

Mason County, WA

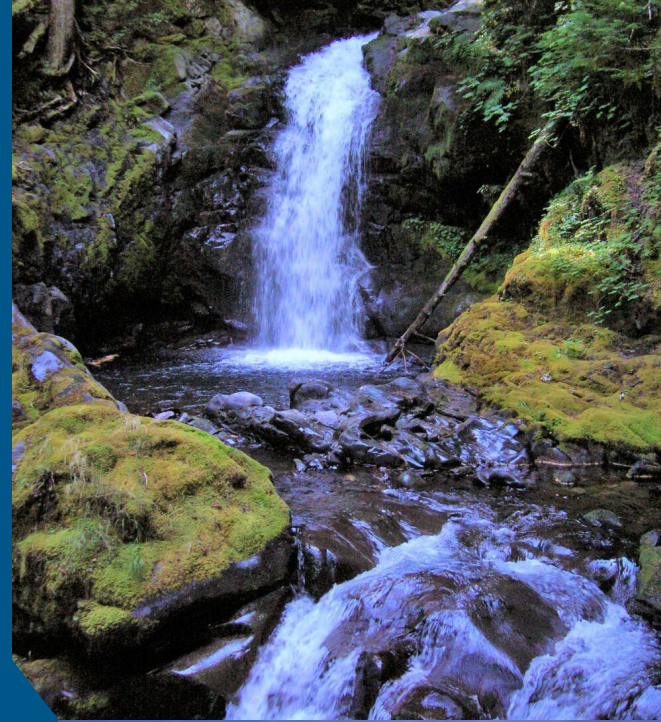
Climate Resilience Sub-Element

PAC | April 28, 2025



Agenda

- The Climate Element
 - Overview of the Climate Resilience Sub-Element
- Climate Impacts: Mason County's Assets & Hazards
- Vulnerability & Risk Assessment
- Relevant Plans & Policies
- Next Steps



Climate Element

House Bill 1181 aimed to address climate impacts for all jurisdictions planning under the Growth Management Act and required them to include a Climate Element in their comprehensive plans.

The Climate Element includes **two sub-elements**:

Climate Resilience Sub-Element

Anticipating, preparing for, and adapting to changes in climate and minimizing negative impacts to our natural systems, infrastructure, and communities.

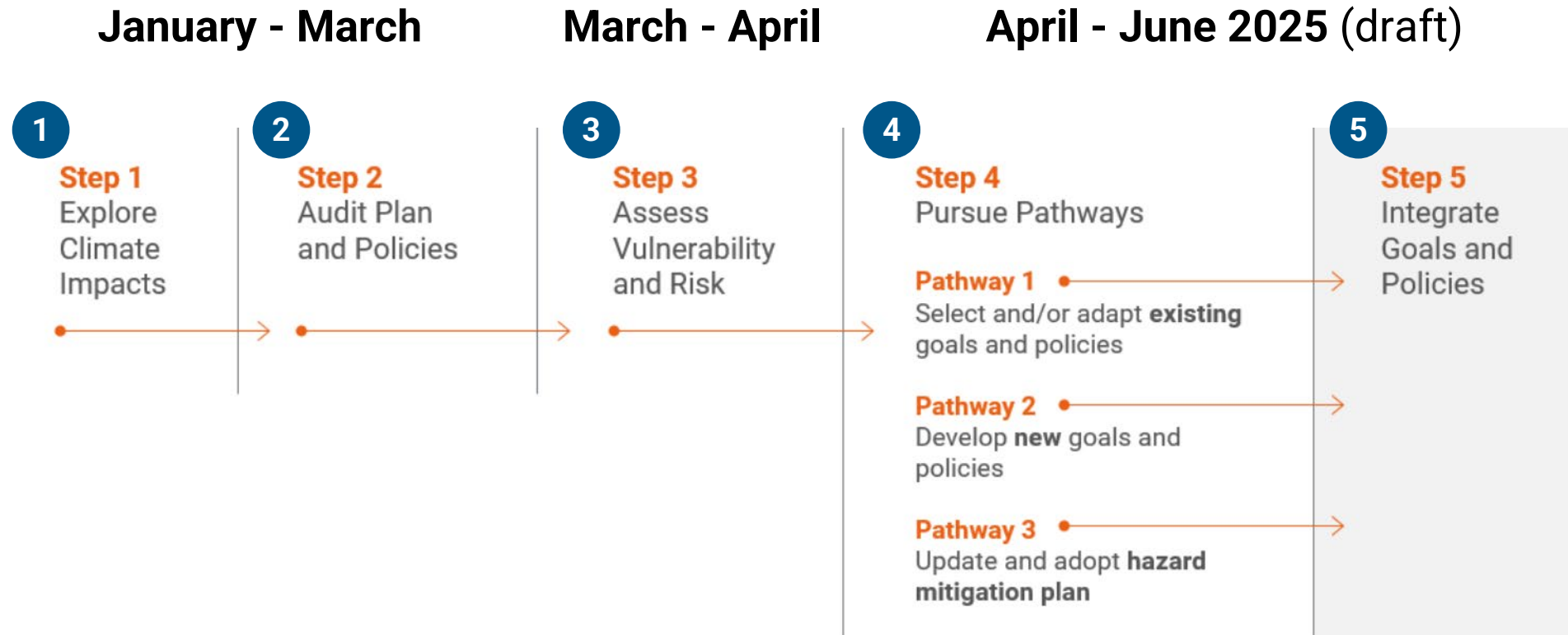
Mandatory for *all jurisdictions* planning fully under the Growth Management Act.

GHG Emissions Reduction Sub-Element

Requires measures to reduce greenhouse gas emissions and per capita vehicle miles traveled.

Mandatory for the state's *largest and fastest-growing* counties and their cities

Climate Resilience Sub-Element | Steps



Climate Resilience Sub-Element | Requirements

Climate resilience goals and policies, at a minimum, must...

Requirement 1:

Address natural hazards created or aggravated by climate change (flooding, drought, extreme rain, heat, wildfire, etc.).

Requirement 2:

Identify, protect, and enhance natural areas to foster climate resilience, as well as areas of vital habitat for safe species migration.

Requirement 3:

Identify, protect, and enhance community resilience to climate impacts, including social, economic, and built-environment factors.

Mason County must develop at least one climate resilience goal and supportive policy:

- Within each of the **11 priority sectors** identified by Commerce
- For each **climate-exacerbated hazard** that is relevant to Mason County

Climate Resilience Sub-Element | 11 Sectors



Agriculture & Food Systems

includes production and distribution



Buildings & Energy

includes generation, transmission, and consumption



Cultural Resources & Practices

includes historic sites and cultural resources and practices



Economic Development

includes business continuity, opportunities



Emergency Management

includes preparedness, response, recovery



Health & Well-being

includes community well-being, equity, and engagement



Ecosystems

includes terrestrial and aquatic species, habitats, and services



Transportation

includes multimodal travel and infrastructure



Waste Management

includes materials recycling and disposal



Water Resources

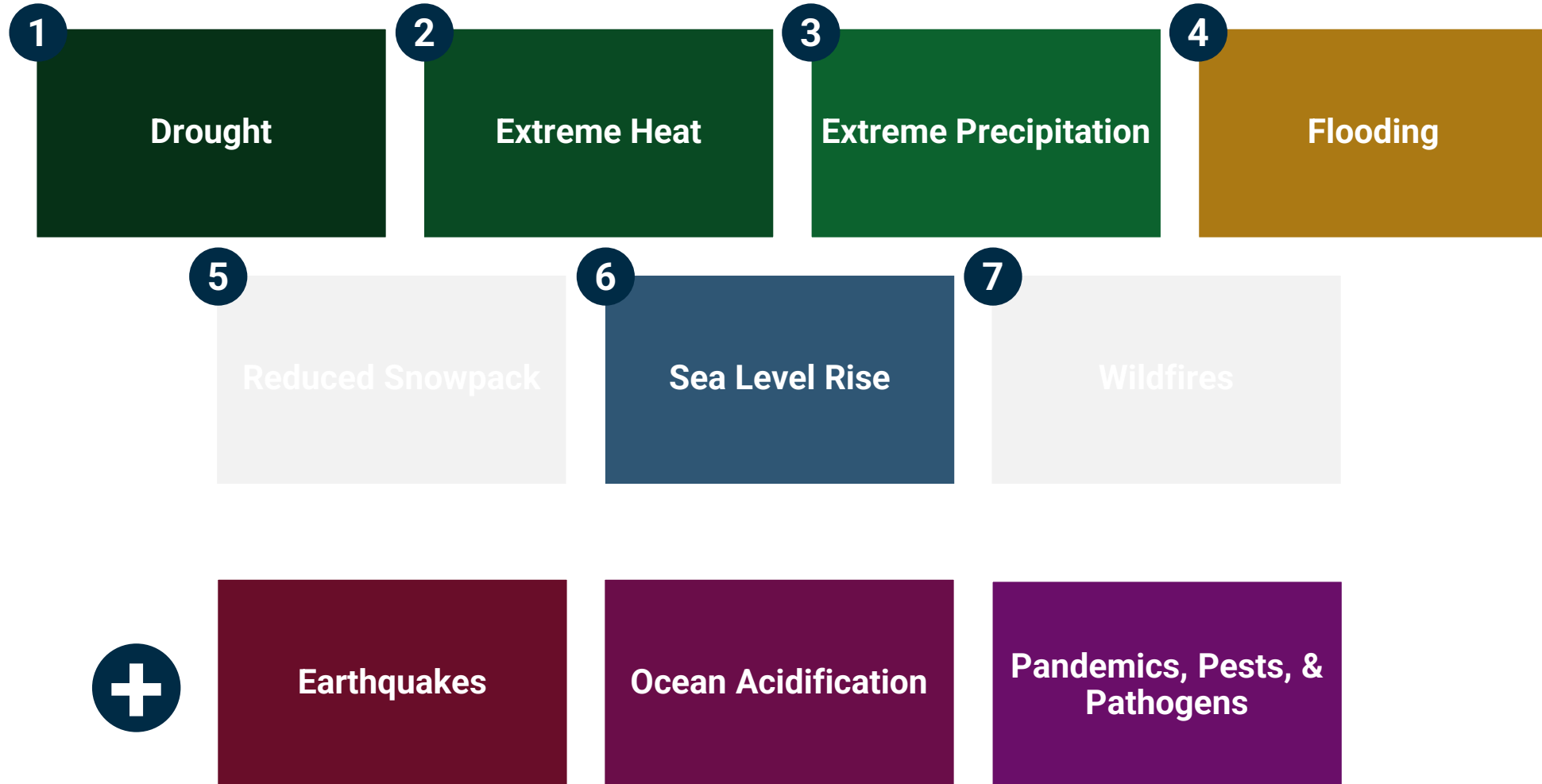
includes water quality and quantity



Zoning & Development

includes site use, design, and other development facets

Climate Resilience Sub-Element | Hazards





Climate Impacts in Mason County

Mason County Assets

Sectors	Assets
1 Agriculture & Food Systems	Aquaculture, agricultural croplands, livestock, poultry and products, Forest products
2 Buildings & Energy	Public Utility District (PUD) facilities and structures, Schools, Grocery Stores, County Facilities (gov bldgs., Court Rooms, Jail/Detention Center/prison), Civic Center, Communication centers and Towers, Power Lines, Dams & Power stations (Tacoma Power)
3 Cultural Resources & Practices	Salmon, Shellfish, Native Tribes and Reservations, Historic buildings and sites, Faith-based structures, Mushroom and berry picking sites
4 Economic Development	Local Banks and Banking Resources, local businesses, Mason County Conservation District, Shellfish Industry, Tourism, Industrial sector, Squaxin Island Tribe (largest employer), Skokomish Tribe, Ports, Aquaculture & Timber Industries, Emerging industries, racetrack
5 Ecosystems	Rivers and streams, marine ecosystems, Lakes, shellfish harvest areas, watersheds, Riparian areas/shorelines, Native plants, Olympic National Forest, State parks, tree canopy, Prairies, open space, state lands, old/mature forests, wetlands

Mason County Assets

Sectors	Assets
6 Emergency Management	Mason County Sheriff, Mason County Fire and EMS, Shelters and Evacuation Centers (including tsunami evacuees from other counties), roadways, community first-responder training, state patrol training
7 Health & Well-being	Elderly Care/Rehabilitation centers, Assisted living, Medical Centers, Air quality, Park systems, Fishing/shellfish Harvesting, golf courses, Mason Lake Recreation Area,
8 Transportation	State Highways, County Roads, Bridges, Trails, Airport, EV Charging Stations, Mason transit authority, waterways, railroad lines
9 Waste Management	Wastewater Treatment Facilities, Stormwater Management Facilities, Solid Waste Facilities, Transfer Stations, Drop Box Stations, Reclamation Centers, recycling facilities, hazardous waste facilities, bio-solids treatment, Septage Stations, Septic Systems, Junk Yards
10 Water Resources	Snowpack, Reservoirs, Groundwater, Rivers and Streams, Water Supply Infrastructure, Individual wells, Water Reclamation Facilities, Community/HOA Wells
11 Zoning & Development	Residential zoning, Tourism Zoning, Commercial, Agriculture Resource lands, Commercial Forest

Mason County Asset-Hazard Pairs

Assets	Hazards	Sectors
Aquaculture, Shellfish, and Salmon Fishing	<ul style="list-style-type: none">• Sea Level Rise• Extreme Heat• Drought	<ul style="list-style-type: none">• Agriculture & Food Systems• Cultural Resources & Practices• Economic Development

Climate Impacts:

- Moderate sea level rise is expected to increase beach and bluff erosion and the frequency of flooding in coastal marshes and tidal flats. Changes in coastal ecosystems can reduce habitats for some aquatic, wildlife, and plant species.
- Warmer stream temperatures are expected to reduce habitat quality for salmonids and other aquatic species that depend on cold water. This reduces the abundance of and access to these culturally important species for Northwest Tribes.

Non-Climate Stressors:

- Use of harmful chemicals and antibiotics.
- Competing habitats between salmon and shellfish, and areas needed for aquaculture and hatcheries.
- Hatchery practices that impact the survival rates of wild populations and increase disease.
- Non-native salmon species.
- Shoreline development removes coastal trees that act as a filtration system for aquaculture and waterways.
- Legal and illegal coastal development.
- Dams, large and small
- Increased impervious surfaces driving more polluted runoff into waters.

Mason County Asset-Hazard Pairs

Assets	Hazards	Sectors
Forests, Native Plants, Timber Industries	• Extreme Heat	• Agriculture & Food Systems
	• Drought	• Cultural Resources & Practices
	• Pest & Pathogens	• Economic Development
		• Ecosystems

Climate Impacts:

- Warmer summers are expected to reduce summer soil moisture and increase physiological stress for some plants and animals.
- Warmer temperatures are expected to reduce tree growth and forest productivity in some areas and increase growth and productivity in mild climates.
- Less summer precipitation will contribute to drought stress and reduce the growth and productivity of some plants.
- Outbreaks of some forest pests, such as mountain pine beetles, are expected to increase.

Non-Climate Stressors:

- Illegal and clear-cut logging.
- Development and urbanization in timberland areas.
- Agricultural expansion.
- Monoculture plantations - reducing biodiversity.
- Invasive plant and insect species.
- Removing protective designations e.g. National Forest.
- Fragmentation from roads and development, disrupting wildlife migration and pollination corridors.
- Speed of timber extracting and harvesting compared to growth cycles.
- Shorter forestry rotations/time between logging cycles; need to incentivize longer rotations to better adapt to climate change.
- Industrial timber extraction practice, e.g., spraying herbicides on crops, impacting soil quality, and heavy machinery killing microbiomes in the soil.

Mason County Asset-Hazard Pairs

Assets	Hazards	Sectors
Air Quality, Parks & Recreation Areas, Aquatic and Terrestrial Harvesting	<ul style="list-style-type: none"> • Extreme Heat • Ocean Acidification • Sea level rise, Flooding, Extreme Precipitation 	<ul style="list-style-type: none"> • Ecosystems • Health and Wellbeing

Climate Impacts:

- Warmer summers are expected to increase concentrations of air pollutants, ozone, and carbon dioxide (CO2). They also foster some vector-borne illnesses, such as West Nile virus. These can drive increased ocean acidification.
- Warmer summers are expected to reduce summer soil moisture and increase physiological stress for some plants and animals. They are expected to reduce tree growth and forest productivity in some areas.
- Outbreaks of some forest pests, such as mountain pine beetles, are expected to increase and thrive in warmer temperatures.

Non-Climate Stressors:

- Shoreline development and related urban waste and runoff.
- Water pollution from increased floods and stormwater runoff bringing toxic substances and pollution into soil and waterways.
- Sprawling development increases emissions and impacts air quality.
- Release of carbon dioxide (CO2) from human activities such as burning fossil fuels.
- Deforestation and the removal of tree canopy.
- Local natural processes driving ocean acidification in marine waters, such as seasonal upwelling of Pacific Ocean water rich in carbon dioxide, deliveries of organic carbon from land, and absorption of other, non-carbon dioxide, acidifying gases from the atmosphere. (Dept. of Ecology, WA)
- Lack of funding for park systems.
- Private companies pulling out of recreation services.

Mason County Asset-Hazard Pairs

Assets	Hazards	Sectors
Roads and Bridges, Culverts, Non-motorized transportation	<ul style="list-style-type: none">• Sea Level Rise• Extreme Heat• Flooding	<ul style="list-style-type: none">• Transportation• Emergency Management

Climate Impacts:

- Heavier precipitation events are expected to intensify flooding, landslides, and erosion, which can interrupt transportation routes, damage infrastructure, and increase maintenance and repair costs.
- More frequent high streamflows are expected to increase the frequency of flood damage to roads, bridges, and railways, leading to higher costs for operation and maintenance. Service delays, cancellations, and reroutes are expected to become more common.
- Heavy storms and flooding have the potential to increase the demand for emergency services to plan, prepare, and respond to such events.

Non-Climate Stressors:

- Population growth, along with more vehicle traffic and associated wear and tear on transportation infrastructure.
- Sprawling development increasing heavy vehicle loads on rural roads.
- Increased impervious surfaces.
- Non-paved roads in many areas.
- Lack of access redundancy for certain communities.
- Lack of infrastructure funding.
- Aging infrastructure (especially bridges and culverts)
- Out-of-county transportation systems management that can impact the local network.

Mason County Asset-Hazard Pairs

Assets	Hazards	Sectors
Utility Lines and Structures	<ul style="list-style-type: none">• Sea Level Rise• Extreme Precipitation• Flooding	<ul style="list-style-type: none">• Buildings & Energy

Climate Impacts:

- More frequent high streamflows are expected to increase flooding. This can cause damage to all types of infrastructure in flood zones and could expand the flood zone in some areas, damaging infrastructure not currently in flood zones.
- Increased landslides due to extreme precipitation and flooding can also impact powerlines and other utility infrastructure.

Non-Climate Stressors:

- Population growth stretches resources and overloads systems.
- Compounding impacts on power systems leading to blackouts and brownouts.
- Policy decisions around hydropower and breaching of dams - impacts to reliability on the power grid.
- Sprawling development increases the need for utility services.
- Lack of infrastructure funding.
- Aging infrastructure.
- Increased impervious surfaces exacerbate flooding.
- Disparity in the quality of services provided depending on location and the company's preferences.
- Inflation and economic stressors leading to vandalism and copper wire stealing.

Mason County Asset-Hazard Pairs

Assets	Hazards	Sectors
Residential and Commercial Zoning, Shelters & Evacuation Centers	<ul style="list-style-type: none">• Sea Level Rise• Extreme Precipitation• Flooding	<ul style="list-style-type: none">• Zoning and Development• Emergency Management

Climate Impacts:

- Heavier precipitation events are expected to intensify urban flooding and demands on stormwater systems, which can affect zoning restrictions on new buildings and require revised building codes for development in more frequently flooded areas.
- Higher streamflows are expected to increase damage to all types of infrastructure in flood zones and could expand the flood zone in some areas, damaging development not currently in flood zones.
- High sea level rise will inundate low-lying areas and intensify coastal flooding, making some locations much harder to reach for emergency response activities, especially when combined with high tides and storm surges.
- More frequent flooding has the potential to increase insurance premiums or make some properties more difficult to insure.

Non-Climate Stressors:

- Encroachment/development on the floodplain.
- Increasing shoreline development.
- Population increase without proper accommodations for density can create sprawl and spread the impact on the environment.
- Zoning allowing development in flood zones.
- Limited capacity to adequately provide timely emergency services to growing populations - limited funding available.
- Lack of dedicated emergency shelters.
- Lack/inefficiency of coordination during emergency events.
- High rates of mobile homes and substandard housing.
- Extremely limited permanent supportive housing options.
- Aging infrastructure for shelters.
- Isolated populations without phone/internet access.

Mason County Asset-Hazard Pairs

Assets	Hazards	Sectors
Storm & Wastewater Facilities, Waterways & Water Sources	<ul style="list-style-type: none">• Sea Level Rise• Extreme Precipitation• Flooding	<ul style="list-style-type: none">• Waste Management• Water Resources

Climate Impacts:

- More frequent high streamflows and heavier precipitation are expected to increase flooding, which can generate more debris and waste. More waste will strain municipal cleanup and refuse capacity.
- Heavier precipitation events are expected to carry debris and pollutants into water streams, impacting water quality.
- Sea level rise is expected to increase saltwater intrusion into groundwater and coastal aquifers, which could reduce water quality.

Non-Climate Stressors:

- Population increase, urbanization, and land use changes challenge resource availability by decreasing water supply or increasing demand.
- Agricultural runoff and industrial pollution.
- Inadequate water management policies, including not informing the public of failure events at treatment plants/overflows.
- The finite amount of locally available freshwater.
- Land management practices that impact the overall water cycle.
- Conflicts over water resources.
- Seasonal and vacation homes increase infrastructure costs for year-round residents.
- Within Shelton, lack of population growth meant fewer people bearing the burden of covering costs.
- Poor maintenance and misuse of septic capacity impacting water.
- Lack of funding for infrastructure.

Mason County Asset-Hazard Pairs

Assets	Hazards	Sectors
Solid Waste & Recycling Facilities, Hazardous Waste Facilities	<ul style="list-style-type: none">• Sea Level Rise• Extreme Precipitation• Flooding	<ul style="list-style-type: none">• Waste Management

Climate Impacts:

- More frequent high streamflows and heavier precipitation are expected to increase flooding, which can generate more debris and waste. More waste will strain municipal cleanup and refuse capacity.
- Flooding of waste management facilities can release contaminants and hazardous materials.

Non-Climate Stressors:

- Population increase, economic development, urbanization, and land use changes challenge resource sustainability by increasing demand for waste treatment facilities.
- Lacking/inefficient industrial waste management policies.
- Location of waste management facilities in areas prone to flooding.
- Workforce availability and stability (due to an aging population and the need for physical labor).
- Increased waste production and rising disposal costs.

Mason County Asset-Hazard Pairs

Assets	Hazards	Sectors
Shelton Port, Racetrack (Ridge Motorsports Park), Golf Courses	<ul style="list-style-type: none">• Sea Level Rise• Extreme Precipitation• Flooding	<ul style="list-style-type: none">• Economic Development

Climate Impacts:

- Moderate sea level rise will increase the frequency and extent of coastal flooding.
- More frequent high streamflows are expected to increase the frequency of flooding impacts to businesses and the economy by disrupting travel and shipping routes and damaging property.
- More frequent flooding has the potential to increase insurance premiums or make some properties more difficult to insure.

Non-Climate Stressors:

- Workforce availability and stability (due to needing specialized/skilled labor).
- Transportation challenges for commuters to the destinations.

Mason County Asset-Hazard Pairs

Assets	Hazards	Sectors
Roads and Bridges, Urban Development, Utility Infrastructure, Waste Facilities, Shelton Port	<ul style="list-style-type: none">• Earthquake	<ul style="list-style-type: none">• Buildings & Energy• Economic Development• Ecosystems• Emergency Management• Transportation• Waste Management

Climate Impacts:

- The impacts of global climate change on earthquake probability are unknown. There is growing evidence that melting glaciers and extreme precipitation could induce tectonic activity.
- Secondary impacts of earthquakes could be magnified by climate change. Soils saturated by repetitive storms could experience liquefaction or an increased propensity for slides during seismic activity due to the increased saturation.

Non-Climate Stressors:

- Soil type and stability.
- Building age and quality of construction.
- Proximity to fault lines.
- Population growth leading to greater demands on existing, aging infrastructure, as well as increasing demand for affordable rural housing options.
- Insufficient tax revenue to maintain and retrofit existing infrastructure.



Vulnerability & Risk

Vulnerability Assessment Methodology

1: Rate Asset's Sensitivity

To what degree is the hazard affecting the asset? Use indicators.

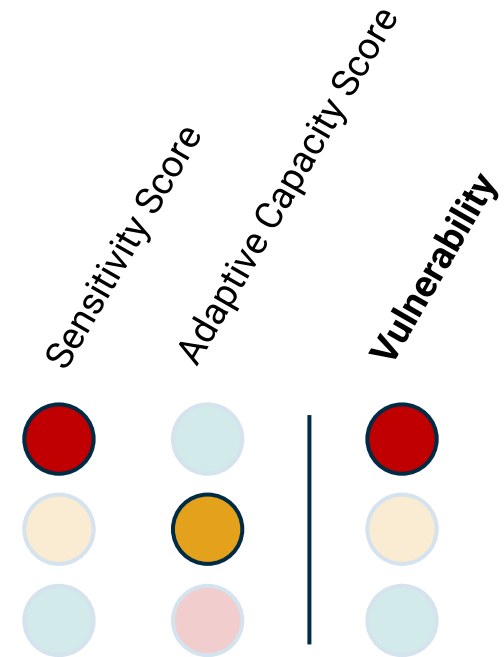
2: Rate Asset's Adaptive Capacity

What is the ability of the asset to adjust to the hazard, take advantage of new opportunities, or cope with change?

3: Assess Vulnerability

Characterize the vulnerability of each asset-hazard pair with a composite, qualitative rating: low, medium, or high.

- For example, assets with **high sensitivity** and **medium adaptive capacity** would be assessed at **high vulnerability**.



Vulnerability Assessment | Asset-Hazard Pairs

Assets	Hazards	Sectors
Aquaculture, Shellfish, and Salmon Fishing	<ul style="list-style-type: none">• Sea Level Rise• Extreme Heat• Drought	<ul style="list-style-type: none">• Agriculture & Food Systems• Cultural Resources & Practices• Economic Development

Sensitivity Indicators:

- **Fragmentation:** High—habitats are already fragmented, limiting species movement.
- **Temperature:** Narrow—species like oysters and salmon are sensitive to temperature changes due to heat and low water levels.
- **SLR exposure:** High—tidal ecosystems are highly exposed to rising seas and salinity intrusion.
- **Disease exposure:** Elevated water temperatures increase susceptibility to pathogens and algal blooms.
- **Cultural impact:** Heat-related declines in salmon directly affect tribal and cultural practices.
- **Streamflow dependency:** High—salmon require adequate freshwater flows for migration and spawning.
- **Salinity fluctuation exposure:** High—shellfish and aquaculture operations are sensitive to increased salinity due to reduced freshwater input.

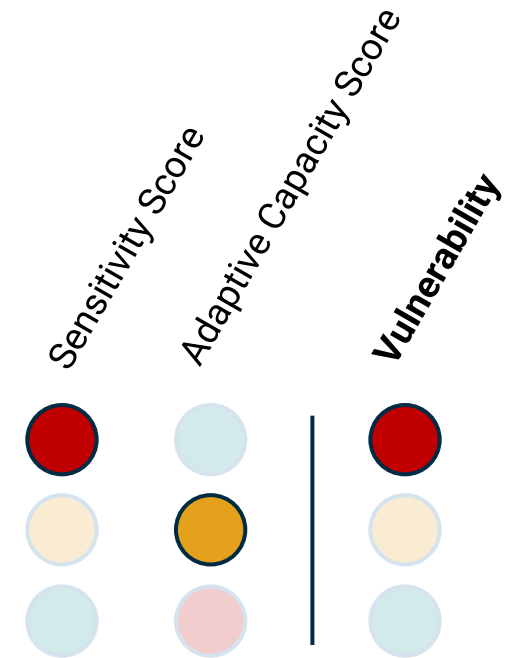


Vulnerability Assessment | Asset-Hazard Pairs

Assets	Hazards	Sectors
Aquaculture, Shellfish, and Salmon Fishing	<ul style="list-style-type: none">• Sea Level Rise• Extreme Heat• Drought	<ul style="list-style-type: none">• Agriculture & Food Systems• Cultural Resources & Practices• Economic Development

Adaptive Capacity Indicators:

- Many operations lack physical barriers or elevation adjustments, but some mitigation strategies exist (e.g., selective breeding for resilient species, relocation of aquaculture sites).
- Financial and institutional resources are limited for small fishers, but tribal and state partnerships (e.g., shellfish recovery programs) enhance capacity.
- Mitigation is limited by the inability to control natural water temperatures in streams and coastal areas.
- Infrastructure like hatcheries may lack sufficient cooling systems.
- Many operations are small-scale with limited financial or technical capacity for rapid adaptation, resulting in low adaptive capacity
- Some hatcheries and aquaculture facilities may implement water recycling, relocate operations, or use alternative water sources. However, wild salmon stocks and small operators lack strong drought contingency measures.

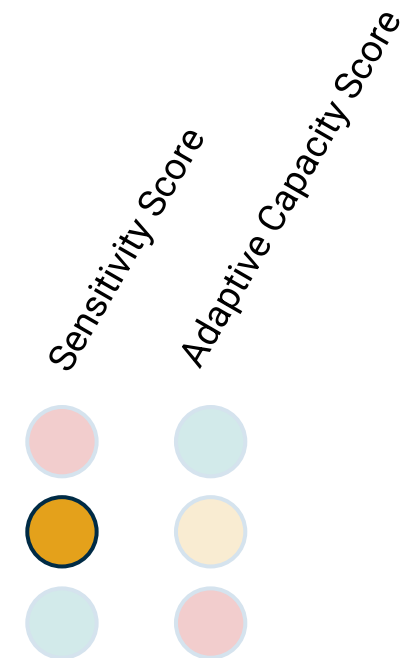


Vulnerability Assessment | Asset-Hazard Pairs

Assets	Hazards	Sectors
Forests, Native Plants, Timber Industries	• Extreme Heat	• Agriculture & Food Systems
	• Drought	• Cultural Resources & Practices
	• Pest & Pathogens	• Economic Development
		• Ecosystems

Sensitivity Indicators:

- **Temperature tolerance:** Moderate – Some tree species are heat-sensitive (e.g., Douglas fir), but others are more resilient.
- **Fragmentation:** Moderate – Mason County forests include some patchy, logged parcels but also large contiguous areas.
- **Moisture loss and fire risk:** Elevated during heat waves.
- **Moisture stress:** Present, but not extreme – most species are moderately drought-tolerant.
- **Overall pest susceptibility:** Heat exacerbates bark beetle pressure.
- **Species pest susceptibility:** Medium – Douglas fir and other species are affected by bark beetles and root rot, but not uniformly.
- **Forest age and condition:** Managed rotation forestry leads to younger, healthier stands.

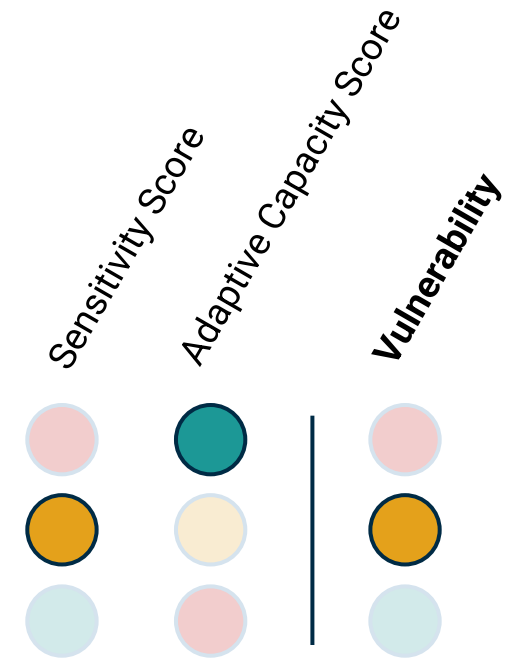


Vulnerability Assessment | Asset-Hazard Pairs

Assets	Hazards	Sectors
Forests, Native Plants, Timber Industries	• Extreme Heat	• Agriculture & Food Systems
	• Drought	• Cultural Resources & Practices
	• Pest & Pathogens	• Economic Development
		• Ecosystems

Adaptive Capacity Indicators:

- Design flexibility: Forestry operations can apply selective thinning, change species, or controlled burns to reduce heat-related stress and conserve water.
- Financial resources: Private companies and public programs (WA DNR, Forest Stewardship) provide resources.
- Staff capacity: Experienced forestry professionals, tribal scientists, and extension staff support planning and response.
- Larger timber operators have some flexibility to shift management practices, though heat-resistant replanting strategies are still emerging.
- Smaller private lands may lack resources, but private and public support and management programs exist.
- Pest monitoring: WA DNR conducts regular pest surveys and forest health assessments.
- Pest management tools: Landowners use targeted thinning, replanting, and integrated pest management.

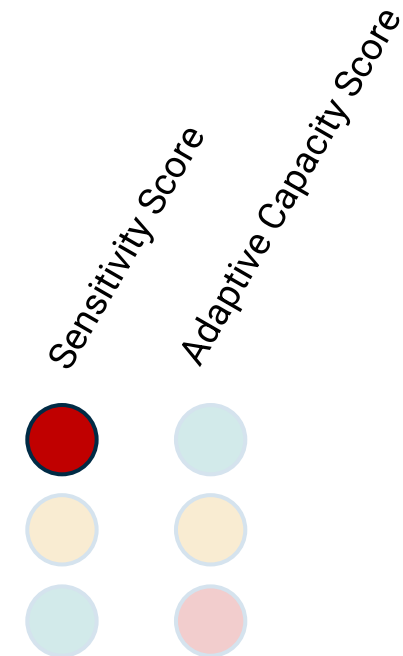


Vulnerability Assessment | Asset-Hazard Pairs

Assets	Hazards	Sectors
Air Quality, Parks & Recreation Areas, Aquatic and Terrestrial Harvesting	<ul style="list-style-type: none"> • Extreme Heat • Ocean Acidification • Sea level rise, Flooding, Extreme Precipitation 	<ul style="list-style-type: none"> • Ecosystems • Health and Wellbeing

Sensitivity Indicators:

- **Air Quality:** Wildfire smoke and stagnant hot air increase ozone and PM2.5 levels, worsening asthma and cardiovascular conditions, especially in children and older adults. Heavy precipitation is often accompanied by damp indoor conditions, contributing to mold risk in homes and community centers, especially affecting vulnerable populations.
- **Parks & Recreation:** Prolonged heat discourages outdoor recreation and increases the risk of heat illness for outdoor workers and visitors. Ocean Acidification affects coastal recreational areas. Many parks and trails in Mason County are in shoreline areas (e.g., Oakland Bay, Potlatch State Park) and are susceptible to flooding, erosion, and saltwater intrusion. Trails and access roads wash out, and facilities close.
- **Aquatic/Terrestrial Harvesting:** Heat can reduce fish activity, change plant productivity, and increase harmful algal blooms, affecting cultural and subsistence harvesters. Ocean Acidification affects shellfish and species that form the base of the food chain. Flooding affects intertidal areas and can degrade water quality and habitat conditions (e.g., shellfish contamination from runoff and sedimentation). Indigenous and subsistence harvesters rely on intertidal areas for clam and shellfish gathering.

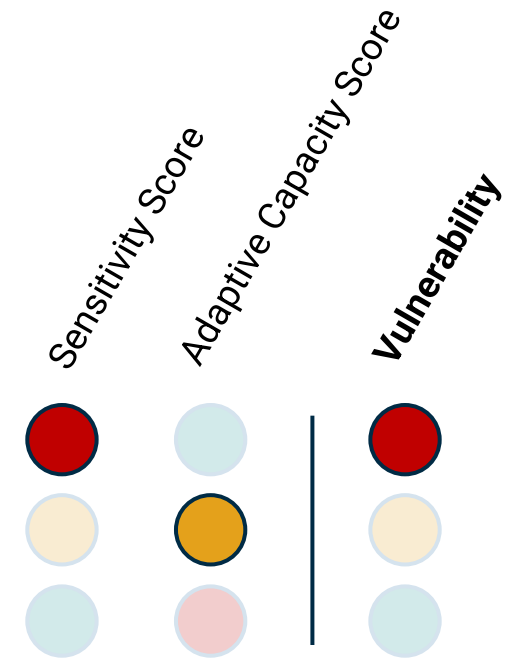


Vulnerability Assessment | Asset-Hazard Pairs

Assets	Hazards	Sectors
Air Quality, Parks & Recreation Areas, Aquatic and Terrestrial Harvesting	<ul style="list-style-type: none"> • Extreme Heat • Ocean Acidification • Sea level rise, Flooding, Extreme Precipitation 	<ul style="list-style-type: none"> • Ecosystems • Health and Wellbeing

Adaptive Capacity Indicators:

- Parks & Infrastructure: Limited capacity to modify hours, provide shade, or monitor air quality in real time. Mason County has started including climate-related risks in parks planning, but retrofitting options are limited due to limited funding.
- Public Health Infrastructure: Mason County Public Health provides heat warnings but lacks widespread cooling centers or transportation options.
- Ocean Acidification (OA): Monitoring through State partnerships with research institutions track OA, improving scientific understanding, but limited ability to mitigate effects on-site. Tribal and subsistence users have deep ecological knowledge but limited ability to counteract impacts directly.
- Harvesting Systems: Indigenous knowledge systems adapt practices, but State regulations are often reactive rather than adaptive. Some tribal and county entities monitor stormwater runoff and close harvesting when necessary, protecting public health but limiting flexibility.
- Air Quality/Health Response: Indirectly affected through increased salinity and degraded wetland buffers. There are emergency alerts and shelter systems, but no robust wet-weather respiratory health programs.

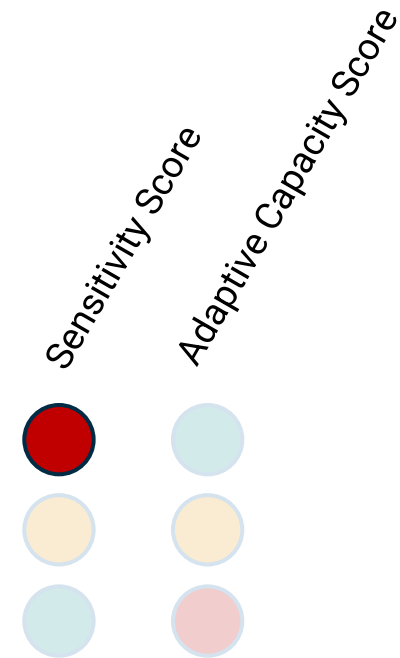


Vulnerability Assessment | Asset-Hazard Pairs

Assets	Hazards	Sectors
Roads and Bridges, Culverts, Non-motorized transportation	<ul style="list-style-type: none">• Sea Level Rise• Extreme Heat• Flooding	<ul style="list-style-type: none">• Transportation• Emergency Management

Sensitivity Indicators:

- **Age & Condition:** Many rural roads and culverts in Mason County are aging, undersized, or designed for outdated precipitation norms. Roads in low-lying areas (e.g., Old Belfair Highway) may not be elevated or armored, but many inland routes are not at direct risk of SLR.
- **Physical Design:** Some bridges and culverts (especially in the Skokomish Valley) frequently experience overtopping and road washouts. They tend to be more vulnerable to riverine flooding than direct sea level rise.
- **Non-motorized Infrastructure:** Trails and bike paths often lack drainage features and are susceptible to erosion or prolonged closure.
- **Location & Design:** In Mason County, some key roads and trails run near Oakland Bay, Pickering Passage, and along the Hood Canal shoreline areas that may see tidal flooding and saltwater intrusion.

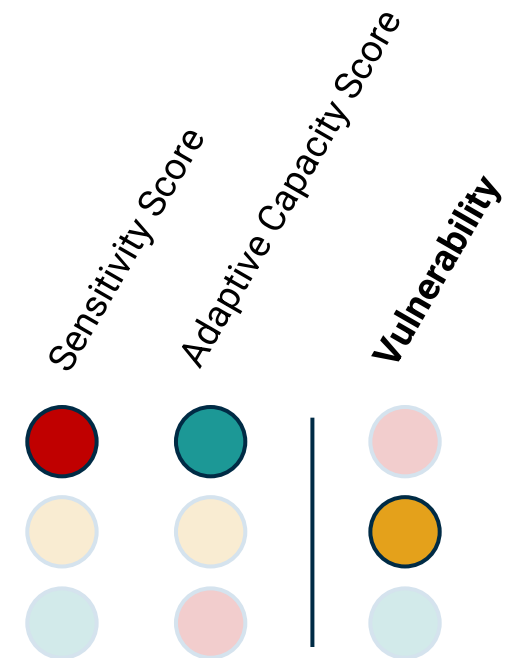


Vulnerability Assessment | Asset-Hazard Pairs

Assets	Hazards	Sectors
Roads and Bridges, Culverts, Non-motorized transportation	<ul style="list-style-type: none">• Sea Level Rise• Extreme Heat• Flooding	<ul style="list-style-type: none">• Transportation• Emergency Management

Adaptive Capacity Indicators:

- **Planning/Upgrades:** The County and WSDOT have begun incorporating climate projections into culvert replacement and floodplain restoration (e.g., fish passage projects). Sea level rise is being considered in shoreline and stormwater planning (e.g., Shoreline Master Program), but not consistently integrated into transportation engineering.
- **Emergency Response:** There are detour and closure systems, but smaller roads and rural routes often lack redundancy.
- **Financial Resources:** Federal and state grants exist (e.g., FEMA BRIC), but implementation is slow and unevenly distributed. Rural counties have limited funding for major elevation or relocation projects and must rely on external grants (e.g., FEMA BRIC, FHWA resilience funds).
- **Engineering Flexibility:** Culverts and coastal roads can be redesigned over time, but not retrofitted quickly.



Vulnerability Assessment | Asset-Hazard Pairs

Assets	Hazards	Sectors
Utility Lines and Structures	<ul style="list-style-type: none">• Sea Level Rise• Extreme Precipitation• Flooding	<ul style="list-style-type: none">• Buildings & Energy

Sensitivity Indicators:

- **Age, Condition, and Design:** Many utility structures in Mason County (e.g., power substations, sewer systems, storm drains) are decades old and not designed for today's extreme rainfall volumes. Many systems were not built with future sea level rise in mind, especially for drainage and pump systems.
- **Location Exposure:** In Mason County, some utility infrastructure, particularly near Oakland Bay, Hood Canal, and low-lying parts of Shelton, is within reach of long-term sea level rise projections (e.g., lift stations, coastal pump stations).
- **Vulnerability of Lines:** Surface water and debris during flood events can damage overhead lines and overwhelm underground cable trenches.

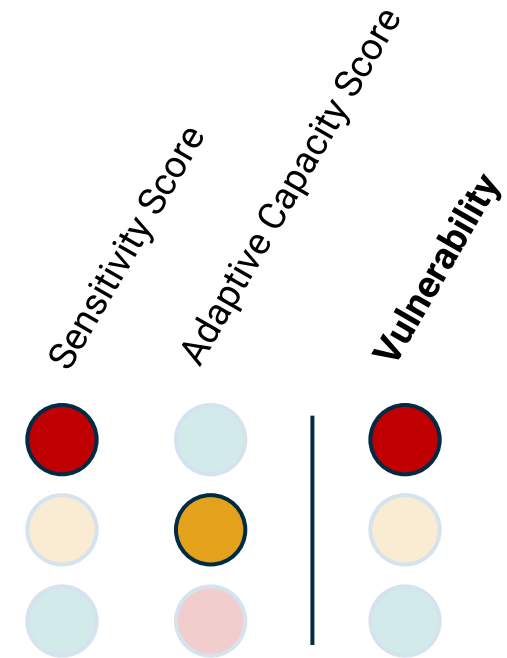


Vulnerability Assessment | Asset-Hazard Pairs

Assets	Hazards	Sectors
Utility Lines and Structures	<ul style="list-style-type: none">• Sea Level Rise• Extreme Precipitation• Flooding	<ul style="list-style-type: none">• Buildings & Energy

Adaptive Capacity Indicators:

- Redundancy & Emergency Response: Mason PUDs and regional utilities can reroute service in some areas; portable pumps and backup generators are available.
- Planning Integration: Recent Capital Improvement Plans acknowledge flood and precipitation risks, but implementation is uneven and not countywide. Sea level rise is beginning to appear in long-term capital facility planning (e.g., sewer lift stations), but strategies are often reactive.
- Funding & Coordination: Some grant-funded resilience projects are underway, but smaller jurisdictions face resource gaps.
- Infrastructure Upgrades: Stormwater improvements are underway in some jurisdictions, but larger system retrofits are expensive and long-term.
- Design Flexibility: Utilities can eventually be redesigned or elevated, but projects are incremental.



Vulnerability Assessment | Asset-Hazard Pairs

Assets	Hazards	Sectors
Residential and Commercial Zoning, Shelters & Evacuation Centers	<ul style="list-style-type: none">• Sea Level Rise• Extreme Precipitation• Flooding	<ul style="list-style-type: none">• Zoning and Development• Emergency Management

Sensitivity Indicators:

- **Zoning Exposure:** Some development has occurred in or near known floodplains (e.g., Skokomish Valley, downtown Shelton), increasing exposure. Most residential and commercial zones in Mason County are located inland, but some shoreline communities (e.g., Union, Allyn, parts of Shelton near Oakland Bay) are susceptible to rising seas, tidal flooding, and rising groundwater.
- **Building Stock Condition:** Older homes and mobile housing units, particularly in rural unincorporated areas, often lack flood resilience features. Buildings in flood hazard zones may not be elevated or designed for long-term tidal inundation.
- **Shelters & Evacuation Centers:** Most evacuation centers are on higher ground (e.g., schools, churches inland), so direct exposure to SLR is limited. However, many community shelters are co-located with schools or churches that may not be elevated or floodproofed.

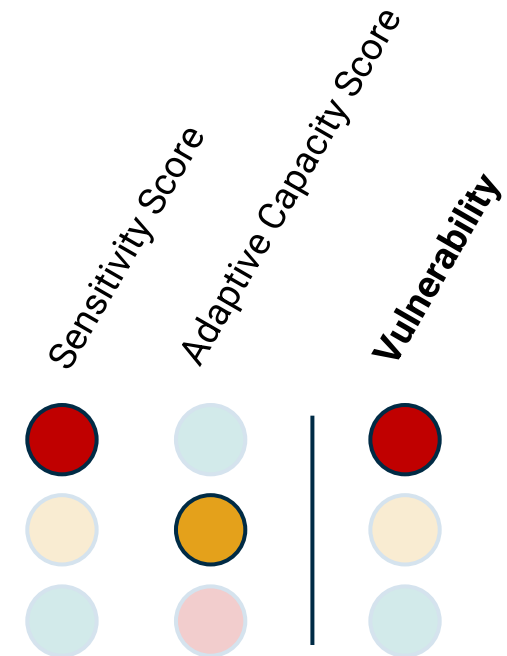


Vulnerability Assessment | Asset-Hazard Pairs

Assets	Hazards	Sectors
Residential and Commercial Zoning, Shelters & Evacuation Centers	<ul style="list-style-type: none"> Sea Level Rise Extreme Precipitation Flooding 	<ul style="list-style-type: none"> Zoning and Development Emergency Management

Adaptive Capacity Indicators:

- **Development Controls:** The County has adopted FEMA floodplain management regulations and requires elevation for new construction in designated areas, but enforcement and mapping updates are ongoing.
- **Shelter Planning:** Emergency Management has basic shelter coordination plans but limited resources for physical retrofits or flood-proofing.
- **Housing Equity:** There is minimal capacity to assist renters or vulnerable homeowners with retrofits or relocation.
- **Planning & Zoning Tools:** Shoreline Master Program updates account for sea level rise and critical areas protections, but zoning changes lag in implementation.
- **Shelter Siting:** Most designated shelters are inland, providing protection.
- **Funding & Community Capacity:** Elevation, retreat, and retrofits for existing homes and businesses are costly and may be unaffordable for low-income coastal residents.

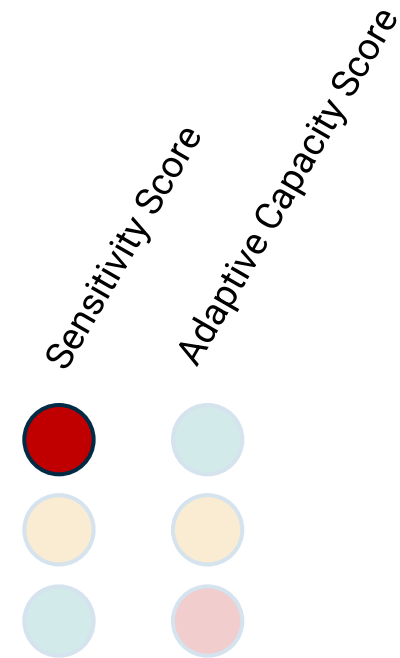


Vulnerability Assessment | Asset-Hazard Pairs

Assets	Hazards	Sectors
Storm & Wastewater Facilities, Waterways & Water Sources	<ul style="list-style-type: none">• Sea Level Rise• Extreme Precipitation• Flooding	<ul style="list-style-type: none">• Waste Management• Water Resources

Sensitivity Indicators:

- **Age and Condition:** Many of Mason County's stormwater and wastewater systems are dated, especially in Shelton and Belfair. Some rely on combined sewer-stormwater systems vulnerable to overflow.
- **Physical Design:** Older pump stations, manholes, and treatment systems are not designed for today's high-intensity rainfall events.
- **Facility Location:** Several stormwater and wastewater facilities are located near Oakland Bay, Hood Canal, and other tidal zones—making them susceptible to inundation, rising groundwater, and saltwater intrusion.
- **Stormwater Backflow:** Coastal outfalls can become overwhelmed during high tides or king tide events, especially during storm surges.
- **Waterways and Water Sources:** Flooding increases turbidity, pollution loads, and risk of source water contamination for wells and surface water intakes. Rising sea levels elevate groundwater tables, increasing the risk of septic system failure and brackish contamination of shallow wells and coastal aquifers.

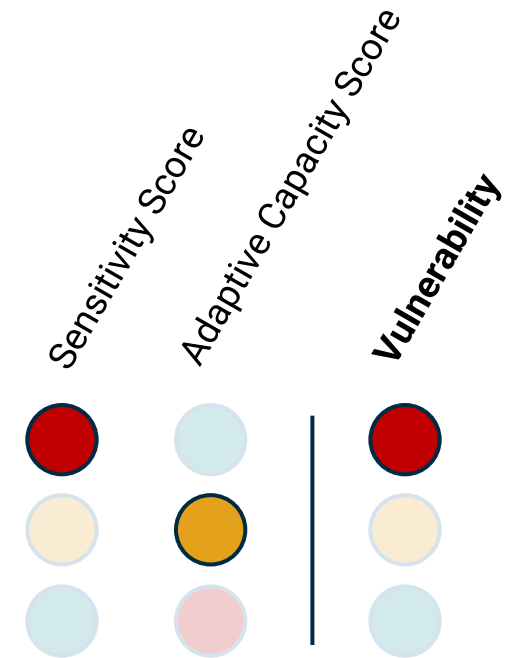


Vulnerability Assessment | Asset-Hazard Pairs

Assets	Hazards	Sectors
Storm & Wastewater Facilities, Waterways & Water Sources	<ul style="list-style-type: none">• Sea Level Rise• Extreme Precipitation• Flooding	<ul style="list-style-type: none">• Waste Management• Water Resources

Adaptive Capacity Indicators :

- Mitigation Measures: Some areas have improved detention ponds, green infrastructure, and backflow prevention, but these are not yet widespread. Some tide gates and backflow valves have been installed, but full facility redesigns are rare and expensive.
- Water Source Monitoring: Some utilities monitor salinity intrusion, but alternative water sourcing or treatment capacity is limited in rural areas.
- Emergency Protocols: Public Works and Emergency Management coordinate overflow response, but rural areas often lack backup systems.
- Funding: Competitive grants (e.g., Ecology's Stormwater Financial Assistance Program) support retrofits, but coverage is limited.
- Planning and Mapping: The County and Ecology have conducted sea level rise vulnerability mapping and have integrated coastal hazard planning into the Shoreline Master Program.

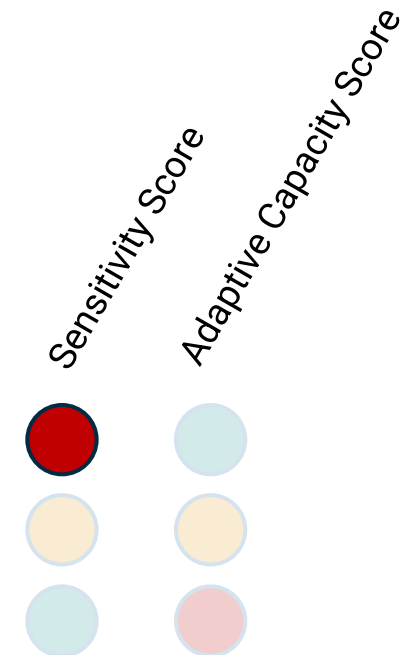


Vulnerability Assessment | Asset-Hazard Pairs

Assets	Hazards	Sectors
Solid Waste & Recycling Facilities, Hazardous Waste Facilities	<ul style="list-style-type: none">• Sea Level Rise• Extreme Precipitation• Flooding	<ul style="list-style-type: none">• Waste Management

Sensitivity Indicators:

- **Facility Location:** Mason County's primary transfer stations and recycling centers are inland but near drainages that flood seasonally. Most permanent solid and hazardous waste facilities are located inland and elevated above current sea level projections. However, temporary or satellite collection points in coastal communities may face long-term risk.
- **Design and Containment:** Most facilities have stormwater control measures, but heavy rainfall can overwhelm containment systems and cause hazardous runoff, especially where hazardous waste (e.g., paint, chemicals) is temporarily stored. Waste facilities are generally buffered from surface water and follow regulatory design standards for stormwater and containment.
- **Operational Disruption:** Flooding can make access roads impassable and delay waste collection and transfer services.
- **Hazard Potential:** If inundation occurred, exposure of waste stockpiles or chemical storage to tidal waters would pose ecological and health risks.

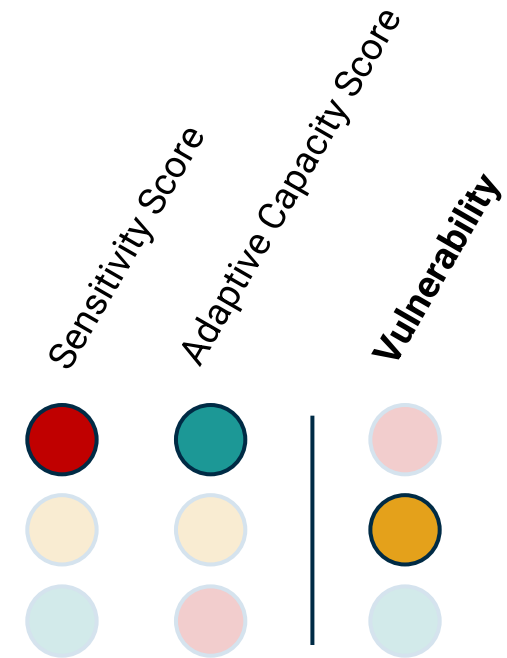


Vulnerability Assessment | Asset-Hazard Pairs

Assets	Hazards	Sectors
Solid Waste & Recycling Facilities, Hazardous Waste Facilities	<ul style="list-style-type: none">• Sea Level Rise• Extreme Precipitation• Flooding	<ul style="list-style-type: none">• Waste Management

Adaptive Capacity Indicators:

- Stormwater Best Management Practices: Facilities have containment zones, storm drains, and diversion systems, but they may be insufficient for extreme precipitation.
- Hazardous Waste Protocols: Collection events are seasonal, and storage is temporary and indoors, reducing long-term exposure risk.
- Planning & Operations: Emergency shutdown procedures exist, and County Public Works coordinates closely with utilities and first responders.
- Planning Awareness: Sea level rise is not yet consistently integrated into waste infrastructure planning, but coastal facility siting policies already limit hazardous uses in flood-prone areas.
- Facility Control: The County directly operates most waste facilities, allowing for coordinated adaptation when risks arise.
- Design Flexibility: Existing engineering controls (e.g., sealed containers, covered structures) reduce exposure risk.



Vulnerability Assessment | Asset-Hazard Pairs

Assets	Hazards	Sectors
Shelton Port, Racetrack (Ridge Motorsports Park), Golf Courses	<ul style="list-style-type: none">Sea Level RiseExtreme PrecipitationFlooding	<ul style="list-style-type: none">Economic Development

Sensitivity Indicators:

- **Port of Shelton:** Includes industrial sites and airport facilities near Oakland Bay; susceptible to stormwater ponding and drainage overload. Some areas of the airport and adjacent industrial lands are near Oakland Bay and could be affected by rising tides and groundwater over time.
- **Racetrack (Ridge Motorsports):** Located inland and at higher elevation, not directly at risk from sea level rise. Located in a forested area with significant impervious surface, vulnerable to erosion and washout during extreme rainfall.
- **Golf Courses:** Some courses near the shoreline or estuarine areas may experience groundwater rise or saltwater intrusion, but most are inland. Heavy rain can overwhelm drainage systems, leading to flooding, closures, and turf damage, especially on low-lying fairways.

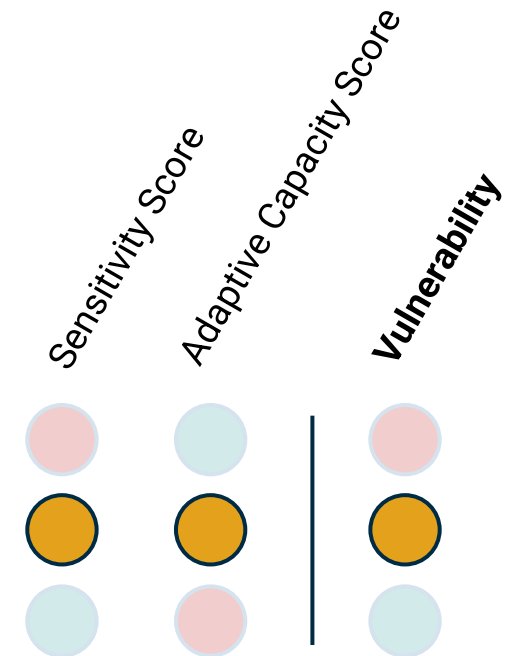


Vulnerability Assessment | Asset-Hazard Pairs

Assets	Hazards	Sectors
Shelton Port, Racetrack (Ridge Motorsports Park), Golf Courses	<ul style="list-style-type: none">• Sea Level Rise• Extreme Precipitation• Flooding	<ul style="list-style-type: none">• Economic Development

Adaptive Capacity Indicators:

- Drainage Systems: Port facilities and golf courses maintain drainage and stormwater systems, though not always designed for current rainfall extremes.
- Response & Coordination: Port of Shelton has emergency response protocols; private operators (racetrack and golf courses) typically close temporarily and conduct maintenance post-event.
- Funding: Some public infrastructure (Port) may qualify for improvement grants, while private facilities may face greater financial limitations.
- Long-term Planning: Port Facilities managed by a public authority have access to planning resources and funding for shoreline infrastructure adaptation. Sea level rise is not consistently factored into long-term economic development strategies.
- Racetrack & Golf Courses: Privately operated, may have less incentive or ability to invest in proactive adaptation unless directly impacted.



Vulnerability Assessment | Asset-Hazard Pairs

Assets	Hazards	Sectors
Roads and Bridges, Urban Development, Utility Infrastructure, Waste Facilities, Shelton Port	<ul style="list-style-type: none">• Earthquake	<ul style="list-style-type: none">• Buildings & Energy• Economic Development• Ecosystems• Emergency Management• Transportation• Waste Management

Sensitivity Indicators:

- **Transportation & Roads:** Mason County's roads and bridges include older structures not designed to current seismic standards. Some lie near unstable slopes and alluvial soils.
- **Urban Development:** Many structures in Shelton and rural areas are wood-frame or older concrete/masonry buildings with limited retrofitting.
- **Utility Infrastructure:** Overhead power lines, pump stations, and gas lines are at risk of disruption or rupture.
- **Waste Facilities:** Unsecured hazardous waste and landfill sites may rupture or leak.
- **Shelton Port:** Industrial buildings and transportation linkages could suffer foundational damage.

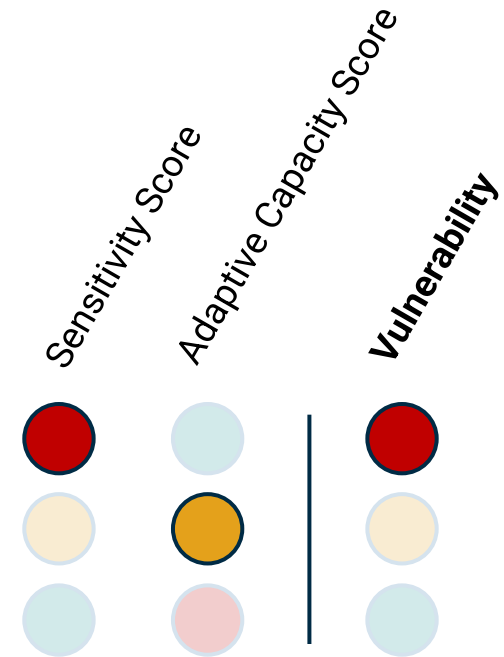


Vulnerability Assessment | Asset-Hazard Pairs

Assets	Hazards	Sectors
Roads and Bridges, Urban Development, Utility Infrastructure, Waste Facilities, Shelton Port	<ul style="list-style-type: none">• Earthquake	<ul style="list-style-type: none">• Buildings & Energy• Economic Development• Ecosystems• Emergency Management• Transportation• Waste Management

Adaptive Capacity Indicators:

- Seismic Retrofit Planning: Limited retrofits have occurred across public infrastructure; funding constraints delay widespread implementation.
- Emergency Operations: The County has a hazard mitigation plan and continuity plans, but gaps remain in backup infrastructure.
- Cross-Sector Coordination: Agencies have protocols but rely on post-event coordination more than pre-event structural resilience.



A scenic sunset over a large body of water, likely a lake or bay. The sun is low on the horizon, casting a warm orange and yellow glow across the sky and reflecting on the water. In the foreground, a dark, rocky shoreline is visible with a metal railing and a small structure. A long pier extends into the water, supported by several vertical posts. In the background, a range of dark mountains is silhouetted against the sky. The overall atmosphere is calm and serene.

Relevant Plans & Policies

Relevant Plans & Policies

- **Mason County Plan 2016-2036**
 - To be replaced with this new Comprehensive Plan
- Shoreline Master Program 2021
- Mason County PROST Plan 2022-2027
- Hazard Mitigation Plan 2023



Auditing Goals and Policies

Example Goals & Policies from the 2016 Comprehensive Plan

Transportation 3.5 - Promote interconnecting street networks that provide alternative routes.

- Relevant Sectors: Emergency Management, Transportation
- Gaps & Opportunities: Address sensitivity to roads impacting ecosystems and fragmenting habitats.
- Next Steps: Update to consider impacts to ecosystems in the planning stages.

Economic Development 5.6 - In environmentally sensitive areas, ensure land use permit processes control activities which may have a detrimental effect on public health, safety, or the environment, consistent with state and federal requirements.

- Relevant Sectors: Agriculture & Food Systems, Economic Development, Ecosystems, Health & Well-being, Water Resources, Zoning & Development.
- Gaps & Opportunities: Propose some level of environmental review in all areas.
- Next Steps: Carry forward.

Auditing Goals and Policies

Example Goals & Policies from the 2016 Comprehensive Plan

Open Space 9.2 - Provide accessible public open space and protect environmentally important areas without compromising private property rights.

- Relevant Sectors: Ecosystems, Health & Well-being, Zoning & Development
- Gaps & Opportunities: No reference to Treaty Rights. Should include wherever Private Rights are mentioned.
- Next Steps: Carry forward and add *“and Treaty Rights.”*

Open Space 9.5 - Encourage retention of open space and the development of recreational opportunities like parks and public-use recreation areas appropriate for camping, hiking, horseback riding, and off-leash dog exercise.

- Relevant Sectors: Cultural Resources & Practices, Ecosystems, Health & Well-being, Zoning & Development
- Gaps & Opportunities: No reference to maintaining these assets.
- Next Steps: Carry forward and add *“retention and maintenance...”*

Auditing Goals and Policies

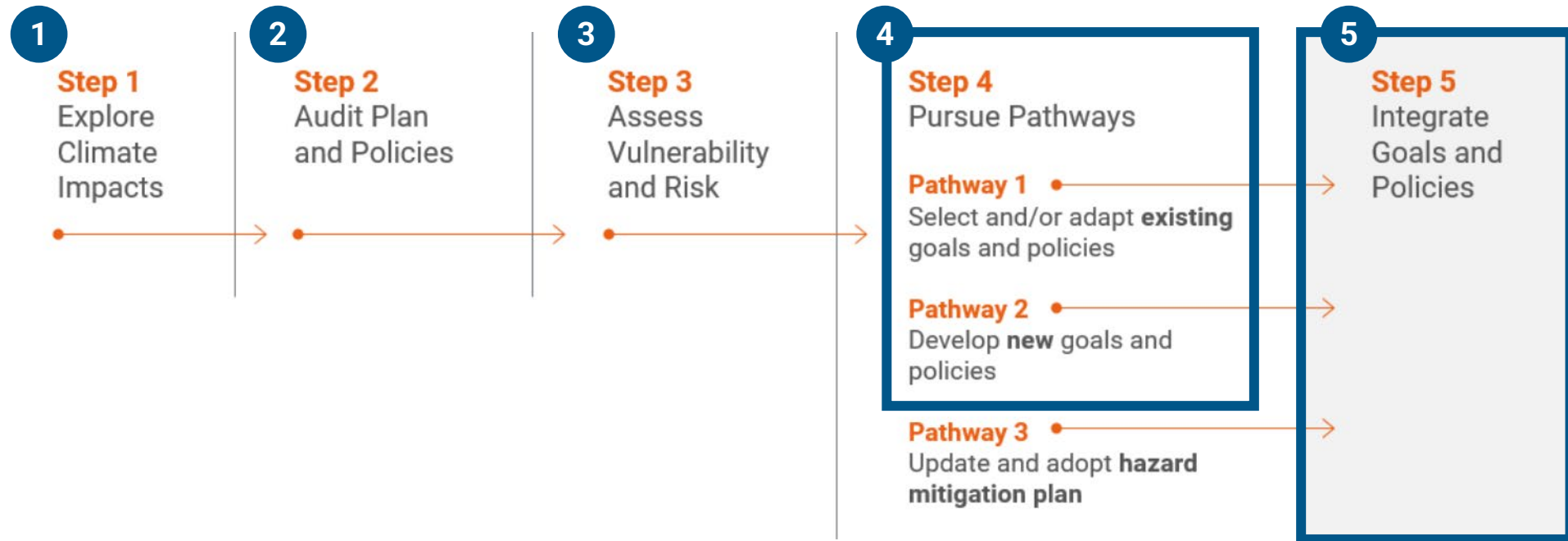
Goals & Policy Gaps missing in the 2016 Comprehensive Plan

- Explicitly addressing the needs of vulnerable populations and their increased exposure to climate impacts:
 - Elderly and young populations
 - Populations with underlying illnesses and disabilities
 - Unhoused populations
 - Rural populations prone to isolation during hazardous events
- Including Emergency Management policies that address language accessibility in emergency notices
- Lacking policies on Waste Management



Next Steps

Climate Resilience Sub-Element | Next Steps





Thank you.

