts of the RTP expands well beyond the discussion in this chapter. Each project will undergo rigorous environmental analysis prior to construction.

It is helpful to consider our environmental impacts in four distinct areas: the natural environment, the built environment, the social environment, and climate change:

- **Natural environment** includes those aspects that come to mind upon hearing the word "environment" — air, water, earth, plants, and animals.
- **Built environment** encompasses many of the physical aspects of human activity, such as noise, chemical emissions land and shoreline use, historical and cultural preservation, transportation systems, and other public services and utilities.
- **Social environment** entails how we relate to one another through the natural and built environments. The RTP investigates issues of social justice in the access to, location and construction of facilities, and how changes in our society and the way we travel impact personal health.
- **Climate change** refers to long-term shifts in temperatures and weather patterns. These shifts can be natural, but since the 1800s, human activities have been the main driver of climate change, primarily due to burning fossil fuels that produce heat-trapping gases.

The RTP's core concepts related to the natural, built, and social environment are consistent with those in Thurston Regional Planning Council's (TRPC) Sustainable Thurston Plan (*Creating Places – Preserving Spaces: A Sustainable Development Plan for the Thurston Region*). TRPC staff consulted with local policymakers, residents, business owners, and other interested parties to craft the plan's regional sustainability vision for 2035. The Sustainable Thurston Plan's goals, targets, and actions related to air quality, water quality, habitat, energy, land use, and transportation are consistent with the RTP's policies. Although more than a decade old now, Sustainable Thurston marks the most comprehensive and expansive plan and vision for the Thurston region's future.

The goals, strategies, and actions of the Thurston Climate Mitigation and Thurston Climate Adaptation plans have also heavily influenced the RTP.

Natural Environment

This section summarizes the major natural environment issues addressed by the RTP, and how the RTP goals, policies, and recommendations accommodate those issues. Air quality, water quality, habitat, and energy use are the focus.

Air Quality

The RTP includes an assessment of air quality impacts attributed to vehicles, specifically an evaluation of PM10 — particulate matter less than 10 microns in size. Vehicle sources of particulates include tailpipe emissions, road dust, and tire and brake wear. These tiny airborne particles pose hazards to people with asthma and other respiratory problems, as well as people under the age of 18 or over the age of 65.

Significantly, wood burning also produces PM10. In the 1980s, wood smoke caused a substantial PM10 air quality problem in the Lacey-Olympia-Tumwater area. The region's clean air authority worked with homeowners to control outdoor burning and replace older wood-burning stoves with more efficient models. As a result of these measures, the region

experienced a steady decrease in PM10, which fell below the national standard in 1990 and continues to register well under the standard today. Other key pollutants, such as carbon monoxide, ozone, and PM2.5, continue to be at levels below national standards.

While the region now enjoys good air quality, TRPC continues to monitor the vehicle sources of PM10 by modeling the potential generation of PM10 caused by driving. This includes looking at the number of drivers and vehicles on the road and how the projects listed in the RTP expand the transportation system's capacity for more driving. Tables 7-1 and 7-2 provide a comparison of growth in VMT and population in the region's Maintenance Area (roughly the 1987 city limits of Lacey, Olympia, and Tumwater). The tables are based on regional forecast models for population growth and VMT.

Table 7-1: VMT and Population

	Maintenance Area Daily Average VMT	Maintenance Area Population
2022	2,183,000	101,094
2030	2,350,000	111,049
2040	2,558,000	121,425
2050	2,766,000	129,525

Sources: TRPC Transportation Model; TRPC Population and Employment Forecast.

Table 7-2: VMT and Population Annual Rate of Growth

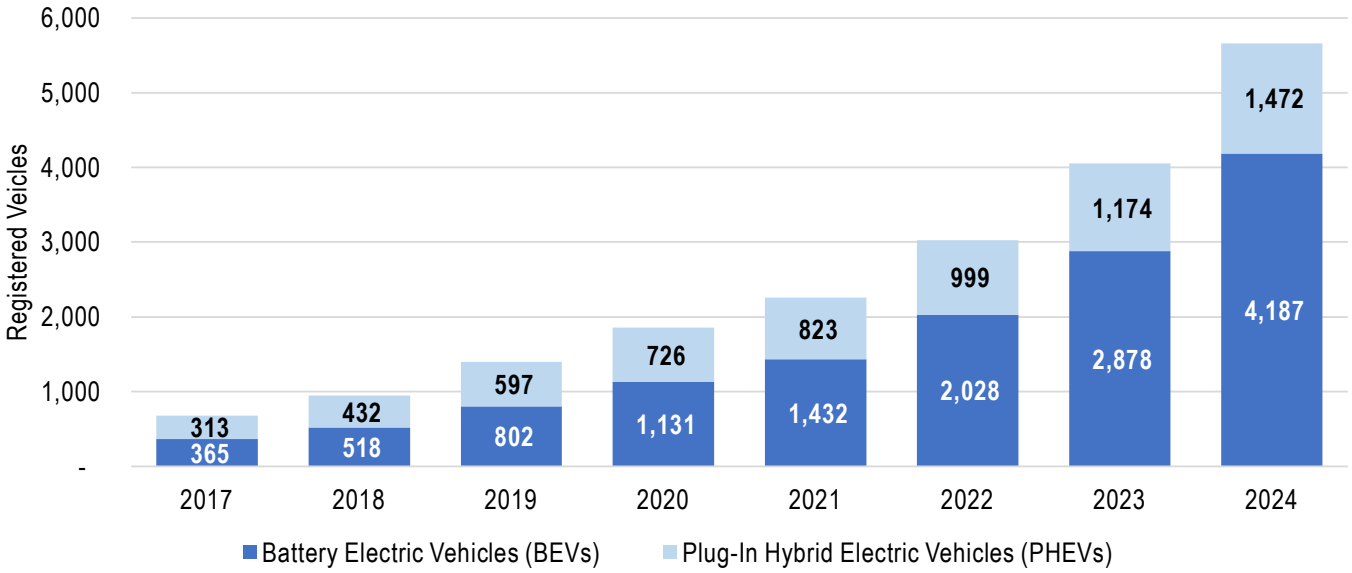
	Maintenance Area VMT	Maintenance Area Population
2022–2030	0.9%	1.2%
2030–2040	0.9%	0.9%
2040–2050	0.8%	0.6%

Sources: TRPC Transportation Model; TRPC Population and Employment Forecast.

Figure 7-1: Intercity Transit Hybrid Bus

Commute alternatives reduce the number of vehicle miles we travel each year, and thus the pollution we generate. A large-scale shift to low- and zero-emission transportation technologies will also reduce air pollution generated today by gas and diesel-powered vehicles.

Figure 7-2: Electric Vehicle Registrations, Thurston County

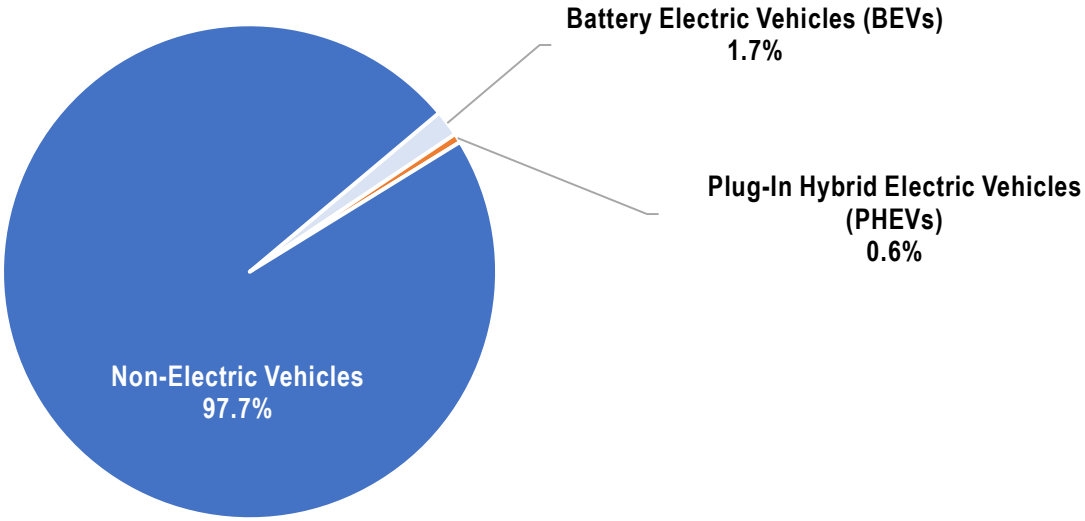


Source: Washington State Department of Licensing
Note: Registrations are current as of March 31st of each year.

The Thurston region will see reductions in air pollution from tailpipes as more drivers use electric and alternative fuel vehicles. Intercity Transit (IT) is in the process of transitioning to a zero-emissions fleet and utilizes both propane- and hybrid biodiesel electric vehicles in its transition efforts. ruralTRANSIT utilizes propane-fueled vehicles that have been shown to significantly reduce harmful air quality emissions compared to diesel. Although electric buses are considered the most environmentally friendly option due to their zero tailpipe emissions, infrastructure and range limitations have impacted their deployment.

Electric and alternative fuel passenger vehicles are becoming more common. The number of battery electric vehicles registered in Thurston County has increased 370 percent since 2017 (Figure 7-2). However, such registrations make up less than three percent of all vehicle registrations in Thurston County (Figure 7-3). As of 2024, there were 72 electric vehicle charging stations in Thurston County open to the public.[1]

Figure 7-3: Vehicle Registrations, Thurston County (2024)



Source: Washington State Department of Licensing
Note: Registrations are current as of March 31st of each year.

[1] US Department of Energy Alternative Fuels Data Center. A station can have multiple chargers but will only be counted as one station.

Efforts are underway to accelerate the adoption of electric vehicles. The Washington State Plan for Electric Vehicle Infrastructure Deployment envisions that all residents and visitors can use electric vehicles (EV) and find convenient, affordable, and accessible fast-charging stations. The state has adopted California's vehicle emissions standards and will require all new light-duty cars and trucks sold in the state and a substantial proportion of medium- and heavy-duty vehicles to meet zero-emission vehicle standards vehicles by 2035.

The RTP sets forth several policies and features intended to support the reduction and control of air pollutants:

- The PM10 constraint: Modeling of projects in the RTP must show that the sustained annual growth rate in vehicle miles traveled in the Lacey-Olympia-Tumwater area will not exceed 6.3 percent.
- The transportation demand management Goals and Policies in Chapter 3 promote mixed-use urban development to reduce the need for auto travel; improve access to public transportation, ridesharing, bicycling, and walking; encourage employers to help change commute patterns through telework, flex-time, and compressed work weeks; and promote park and ride lot use and development.
- The Thurston region actively promotes Commute Trip Reduction (CTR), a transportation demand management strategy. In Thurston County, 190 worksites are affected by the state's CTR law or have voluntary programs. These are predominantly government worksites and a few private businesses or organizations. Statewide between 2007 and 2018, CTR efforts reduced the vehicle miles traveled per employee by 13 percent. This means nearly four million fewer gallons of fuel were used each year, for an annual reduction of 75,000 metric tons in greenhouse-gas emissions, the same amount of carbon sequestered annually by about 88,269 acres of forest.
- The RTP emphasizes other Goals and Policies that materially contribute to the preservation and health of our environment and limit the impacts of air pollution. The RTP calls for consistency between land use and transportation, promoting development that supports bicycle, pedestrian, and transit travel. These strategies are consistent with the Thurston Climate Mitigation Plan strategies aimed at reducing transportation-related emissions.
- The RTP envisions a multimodal transportation system, decreasing the need for drive alone trips. It encourages the use of transportation technologies to improve the operation of the system, which often result in air quality improvements. The RTP also promotes appropriate levels of public transportation and an increase in the share of all trips made by active transportation — like bicycling and walking.

Figure 7-4: Permeable Sidewalk

This permeable sidewalk and swale, located on McPhee Road on Olympia's Westside, filters water runoff onsite.

Water Quality

Thurston County has many water bodies that can be impacted by the concentrated particles of oil, gasoline, brake dust, rubber, and other materials that collect on roads and run off as stormwater when it rains. Erosion during road construction can also affect water quality. Much of the rain that falls in the county makes its way into Puget Sound, through the watersheds draining into Nisqually Reach and Totten, Eld, Budd, and Henderson Inlets. In the Southwestern portion of the county, the Chehalis watershed — which includes areas draining to the Chehalis, Black, and Skookumchuck rivers — flows toward the Pacific Ocean. Glacial activity in the county's geologic past left the land dotted with lakes and ponds that are also sensitive to stormwater runoff.

Rain that doesn't immediately flow out through a stream percolates down into deep groundwater aquifers. This groundwater is also vulnerable to pollution originating from the transportation system — it is the source of drinking water for most Thurston County residents and supplies base flows to our streams during the dry summer months.

The RTP contains many policies that protect water quality:

- Limiting impervious surface area and avoiding, decreasing, and/or treating stormwater runoff.
- Minimizing road crossings through environmentally sensitive areas.
- During transportation planning, design, and construction, proactively address fish barrier removal which may include water quality improvements.

In 2015, Thurston County and the cities of Lacey, Olympia, and Tumwater updated their stormwater regulations to implement new state requirements, placing an emphasis on

removing barriers to low-impact development practices. Low impact development infiltrates rainwater into the ground near where it falls to mimic the natural hydrologic cycle. Such development may use green infrastructure such as bioswales, or vegetated channels, alongside streets to provide treatment and retention of stormwater runoff. Jurisdictions also continue to explore other techniques, such as permeable surfaces, to control stormwater from transportation infrastructure. These new facilities will have major implications on how streets are designed and maintained in the coming years.

In the future the Thurston region will need to consider and plan for how climate change impacts the increased intensity, severity, and frequency of precipitation events. Increased runoff from more intense storms carries higher volumes of water and, in turn, higher pollutant loads into our stormwater systems.

Habitat

Protecting wildlife and native plant species are important considerations in any construction project. Federal, state, and local laws focus on threatened and endangered species, as well as wetlands and other critical areas. Construction projects undergo environmental and land use review and permitting processes that specifically address these issues. Additionally, the RTP specifies policies regarding habitat:

- Discouraging road crossings through designated environmentally sensitive areas and habitat corridors.
- During transportation planning, design, and construction, proactively address fish barrier removal, taking into consideration the habitat of fish-bearing streams and environmentally sensitive areas.

In 2013, a Washington federal court ruled that by 2030, the state must significantly increase the effort to replace state-owned culverts in western Washington that block habitat for salmon and steelhead. Culverts are typically large pipes that allow water to pass under roadways. If designed or constructed improperly, culverts can block salmon and steelhead from reaching spawning grounds. The injunction does not apply to local governments, but Thurston jurisdictions are nevertheless making strides in replacing culverts.

Figure 7-5: Interstate 5 in Thurston County

I-5 runs through the center of Thurston County, from north to south. For many Thurston residents, I-5 is as much part of the local road system as it is an Interstate Highway.

In 2016, the Thurston County Board of Commissioners directed Public Works to create a program to help improve fish passage by identifying culverts that block fish under county roads and replacing them with new fish-passable structures. There has been much progress made in identifying and mapping fish passage barriers, but funding for barrier correction remains a challenge. Recognizing this, Thurston County dedicated some of its Real Estate Excise Tax (REET) to pay for corrections and sought more in grant funding. As of 2024, the program has:

- Identified more than 150 fish barriers
- Received $8.5 million in REET funding
- Received $2.9 million in external grant funding
- Removed 21 barriers at 11 project sites
- Opened 14 miles of fish habitat

Fish habitat is also a key component of ongoing work to address issues with the Interstate 5 (I-5) system in Thurston County. I-5 crosses the Nisqually River at its delta, adjacent to the Billy Frank Jr. Nisqually National Wildlife Refuge. To support and protect the roadway, earth fill was placed throughout the majority of I-5 across the delta. The fill acts as a dam, restricting connectivity between the Nisqually River delta and the main channel upstream. Meanwhile, channel constraint reduces the total fish habitat area, constricts the zone where fresh river water mixes with Puget Sound saltwater (a critical habitat for young salmon as they transition from fresh to saltwater), and may reduce the delivery of habitat-forming sediments from the Nisqually River to the delta. Additionally, the channel constraint has caused the Nisqually River channel to migrate toward I-5, increasing the risk of floods damaging I-5. For more information on Washington State Department of Transportation's efforts on I-5 and the Nisqually Delta, see Chapter 4 of this Plan.

Endangered wildlife species also present unique challenges to the region. In 2022, Thurston County's Habitat Conservation Plan for seven different endangered species was approved by the U.S. Fish and Wildlife Service. Other local jurisdictions are working with federal and state partners to determine how to protect endangered species within their jurisdictional boundaries while still allowing development to occur. As plans are finalized, TRPC updates the land use forecast to account for these changes and further examines the implications to the transportation network.

Figure 7-6: Billy Frank Jr. Nisqually National Wildlife Refuge Barns

Thurston County residents enjoy almost 50,000 acres of state and federal lands, including 2,900 acres of wildlife habitat at the Billy Frank Jr. Nisqually National Wildlife Refuge.

Built Environment

Transportation and land use patterns shape our health outcomes. Built structures also form a component of our environment. Our homes, offices, shopping centers, roads, sidewalks, bicycle trails, water and sewer systems, fire stations, and community centers make up the environment we live in.

How these relate to one another determines many of the choices we make in our daily lives. Particularly for the RTP, how we use our land affects and is affected by transportation.

Land Use

In 2024, Thurston County had approximately 307,000 residents and 155,700 full- and part-time jobs. By 2050, we expect the population to increase to 407,400 with 221,400 jobs. We use these population and employment forecasts to predict where growth will occur in the region, based on the locally adopted land use plans that regulate where houses and businesses may be built. The RTP is developed using a transportation model that incorporates these land use forecasts. The Regional Projects recommended by the RTP support local land use plans, improving access to housing and jobs throughout the county.

The RTP policies encourage transportation-efficient mixed-use development, where appropriate, and transportation facilities that support the location of jobs, housing, industry, and other activities as called for in locally adopted land use plans.

Where we build transportation facilities and the types of transportation services we furnish can substantially affect the type of surrounding land use. Vice versa, where we build our homes and businesses can cause demand for additional roads and transportation services, sometimes where they are expensive and inefficient to deliver, and lead to longer trips and greater greenhouse gas emissions. This relationship between land use and transportation is important.

Rural roads in the south county, in particular, are forecast to see increased use, with large volumes of traffic headed north in the morning to work and returning south in the evening to home. Commute patterns changed during the COVID-19 pandemic (2020–2023), with many people working from home. Commute patterns continue to shift in the pandemic's aftermath as employers reevaluate their workforce needs and expectations. Despite these shifts and changes, the region's general commute pattern still holds true for many workers in the Thurston region.

The transportation system plays other important roles beyond allowing us to travel to work and home. In Thurston County, residents have access to public lands offering a variety of activities such as boating, fishing, bicycling, camping, hiking, and wildlife viewing. Thurston County residents enjoy almost 50,000 acres of state and federal lands, including 2,900 acres of wildlife habitat at the Billy Frank Jr. Nisqually National Wildlife Refuge, 842 acres at Millersylvania State Park, and approximately 40,000 acres in the Capital Forest. We also have several major trails, numerous city and county parks, access to water sports on rivers, lakes, and Puget Sound, and hundreds of miles of bicycle lanes adjacent to local roadways.

The multimodal regional transportation system provides access to these recreational facilities. The RTP's Goals and Policies specifically address the many modes we use to access recreation. Facilities promoting active transportation, such as the Chehalis Western Trail, are supported by both transportation and recreation planning and funds. Like the roadways, trail connections to local paths, sidewalks, and streets are crucial. Many of our local jurisdictions have trail plans to improve recreational access.

Transportation

The forecasted population growth for the region will also result in more trips taken by car, creating:

- Additional demand for new transportation facilities and services;
- More maintenance and preservation costs for facilities and services; and
- Pressure to increase efficiency while improving safety throughout the system.

The RTP is based on a system of regional roadways that provide the main thoroughfares through our community, forming a significant element of our built environment. It assesses overall transit service and includes broad recommendations for changes in transit. The RTP also investigates parking policies available to jurisdictions that would support transportation demand management goals but does not make specific recommendations regarding the amount or location of parking.

Policies in the RTP aim to reduce and control the development impacts of and on transportation facilities. The RTP encourages facilities compatible with approved land use; multimodal, active transportation options that are barrier-free; and facilities that are safer. It prioritizes the repair, maintenance, and preservation of existing infrastructure.

It promotes increased use of transportation demand management to reduce peak period drive-alone trips; transportation technology to improve the transportation system safety and efficiency; and public transportation, bicycling, and walking to increase system efficiency and options.

Land use drives the development of most regional transportation facilities. As an area develops, its greater use by people can lead to an increase in demand for public services, such as fire protection, police protection, schools, water, and sewer. Convenient and reliable access to these services depends on a well-functioning transportation system. How to supply and pay for these needs presents a challenge. The RTP recommends a more comprehensive look at growth patterns and the cost of providing these public services.

Noise

The transportation system can be a considerable source of noise. Local and state transportation agencies are working to address extreme transportation-related noise. For instance, the state uses sound walls and alternative types of paving materials on freeways to decrease transportation-related noise where it is severe. Many communities have regulations regarding the use of noisy truck brakes or restrict trains from blowing their whistles overnight.

Local and state agencies are expected to address potential noise impacts related to their transportation projects.

Historic and Cultural Preservation

Thurston County has a rich legacy of prehistoric and historical cultural resources extending back thousands of years to the earliest habitation of the Coastal Salish people. Beginning in the 1950s, historic preservation efforts began documenting the county's significant cultural resources. The Washington State Department of Archaeology and Historic Preservation (DAHP) maintains a database of historic resources, and there are more than 1,500 properties in Thurston County with potentially historic or cultural value. Jurisdictions must also consult tribal cultural resource staff regarding properties or sites that are unpublished or whose location and significance are a tribal matter, as well as DAHP's confidential record of known archaeological sites.

Potential transportation project-related impacts may include physical changes to historic transportation infrastructure, effects of road widening on historic settings or structures, effects on historic roadside elements, effects of air pollution on resources due to increased traffic, and disturbance or infringement on cultural landscapes. The nature of these impacts is highly site- and project-specific, and the information about historic and cultural resources is constantly evolving. It is important for each project to be evaluated in the specific context and timeframe in which it is designed.

Guiding Principles and Goals and Policies in the RTP support investments that contribute to a community's overall sense of place, including the preservation of historic and cultural resources. The RTP calls for road crossings to be minimized through designated sensitive areas, encourages a multimodal system that may lessen

some transportation impacts on cultural and archaeological resources, and promotes good coordination and communication among agencies, including cultural resources staff, in communities impacted by transportation projects.

State and federal regulations require careful and specific consideration of project impacts on cultural resources, and local jurisdictions have enacted their own policies for historic resources. The RTP works in concert with these regulations to address potential impacts on historic and cultural resources.

Social Environment

Location and access to transportation play key roles in how our society functions today. We became increasingly mobile during the 20th century, fundamentally changing where most of us live and work. As a result, our social environment is shaped, impacted, and sometimes limited by our proximity to and use of the transportation systems available to us. Two areas to monitor in this social environment include environmental justice and personal health.

Executive Orders & Environmental Justice

Three executive orders issued by former Presidents Clinton and Biden have shaped the way we talk about environmental justice:

- Executive Order 12898 (1994) required each federal agency to make achieving environmental justice part of its mission. The federal Environmental Justice requirement directed that we identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of transportation programs, policies, and activities on people of color and people identified as low-income.
- Executive Order 14008 (2021) established the Justice40 Initiative and directed that 40 percent of the overall benefits of certain federal investments must flow to disadvantaged communities marginalized by underinvestment and overburdened by pollution.
- Executive Order 14096 (2023) stated that every person in the nation must have clean air to breathe; clean water to drink; safe and healthy foods to eat; and an environment that is healthy, sustainable, climate-resilient, and free from harmful pollution and chemical exposure.

In January 2025, President Trump issued two Executive Orders (*Initial Recissions of Harmful Executive Orders and Actions* and *Ending Illegal Discrimination and Restoring Merit-Based Opportunity*) rescinding these Clinton- and Biden-era executive orders. The bulk of this Regional Transportation Plan was developed prior to President Trump's rescissions and reflects the policies in place at the time of plan development.

Environmental Justice

Two recent state legislative acts are shaping the way the state addresses environmental justice: the HEAL Act and the Climate Commitment Act.

The Healthy Environment for All (HEAL) Act was passed by the Washington Legislature in 2021. It is the first statewide law to create a coordinated and collaborative approach to environmental justice, making it a priority and part of the mission of key state agencies, including Washington State Department of Transportation (WSDOT). The intent of the HEAL Act is to address disproportionate environmental and health impacts in all laws, rules, and policies by prioritizing vulnerable populations and overburdened communities; equitably distributing resources and benefits; and eliminating harm. The HEAL Act defines what communities are considered overburdened, which populations are considered vulnerable, and what "equitable distribution" means.

Also in 2021, Washington state enacted the Climate Commitment Act (CCA) which established a greenhouse gas emissions cap-and-invest program. Central to the CCA's cap-and-invest program is the recognition that while climate change is a global problem, some communities have historically borne the disproportionate impacts of environmental burdens and now bear the disproportionate negative impacts of climate change. To combat this imbalance, at least 35 percent of the funds received by the state from the cap and invest program must be invested so that vulnerable populations (as defined by the HEAL Act) within overburdened communities receive direct and meaningful benefits from the funding. This can be in the form of reducing environmental burdens, supporting community-led projects, or meeting identified community needs. Another 10 percent of the funding must be set aside for projects supported by (and ideally administered by) Tribal nations.

The Thurston region's policymakers strongly support transportation options serving all of the system's users. However, the transportation system was not originally designed to support all system users. Barriers remain for those who have experienced historical racist practices, people whose home language is other than English, people identified as low-income, people over the age of 65 or under the age of 18, and people with disabilities. The RTP's emphasis on a multimodal system, with robust options for transit and safe bicycle and pedestrian facilities, supplies choices for all residents. The benefits and impacts of the RTP's regional projects are spread equitably across the region. The continuing land use and transportation discussion will emphasize the economic impacts of decisions on where we live and how we travel.

Ongoing regional programs look beyond traditional fixed-route buses and coordinate the resources — vehicles and drivers — of non-profit, faith-based, and other social service providers to create an efficient network of transportation choices for residents of rural communities. The RTP also contains policies that focus on barrier-free transportation and enhanced public involvement strategies that encourage innovative means to reach out to all residents.

HEAL Act Definitions

"Overburdened community" means a geographic area where vulnerable populations face combined, multiple environmental harms and health impacts, and includes, but is not limited to, highly impacted communities as defined in RCW 19.405.020.

"Equitable distribution" means a fair and just, but not necessarily equal, allocation intended to mitigate disparities in benefits and burdens that are based on current conditions, including existing legacy and cumulative impacts, that are informed by cumulative environmental health impact analysis.

"Low-income" means household incomes as defined by the department or commission, provided that the definition may not exceed the higher of 80 percent of area median household income or 200 percent of the federal poverty level, adjusted for household size.

"Vulnerable populations" means population groups that are more likely to be at higher risk for poor health outcomes in response to environmental harms, due to:

- Adverse socioeconomic factors, such as unemployment, high housing and transportation costs relative to income, limited access to nutritious food and adequate health care, linguistic isolation, and other factors that negatively affect health outcomes and increase vulnerability to the effects of environmental harms;
- Sensitivity factors, such as low birth weight and higher rates of hospitalization.

"Vulnerable populations" includes, but is not limited to:

- Racial or ethnic minorities;
- Low-income populations;
- Populations disproportionately impacted by environmental harms; and
- Populations of workers experiencing environmental harms.

Personal Health

Personal health is impacted by many factors, decisions, and behaviors, and physical activity is an important behavior that has a positive impact on personal health. Active transportation — like walking, bicycling, and riding the bus (which always involves walking or using a mobility device) to get to work, school, and shopping — is a key source of physical activity, and one which has substantially declined as we have become largely automobile dependent. Active transportation is also a key strategy to alleviate vehicle congestion. It's a win-win — walking, bicycling, and bus riding improve our health, and improve traffic flow for longer trips we need to make by car.

County Health Rankings Model

The County Health Rankings Model explores how health is influenced by various factors including health behaviors, clinical care, social and economic factors, and our physical environment. In 2024, Thurston County was one of the healthiest places to live in Washington state — 12th overall for health outcomes (was 5th overall in 2019). Measures affecting this ranking include:

- 71 percent of workers drive alone (15th in the state; was 35th in 2019)
- 35 percent of commuters have long commutes — more than 30 minutes (26th in the state; was 24th in 2019)

See www.countyhealthrankings.org for more information on the County Health Rankings Model.

The RTP includes policies and projects that support greater reliance on walking and bicycling. Land use policies support mixed-use development, making walking and bicycling trips convenient for shopping and running errands in city centers. Transportation demand management policies promote greater access to and flexibility for using alternatives to driving alone, such as transit, carpooling, bicycling, and walking. In addition, the RTP supports the development of regionally important, active transportation facilities which are also used for recreation. The RTP strongly promotes choice in transportation options, including driving, but also creating more convenient opportunities for walking, bicycling, and using transit.

Figure 7-7: Children Walking to School

Intercity Transit's Walk N Roll education program increases independence, improves safety and inspires a healthy lifestyle by making walking, biking, rolling and riding public transit more accessible to people of all races, ages, incomes and abilities.

Climate Change

Climate change is caused by air pollution from heat-trapping greenhouse gases released into the atmosphere, including carbon dioxide, methane, nitrous oxide, and hydrofluorocarbons. Gas- and diesel-powered engines from on-road vehicles are a substantial source of greenhouse gases. Our climate is changing, but how might such changes affect transportation in the Thurston region?

Climate Change Factors

There's no crystal ball that shows what the future holds. So, scientists run plausible greenhouse gas emissions scenarios through computer simulations of the global climate and then downscale such models. This produces regional projections for temperature, precipitation, sea-level rise, and other climate indicators that affect our human and natural systems.[2]

[2]Unless noted otherwise, the regional projections listed are from the University of Washington's Climate Impacts Group.

Temperature

Puget Sound's long-term climate changes are consistent with those observed globally, resulting from increasing levels of carbon dioxide and other heat-trapping gases. Thurston County's average annual temperature has warmed about 2.4°F between 1895 and 2024.[3] Changes we're seeing already include a longer frost-free season and more nights with warm temperatures. This warming is expected to lead to more frequent and intense heatwaves, as well as extreme heat days. Additional warming is projected this century with the change in annual temperature anticipated to be at least double that experienced in the 20th century – and possibly ten times as large.[4]

Figure 7-8: Deschutes River, Thurston County

The Deschutes River surges over its banks at Tumwater Falls Park following a record-breaking rainstorm in December 2015. Puget Sound climate models project that future occurrences of heavy rainfall would be more frequent and intense, exacerbating flood risks in many watersheds.

[3] NOAA National Centers for Environmental Information. (2024, December). Retrieved from County Time Series.
[4] Mauger, G.S., J.H. Casola, H.A. Morgan, R.L. Strauch, B. Jones, B. Curry, T.M. Busch Isaksen, L. Whitely Binder, M.B. Krosby, A.K. Snover, 2015. State of Knowledge: Climate Change in Puget Sound. Report prepared for the Puget Sound Partnership and the National Oceanic and Atmospheric Administration. Climate Impacts Group, University of Washington, Seattle. doi: 10.7915/ CIG93777D

Precipitation

There's no discernible long-term trend in regional precipitation over the past few decades. Looking ahead, our seasonal precipitation totals — and to a lesser extent, our annual precipitation totals — are projected to change. While annual precipitation in Thurston County is highly variable from year to year, generally the future Puget Sound summers are expected to be warmer and drier, with more extreme heat events, and winters are likely to be warmer and wetter, with more intense heavy rain events. This change in precipitation patterns is expected to contribute to summer regional drought conditions, which are expected to last longer and be more severe in the future.

Global models project that the heaviest 24-hour rain events west of the Cascade Range will intensify by 22 percent, on average, by the end of this century (2070-2099, relative to 1970-1999). Such "high-intensity" events would occur more frequently — about eight days per year by the 2080s, compared to two days per year historically.

Sea Level Rise

Between 1899 and 2023, sea levels in the Puget Sound region rose by 0.68 feet. Sea level rise is driven by multiple factors including ice melt from glaciers and ice sheets, thermal expansion, and vertical land movement. Land in Thurston County is also subsiding to a small degree; this can increase the risks associated with sea level rise for the region's coastal communities and infrastructure. In the Thurston region, sea levels are expected to continue rising — up to 0.8 feet by 2050 and 2.3 feet by 2100.[5]

In 2019, The City of Olympia, LOTT Clean Water Alliance, and the Port of Olympia completed the *Olympia Sea Level Rise Response Plan*. In the future, sea level rise will cause flooding downtown that could lead to property damage and loss of public services. In addition to identifying areas at risk of flooding from sea level rise, the plan developed a comprehensive approach for responding to sea level rise for downtown Olympia. Along with physical solutions, adaptation strategies include governance strategies, identification of informational gaps, and changes to operations and services.[6]

[5]Thurston County (2024). Thurston County Climate Change Vulnerability Assessment: Technical Appendix to the Thurston County Comprehensive Plan. Prepared by Cascadia Consulting Group and Berk Consulting.
[6]City of Olympia (2019). Olympia Sea Level Rise Response Plan. Prepared by AECOM.

Transportation Impacts

Consequences of coastal inundation, flooding, wildfires, and other hazards include increased safety risks, road closures, and infrastructure maintenance costs.[7] The Thurston Climate Mitigation Plan highlights many of the climate impacts the Thurston Region faces:

- Flooding and Severe Weather. The Thurston region will likely experience a 100-year flood event and more than one severe weather event in the next 25 years; these almost always affect transportation infrastructure whether from direct damage or from falling trees blocking sidewalks, trails, and roadways. From 1965 to 2022, Thurston County was included in 21 federal disaster declarations for severe storms, high winds, and flooding; of these, 12 were issued principally for flood losses. Twenty-three regional transportation lifelines are located in the 100-year special flood hazard area.

- Landslide Events. Research and climate forecasts provide clear evidence that long-term climate change will have a measurable impact on the frequency of landslides, which already occur nearly every year in the Thurston region. An estimated 5,732 people throughout Thurston County live in areas that are potentially at risk for landslides as are eleven regional transportation lifelines, including several state highway bridges.

Sea Level Rise. Communities and agencies with assets or service areas bordering Puget Sound are likely to experience up to six inches of sea level rise in the next 25 years. The long-term operations for the Port of Olympia Marine Terminal will need to adapt and mitigate the effects of sea level rise to remain a viable shipping and freight facility for the region. Six state highway bridges that act as regional transportation lifelines are also located in the sea level rise inundation area.

- Wildfire Events. Wildfires can block or damage roads and require rerouting or stop transit service altogether. Eighty-nine roadways in Thurston County are transportation lifelines located in the Wildland-Urban Interface and Intermix areas; such roadways are critical facilities for two-thirds of the Thurston region's population.

[7]City of Olympia (2019). Olympia Sea Level Rise Response Plan. Prepared by AECOM.

Climate Action & Energy Transition

Our future is not yet written, fortunately, and we have time to mitigate and adapt. As a region, we're taking steps to reduce our transportation-related emissions and prepare for a changing climate.

In 2018, TRPC adopted a watershed- based plan with adaptation actions that public- and private-sector stakeholders throughout Thurston County can use to reduce, prepare for, and cope with climate change impacts in the decades ahead. The Thurston Climate Adaptation Plan includes a menu of 91 strategies and actions to address impacts like increased winter precipitation, wildfires, and heatwaves.

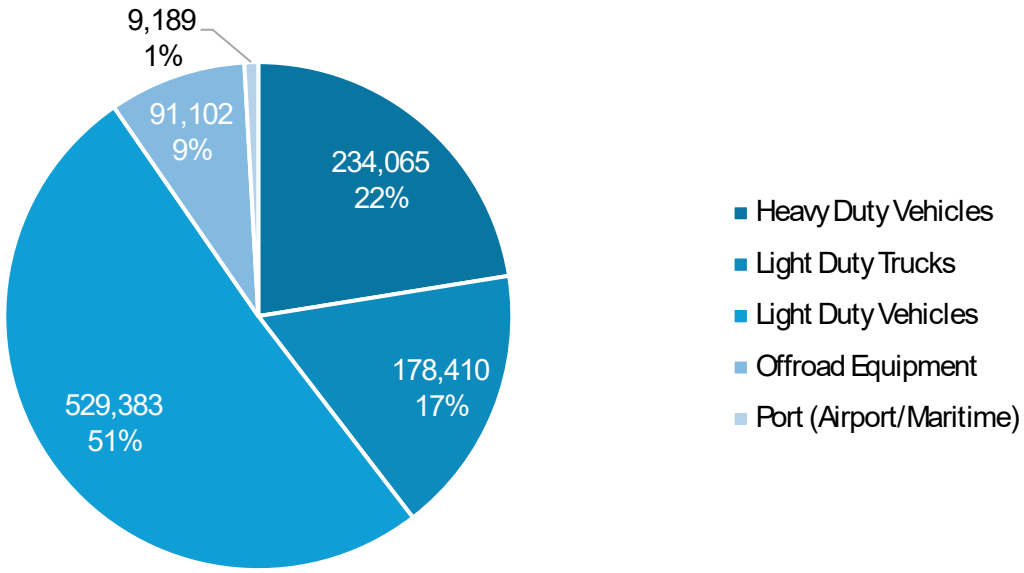
In 2020, TRPC, Lacey, Olympia, Tumwater, and Thurston County completed a climate mitigation plan. The plan identified strategies and actions to reduce regional greenhouse gas emissions 45 percent below 2015 levels by 2030, and 85 percent below 2015 levels by 2050. TRPC has adopted these targets for the region.

Wildland-Urban Interface & Wildland-Urban Intermix Areas

The Wildland-Urban Interface (WUI) is where urbanized areas meet wildlands. Areas mapped as a WUI include development that is bordered by wildlands on at least one side. Approximately 32 percent of Thurston County's population is located in areas mapped as a WUI.

The Wildland-Urban Intermix is where lower density areas (typically further away from urbanized areas) intermingle with wildlands. Areas mapped as intermix consist of development or structures that are surrounded on two or more sides by wildlands. Approximately 33 percent of the county's population is located in areas mapped as wildland-urban intermix.

Figure 7-9: Thurston County transportation emissions (metric tons of carbon dioxide equivalent) by source (2021)



Source: TRPC, Port of Olympia

As previously discussed, the state's 2021 Climate Commitment Act (CCA) established a cap and invest program. The cap on carbon pollution applies to roughly three-quarters of the state's greenhouse gas emissions and is the state's primary policy for achieving its climate targets, including reducing greenhouse gas emissions 95 percent below 1990 levels by 2050. In addition to the CCA's focus on environmental justice, it also funds new investments in climate-resiliency programs, clean transportation, and addressing health disparities across the state.

In 2021, Thurston County's direct greenhouse gas emissions totaled roughly 2.9 million metric tons of carbon dioxide equivalent (Figure 7-9). Overall, the region has seen a four percent decrease in emissions since 2015 while its population grew by about ten percent over the same period. Overall, transportation accounted for about 36 percent of all county emissions in 2021.

For the last 100 years, the transportation sector has generally relied on combustion engines using gasoline and diesel. During the RTP's planning horizon (2025–2050), the region is likely to see a substantial transition to zero-emission fuels (such as electricity and hydrogen) and utilization of new technologies that make transportation more efficient.

The RTP contains several policies that promote and support energy conservation, including language that specifically promotes the use of alternative fuels.

Transportation demand management goals and policies also support energy conservation. Promoting mixed-use urban development reduces the need for auto travel. Improving access to public transportation, ridesharing, bicycling, and walking decreases car trips. Encouraging employers to help change commute patterns through telework, flex-time, and compressed work week schedules, and promoting development and use of park-and-ride lots, also decrease the number or length of car trips.

In 2017–2018, commuters at participating CTR worksites left about 34,500 cars at home every weekday. These alternative commute trips reduced almost 13 percent of daily vehicle miles traveled per employee between 2007 and 2018 (from 10.9 to 9.5). This decrease in vehicle miles traveled means nearly 4 million fewer gallons of fuel used each year, saving commuters about $25 million annually.

In addition to improving air quality, many of the RTP's goals and policies also promote energy conservation. For example, consistency between land use and transportation, development of a multimodal transportation system, and support for active transportation and transit travel all promote situations where less fuel is used to make a trip. Utilizing new transportation technologies can also help us use the system more efficiently and reduce energy use.

The same RTP policies that promote the reduction of PM10 also work to limit production of greenhouse gases from vehicles. Taking the bus, walking, or riding a bicycle, sharing the ride with a co-worker, using alternative fuels, and creating mixed use urban development — all aim to reduce the number of vehicle miles we travel each year and the greenhouse gases we generate.

Figure 7-10: Salmon in McLane Creek

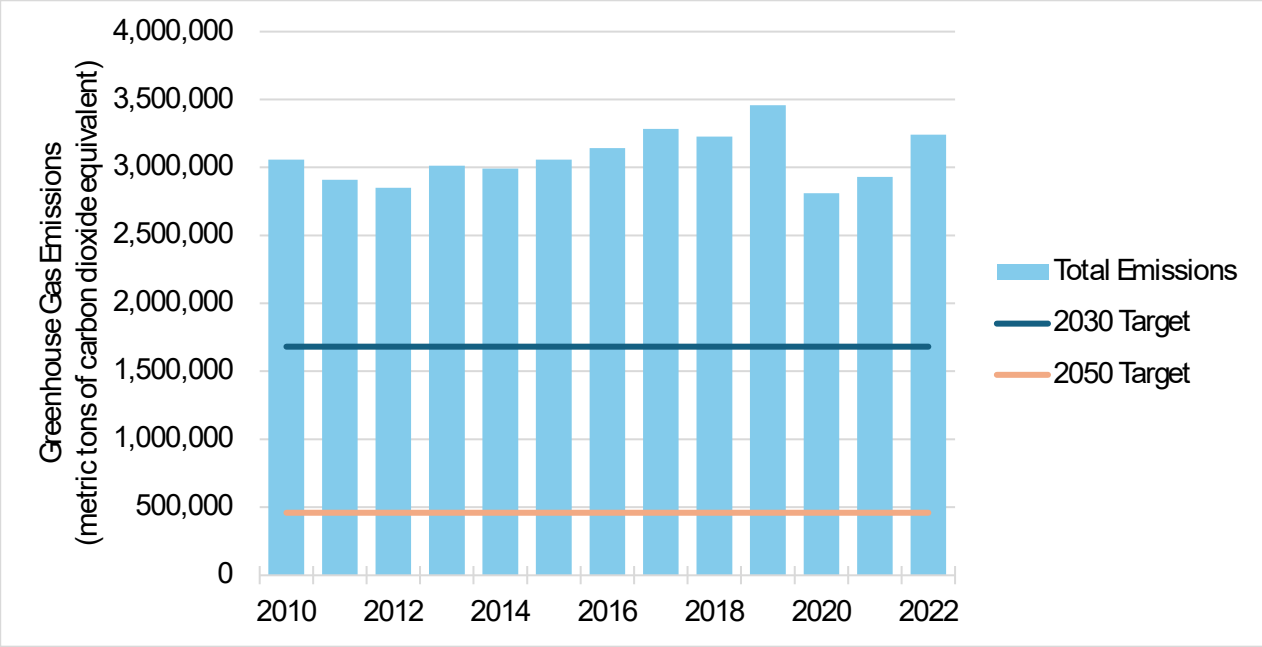
Protecting wildlife and native plant species are important considerations in any construction project.

The RTP's policies acknowledge that changing climate patterns will impact the region; they also incorporate strategies from the Thurston Climate Mitigation Plan that are targeted to reduce greenhouse gas emissions from transportation:

- Set land use policies that support increased urban density and efficient transportation networks and reduce urban sprawl
- Increase efficiency of the transportation system
- Increase adoption of electric vehicles
- Increase the use of public transit
- Increase use of active forms of travel (such as bicycling and walking)

Unfortunately, the region is not on track to meet either the 2030 or 2050 emissions reduction targets. Although total emissions dropped significantly in 2020 at the start of the COVID-19 pandemic, emissions have steadily climbed since (Figure 7-11).

Figure 7-11: Thurston County Greenhouse Gas Emissions



Source: TRPC, Thurston County

In addition to the total emissions targets, the Thurston Climate Mitigation Plan also includes transportation sector-specific targets.

The Plan aims to achieve the following vehicle miles traveled reductions over 2015 levels for different classes of vehicles:

- Passenger vehicles: Five percent by 2030 and 20 percent by 2050
- Light duty trucks: 10 percent by 2030 and 20 percent by 2050
- Heavy duty trucks: 20 percent by 2050

The Plan aims to increase average fuel efficiency over 2015 levels for different classes of vehicles:

- Passenger vehicles: 20 percent by 2030 and 60 percent by 2050
- Light duty trucks: 10 percent by 2030 and 40 percent by 2050
- Heavy duty trucks: 10 percent by 2050

RTP policies also call for reductions in per capita vehicle miles traveled to help limit production of greenhouse gases by gasoline- and diesel-powered vehicles.

The current transportation system will need to plan for and be ready to adapt to changes in weather patterns that could lead to flooding, sea-level rise, and other extreme weather events due to climate change. This could include things like:

- Elevating infrastructure in flood-prone areas
- Relocating coastal transportation routes away from the shoreline
- Utilizing flood-resistant materials
- Implementing early warning systems for extreme weather events
- Enhancing emergency response capabilities to quickly recover from climate-related transportation disruptions
- Promoting alternative modes of transport less susceptible to disruptions like public transit, walking, and cycling
- Enhancing emergency response capabilities to quickly recover from climate-related transportation disruptions

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