

Chapter 8. Climate

The current and future health of natural systems in Tenino is key to ensuring the broader health of the community. Tenino's open spaces, trees, water, air quality, and scenic views are central to making it a remarkable place to live, work, and visit.

Pacific Northwest communities are already experiencing the economic and health impacts of changes to climate patterns, including warming temperatures, changes in rainfall, and reduced snowpack. Without coordinated and ambitious climate mitigation across the globe and climate adaptation at the local level, the impacts of climate change will undoubtedly worsen in the future. In recent years, Tenino has experienced firsthand a shift in the weather patterns impacting the Pacific Northwest, most notably with the increase in extreme temperature events and poor air quality. While there is no delusion that the relatively small actions of a small city like Tenino will solve the issues faced by the world, we can do our part and serve as a positive example for our community and fellow local governments. The City is committed to implementing the goals and policies in this Climate Element to safeguard our natural systems and mitigate the impacts of greenhouse gas emissions to create a more resilient Tenino.

What is climate change?

While weather is what we experience on a day-to-day basis, climate describes average weather conditions over a long period of time. As the climate changes, extreme weather conditions, such as extreme heat and precipitation, become more frequent and severe. Climate change is the result of increasing concentrations of greenhouse gases (GHGs) within our atmosphere. GHGs such as carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O) create a greenhouse effect, trapping heat within the atmosphere and causing the gradual increase of global average temperatures. Human activities, such as driving and heating or cooling homes and businesses, emit large amounts of GHGs due to the combustion of fossil fuels.

Climate Change in Tenino

Climate change represents an ever-increasing threat to the health and well-being of residents in the City of Tenino and beyond. GHG emissions from travel, energy for our homes and buildings, and land use within our community are changing our climate in ways that put the community at risk. Projected changes in temperature, snowpack, severe storms, and wildfire risk threaten Tenino's infrastructure, economy, natural resources, and public health.

Tenino is experiencing climate impacts such as extreme heat, drought, and extreme precipitation. These changes lead to an increase in frequency and severity of natural disasters such as heat waves and flooding. Tenino already experiences these impacts through extreme weather events such as record-breaking heat waves and poor air quality days caused by wildfire smoke. These impacts are harmful to the natural environment, critical resources, and the overall health of our community.

Who and what are most vulnerable?

Tenino's critical water resources—including the Scatter Creek—are vulnerable to flooding, summer low flows, water quality impairment, and loss of suitable habitat for local wildlife and fish. Certain areas in Tenino may be

at increased risk for landslides with changes in rainfall. Agricultural lands adjacent to Tenino are particularly susceptible to drought and the associated economic impacts.

Conditions and Trends

Greenhouse Gas Emissions

Burning fossil fuels to support transportation and energy needs, solid waste decomposition, and other human led activities are the primary sources of increasing greenhouse gas (GHG) emissions in the atmosphere. These gases trap heat, warming the planet which directly contributes to climate change and increases related risks. Tenino is joining Thurston County cities, and communities around the world, in analyzing their carbon footprint and identifying strategies and actions that will reduce the City's GHG emissions.

Community Resilience

Climate resilience is the capacity of a community to anticipate, prepare for, respond to, and recover from hazardous climate-related events. For this jurisdiction, building resilience requires addressing a range of environmental hazards that threaten public health, infrastructure, and economic stability. Due to its significant agricultural land and ecosystems that depend on consistent water availability, drought poses a major threat—reducing crop yields, degrading natural habitats, and straining water resources. Similarly, extreme heat events are becoming more frequent and dangerous, especially as many local structures lack proper insulation and air conditioning, and there is currently no designated cooling shelter to protect vulnerable populations during heat emergencies.

Extreme precipitation also presents a serious concern, as the jurisdiction's location within a valley often traps rainfall, overwhelming stormwater systems and increasing the risk of infrastructure damage and erosion. Compounding this issue is the area's flat, low-lying topography, which contributes to frequent and prolonged flooding that can disrupt daily life, damage property, and delay recovery efforts. Additionally, the wooded and agricultural character of the jurisdiction creates a high wildfire risk, particularly during dry years when vegetation becomes highly flammable. These wildfires endanger lives, property, and air quality, while placing added stress on emergency services.

To enhance climate resilience, the jurisdiction must integrate hazard-specific adaptation strategies into planning efforts. These include improving water management infrastructure, retrofitting buildings for extreme temperatures, expanding stormwater capacity, implementing land use policies that reduce flood risk, and enhancing wildfire prevention and response. By addressing these vulnerabilities through proactive planning, the community can better protect its residents, sustain its natural and agricultural assets, and ensure long-term environmental and economic stability in the face of a changing climate.

Challenges and Opportunities

The jurisdiction faces growing climate-related pressures that impact public health, infrastructure, natural resources, and economic stability. While these challenges are significant, they also present opportunities to implement proactive strategies that build long-term resilience. By addressing key vulnerabilities and investing in adaptive infrastructure, the jurisdiction can better prepare for future climate conditions and protect the well-being of its residents and environment.

Key Challenges

The following key challenges have been identified as priority climate hazards for the City of Tenino

- **Drought vulnerability** due to reliance on water-intensive agriculture and sensitive ecosystems.
- **Increasing extreme heat events** impacting residents in poorly insulated or non-air-conditioned buildings, with no public cooling shelters currently available.
- **Extreme precipitation** frequently overwhelms local drainage systems due to the jurisdiction's valley geography, increasing the risk of erosion and infrastructure damage.
- **Flooding** in flat, low-lying areas leads to regular disruptions and slow recovery.
- **High wildfire risk** from drought-affected vegetation in wooded and agricultural areas, with limited fire mitigation measures in place.

Opportunities

- **Enhance water conservation and drought resilience** through efficient irrigation, drought-tolerant crops, and water storage systems.
- **Reduce heat vulnerability** by upgrading building insulation, supporting home cooling strategies, and establishing community cooling centers.
- **Improve stormwater infrastructure** to better manage heavy rainfall and prevent overflow in vulnerable areas.
- **Implement flood mitigation strategies**, including land use planning, elevation of critical infrastructure, and increased public awareness.
- **Strengthen wildfire preparedness** through defensible space policies, fuel management programs, emergency response planning, and public education.
- **Integrate climate risk into planning and development**, ensuring new investments consider long-term environmental and community resilience.

By strategically addressing these challenges, the jurisdiction can not only reduce risk but also improve quality of life, support local economies, and protect vital ecosystems for future generations.

Climate Objectives

| Challenge | Objectives | Measurable Target | Tool(s) |
|-----------|--------------------------|---|--|
| Drought | Reduce water consumption | 15% reduction in municipal and agricultural use by 2030 | EPA WaterSense Program: Tools for promoting water-efficient products and public awareness. https://www.epa.gov/watersense NRCS EQIP (Environmental Quality Incentives Program): Technical and financial support for |

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| Drought | Expand water storage capacity | 25% increase by 2028 | water-saving agricultural practices. https://www.nrcs.usda.gov |
| Drought | Promote drought-tolerant agriculture | Two (2) demonstration projects by 2026 | US Drought Monitor & NOAA's National Integrated Drought Information System (NIDIS): Tools for drought tracking and response planning. https://droughtmonitor.unl.edu |
| Extreme Heat | Establish cooling infrastructure | 1 permanent cooling center by 2026 | CDC Heat & Health Tracker: Identifies heat-vulnerable populations and trends. https://www.cdc.gov/climateandhealth/heat.htm |
| Extreme Heat | Improve building insulation and cooling | 30% of public buildings upgraded by 2030 | DOE Weatherization Assistance Program (WAP): Funding for low-income home insulation and cooling upgrades. https://www.energy.gov/scep/wap |
| Extreme Heat | Community education on heat risks | Reach 80% of households by 2027 | National Integrated Heat Health Information System (NIHHIS): Heat planning and education resources. https://nihhis.cpo.noaa.gov |
| Extreme Precipitation | Upgrade stormwater systems | Systems designed for 100-year storms by 2032 | EPA Green Infrastructure Wizard (GIWiz): Interactive tool for selecting stormwater solutions. https://www.epa.gov/green-infrastructure/giwiz |
| Extreme Precipitation | Implement green infrastructure | Install in 3 public spaces by 2027 | NOAA Atlas 14: Precipitation frequency data for infrastructure design. https://hdsc.nws.noaa.gov/hdsc/pfds/ |
| Extreme Precipitation | Identify pooling-prone areas | Complete mapping by 2026 | FEMA Hazus: GIS-based risk assessment software for flooding and storm events. https://www.fema.gov/flood-maps/tools-resources/hazus |
| Flooding | Protect critical infrastructure | 100% elevated/floodproofed by 2030 | FEMA Community Rating System (CRS): Incentivizes flood mitigation with insurance discounts. https://www.fema.gov/national-flood-insurance-program/community-rating-system |
| Flooding | Regulate floodplain development | Standards enforced for new builds by 2026 | National Flood Hazard Layer (NFHL): Interactive FEMA flood maps. https://msc.fema.gov/portal/home |
| Flooding | Conduct flood risk outreach | Reach 90% of at-risk property owners by 2027 | Flood Resilience Checklist (EPA): Helps evaluate and improve local flood preparedness. |

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| | | | https://www.epa.gov/smartgrowth/flood-resilience-checklist |
| Wildfire | Create defensible space | 100% of public facilities by 2028 | Ready, Set, Go! Wildfire Preparedness Program (International Association of Fire Chiefs): Community engagement toolkit. https://www.wildlandfirersg.org |
| Wildfire | Increase emergency preparedness | 10% annual increase in wildfire drill participation through 2030 | NFPA Firewise USA® : Community wildfire risk reduction planning and certification. https://www.nfpa.org/Firewise |
| Wildfire | Reduce fire-prone vegetation | Treat 200 acres annually through 2030 | CAL FIRE's Wildfire Risk Reduction Grants & CWPP Templates : Funding and planning tools for fuel treatment and community engagement. https://www.fire.ca.gov/grants |

Goals, Policies, and Actions

Greenhouse Gas Mitigation

Agriculture & Food Systems

Goal GG 1: *Ensure that the local agricultural economy – including food and materials producers, distributors, and sellers – is resilient to the impacts of extreme weather and other natural hazards worsened by climate change.*

- Policy GG 1.1** Coordinate with local, regional and state partners to develop and implement a comprehensive strategy to increase water storage for agricultural purposes that will ensure storage has neutral or positive environmental benefits and does not negatively impact fish and other core environmental requirements.
- Policy GG 1.2** Support the local agricultural sector's efforts to adapt to changing climate conditions and capitalize on sustainable business opportunities.
- Policy GG 1.3** Promote environmentally sustainable water-storage and farming practices that help agricultural producers adapt to changing conditions and reduce production losses while balancing ecosystem needs.

Buildings & Energy

Goal GG 2: *Ensure that energy infrastructure – including generation and transmission – is able to accommodate renewable energy opportunities and to withstand and recover quickly from the impacts of extreme weather and other natural hazards worsened by climate change.*

- Policy GG 2.1** Plan and build facilities, utilities, and infrastructure projects to avoid or withstand flooding.
- Policy GG 2.2** Work with energy utilities to improve the safety and reliability of infrastructure vulnerable to climate change.
- Policy GG 2.3** Require new subdivisions to bury electricity transmission lines and associated infrastructure to reduce damage from storms and wildfire ignition risks.

Goal GG 3: *Ensure that buildings are designed and built sustainably to reduce environmental impacts and remain resilient to extreme weather and other hazards worsened by climate change.*

- Policy GG 3.1** Adopt fire-resilience standards for new and redeveloped sites in high-risk wildfire areas.
- Policy GG 3.2** Develop or modify design standards to integrate exterior building features that reduce the impacts of climate change and increase resilience.

Cultural Resources & Practices

Goal GG 4: *Ensure that cultural resources and practices – including significant historic sites and culturally important traditional foods and natural resources – are resilient to the impacts of extreme weather and other natural hazards worsened by climate change.*

- Policy GG 4.1** Protect significant historic sites prone to floods or other hazards worsened by climate change.

Goal GG 5: *Ensure environmental justice by providing all residents an equitable opportunity to learn about climate impacts, influence policy decisions, and take actions to enhance community resilience.*

- Policy GG 5.1** Build and support partnerships with community-based organizations with the capacity and relationships to convene diverse coalitions of residents and to educate and empower them to implement climate resilience actions.

Goal GG 6: Provide emissions-reduction educational workshops, activities, and engagement opportunities, especially those that prioritize equity and underrepresented communities.

- Policy GG 6.1** Partner with schools, libraries, and local organizations to host regular community workshops and attend events to discuss emissions-reduction strategies, including energy efficiency, renewable energy, zero waste living, and clean transportation.
- Policy GG 6.2** Ensure all educational materials and events are culturally and linguistically accessible to residents, with particular attention to historically underserved populations.

Ecosystems

Goal GG 7: Increase tree canopy cover to boost carbon sequestration, reduce heat islands, and improve air quality, prioritizing overburdened communities.

- Policy GG 7.1** Require open space set-asides (such as parks) for new development of multifamily or single-family residential communities.
- Policy GG 7.2** Maximize tree canopy coverage in surface parking lots.
- Policy GG 7.3** Maintain and manage natural lands (forests, grasslands, wetlands) to maintain or increase their carbon concentrations and avoid conversion of carbon-rich ecosystems.

Emergency Management

Goal GG 8: Integrate GHG reduction strategies into emergency preparedness, response, recovery, and mitigation efforts to enhance climate resilience and reduce long-term emissions.

- Policy GG 8.1** Encourage emergency management facilities and backup power systems to transition to low-carbon or renewable energy sources.
- Policy GG 8.2** Ensure the Local Hazard Mitigation Plan (LHMP) includes specific strategies for GHG reduction and climate-smart emergency response infrastructure.
- Policy GG 8.3** Reduce emissions from emergency evacuations and disaster-related transportation through efficient, multimodal, and low-carbon options.
- Policy GG 8.4** Develop local resilience hubs powered by renewable energy to serve as cooling/warming centers, communication hubs, and emergency supply distribution points.

Health & Well-being

Goal GG 9: *Improve community health and well-being through strategies that reduce greenhouse gas emissions and support equitable access to clean air, safe housing, active transportation, and healthy environments.*

- Policy GG 9.1** Expand infrastructure and programs that encourage walking, biking, and transit to reduce emissions and improve physical health.
- Policy GG 9.2** Reduce emissions and improve respiratory health by promoting high-efficiency, low-emission home upgrades.
- Policy GG 9.3** Increase tree canopy and access to green space to reduce urban heat, sequester carbon, and support mental and physical well-being.
- Policy GG 9.4** Design all health-related climate mitigation programs to prioritize vulnerable populations most affected by climate and air pollution impacts.

Zoning and Development

Resilience

Agriculture & Food Systems

Goal RE 1: *Ensure that the local agricultural economy – including food and materials producers, distributors, and sellers – is resilient to the impacts of extreme weather and other natural hazards worsened by climate change.*

- Policy RE 1.1** Coordinate with local, regional and state partners to develop and implement a comprehensive strategy to increase water storage for agricultural purposes that will ensure storage has neutral or positive environmental benefits and does not negatively impact fish and other core environmental requirements.
- Policy RE 1.2** Support the local agricultural sector's efforts to adapt to changing climate conditions and capitalize on sustainable business opportunities.
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Goal RE 2: *Reduce Greenhouse Gas emissions in rural areas.*

- Policy RE 2.1** Phase out the use of gas-powered landscaping equipment.
- Policy RE 2.2** Promote the sale and use of agricultural supplies, pesticides, fertilizers, and fuels that are not derived from fossil fuels.

Buildings & Energy

Goal RE 3: *Maximize solar access of site design, where practicable, for new solar-ready residential and commercial buildings.*

- Policy RE 3.1** Require solar panels on buildings with large rooftops, as well as within or over parking areas.
- Policy RE 3.2** Install distributed renewable energy generation and battery infrastructure at public facilities to store renewable electricity generated on site and provide emergency power that ensures continuity of operations.

Goal RE 4: *Ensure that buildings use renewable energy, conservation, and efficiency technologies and practices to reduce greenhouse gas emissions.*

- Policy RE 4.1** Require additional net-zero greenhouse gas emission features of all new residential and commercial structures.
- Policy RE 4.2** Maximize renewable energy sources for the supply of electricity and heat to new and existing buildings.
- Policy RE 4.3** Retrofit municipal buildings for energy efficiency.
- Policy RE 4.4** Require all municipal buildings to be powered completely by renewable energy by 2045.

Cultural Resources & Practices

Goal RE 5: *Ensure that cultural resources and practices – including significant historic sites and culturally important traditional foods and natural resources – are resilient to the impacts of extreme weather and other natural hazards worsened by climate change.*

- Policy RE 5.1** Protect significant historic sites prone to floods or other hazards worsened by climate change.

Goal RE 6: *Ensure environmental justice by providing all residents an equitable opportunity to learn about climate impacts, influence policy decisions, and take actions to enhance community resilience.*

- Policy RE 6.1** Build and support partnerships with community-based organizations with the capacity and relationships to convene diverse coalitions of residents and to educate and empower them to implement climate resilience actions.

Ecosystems

Goal RE 7: *Ensure the protection and restoration of streams, riparian zones, estuaries, wetlands, and floodplains to achieve healthy watersheds that are resilient to climate change.*

- Policy RE 7.1** Implement actions identified in restoration and salmon recovery plans to improve the climate resilience of streams and watershed.
- Policy RE 7.2** Increase the climate resilience of native fish species and aquatic ecosystems by reducing the threat of aquatic invasive species (e.g., fish, plants, invertebrates).
- Policy RE 7.3** Restore the structure and function of streams and floodplains to increase habitat resilience for cold-water fish.

Goal RE 8: *Ensure the protection and recovery of ecosystems to provide healthy habitat in a changing climate.*

- Policy RE 8.1** Take inventory of and protect climate refugia and habitat connectivity needs for species under stress from climate change.
- Policy RE 8.2** Ensure no net loss of ecosystem composition, structure, and functions, especially in priority habitats and critical areas, and strive for net ecological gain to enhance climate resilience.

Emergency Management

Goal RE 9: *Develop and maintain local government staff members' technical expertise and skills related to climate change and environmental justice so as to improve communitywide policy implementation, equity, and resilience.*

- Policy RE 9.1** Create evacuation plans and outreach materials to help residents plan and practice actions that make evacuation quicker and safer
- Policy RE 9.2** Provide private forestland owners and residents living in Wildland-Urban Interface (WUI) areas information about fire prevention (e.g., Firewise) practices, and support application of such practices via building code provisions.

Goal RE 10: *Enhance emergency preparedness, response, and recovery efforts to mitigate risks and impacts associated with extreme weather and other hazards worsened by climate change.*

- Policy RE 10.1** Map transportation infrastructure that is vulnerable to repeated floods, landslides, and other natural hazards, and designate alternative travel routes for critical transportation corridors when roads must be closed.

- Policy RE 10.2** Factor climate impacts into the planning of operations and coordination of preparedness, response, and recovery activities among first-responders and partners, including public health, law enforcement, fire, school, and emergency medical services (EMS) personnel.
- Policy RE 10.3** Develop resilience hubs – community-serving facilities that are designed to support residents, coordinate communication, distribute resources, and reduce carbon pollution while enhancing quality of life.
- Policy RE 10.4** Support enhanced data collection for hazard events of all magnitudes to provide fuller understanding of the community’s hazard characteristics – including those affected by climate change.
- Policy RE 10.5** Develop and implement a strategy to expedite management of debris (e.g., downed tree limbs and buildings blocking roads and streams) after a disaster incident to reduce the risks of subsequent fire, flood, injury, and disease vectors.

Health & Well-being

Goal RE 11: *Protect community health and well-being from the impacts of climate change-exacerbated hazards – prioritizing focus on overburdened communities – and ensure that the most vulnerable residents do not bear disproportionate health impacts.*

- Policy RE 11.1** Evaluate and implement habitat reduction and population control for arthropod disease vectors (e.g., mosquitos and ticks) and zoonotic disease reservoirs (e.g., rodents) using integrated pest-management methods.
- Policy RE 11.2** Promote the use of health impact assessments and other tools to address the potential impacts of health, equity, and climate change on vulnerable populations.
- Policy RE 11.3** Enhance emergency preparedness, response, and recovery efforts to mitigate risks and impacts associated with extreme weather and other hazards worsened by climate change.