County of Chelan

2026 Chelan County Climate Resilience Element

Risk Assessment Summary

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Contents

BACKGROUND

Following the Washington State Department of Commerce's Intermediate Planning Guidance document, we have used the Climate Element Workbook to document our assessment of climate impacts, existing plans and policies, and climate change vulnerabilities. This summary describes the data added to the workbook and planning deliverables 2, 3, and 4.

Climate change scenarios and data

The Chelan County Climate Advisory Team supported the identification of assets to be evaluated in the assessment. The assets were evaluated against hazards including drought, extreme heat, extreme precipitation, flooding, reduced snowpack, wildfire, and wildfire smoke.

We identified climate hazards, indicators, and impacts specific to Chelan County using the Climate Mapping for a Resilient Washington ("CMRW") webtool. The CMRW tool provided a long list of climate indicators across 11 sectors, including agriculture, buildings and energy, cultural

resources and practices, economic development, ecosystems, emergency management, human health, transportation, waste management, water resources, and zoning and development. The assessment used the higher greenhouse gas scenario (RCP 8.5) as compared to the lower greenhouse gas scenario (RCP 4.5) as the scenarios do not differ significantly prior to 2050.

Primary information sources

01 **UW Climate Mapping for a Resilient Washington:** A climate projections database used to build baseline awareness of how climate change is expected to affect Chelan County (water resources, transportation, etc.) and its social, economic, and environmental assets in coming decades. The Department of Commerce considers the CMRW webtool a source of best-available science and scientifically credible projections.

02 **Washington Department of Health Environmental Health Disparities Map:** The Environmental Health Disparities map is a collage of lived experiences across Washington. It compares communities using census tracts to identify disparities. Using the EHD map can determine where more attention needs to be paid to address and reduce the specific pollution, societal, and health harms affecting Washington residents.

03 **NOAA National Centers for Environmental Information:** NOAA NCEI provides access to an extensive archive of environmental data through several platforms. It provides climate, coastal, oceanographic, and geophysical data in a variety of formats.

04 **FEMA National Risk Index:** The National Risk Index is a dataset and online tool to help illustrate the United States communities most at risk for 18 natural hazards. It was designed and built by FEMA in close collaboration with various stakeholders and partners in academia; local, state and federal government; and private industry.

05 **Western Regional Climate Center:** The WRCC acts as a repository for high-quality historical climate data and information for the western U.S., a region covering the eleven westernmost states, including Alaska, Hawaii, and the U.S.

06 **CDC Social Vulnerability Index:** The Centers for Disease Control and Prevention and Agency for Toxic Substances and Disease Registry Social Vulnerability Index is a place-based index, database, and mapping application designed to identify and quantify communities experiencing social vulnerability.

07 **FirstStreet.Org:** A platform that assesses and quantifies climate risk, particularly focusing on flooding, wildfire, and other climate hazards for properties globally. It provides data and tools for individuals, businesses, and governments to understand and manage climate-related financial risks.

08 **Wildfirerisk.Org:** A free resource created by the USDA Forest Service to help communities understand, explore, and reduce wildfire risk. It provides interactive maps,

	charts, and tools to help community leaders, such as elected officials, planners, and fire managers, assess and address wildfire risk. The website was last updated in May 2024.
09	**2024 Chelan County Hazard Mitigation Plan:** The Chelan County HMP is a comprehensive document that identifies natural hazards, assesses potential risks, and outlines strategies to mitigate and respond to hazard events within the county. It was approved by FEMA on December 6, 2024.
10	**2025 Chelan County Community Wildfire Protection Plan:** The Chelan County CWPP is a comprehensive document that assesses wildfire risk, identifies areas for risk reduction, and outlines mitigation strategies for Chelan County. It was adopted by the Board of County Commissioners on March 31, 2025.

CLIMATE RISK ASSESSMENT

Deliverable 4b

To determine vulnerability, we evaluated asset-hazard pairs for sensitivity and adaptive capacity using a qualitative rating system. Wildfire hazards were not included in the vulnerability assessment because the vulnerability was already known to be high based on the 2025 CWPP. Based on the results of the assessment, each asset-hazard pair was assigned a vulnerability risk rating of low, medium, or high.

Vulnerability criteria and rating

The framework for determining climate change vulnerability consists of three key components: exposure, sensitivity, and adaptive capacity. Exposure assesses the degree to which a system is subject to climate-related hazards, such as rising temperatures or extreme weather events, highlighting areas that face the greatest risk. Sensitivity evaluates how inherently affected a system is by these climate impacts, considering characteristics that may heighten vulnerability, such as age and condition of infrastructure or socio-economic factors like poverty. Adaptive capacity measures a system's ability to adjust to climate change and minimize damage, influenced by governance, available resources, technologies, and social networks.

Each asset-hazard pair was assigned a high, medium, or low sensitivity and adaptive capacity rating. The sensitivity and adaptive capacity ratings were determined using indicators such as age, asset condition, physical design, social assets, and economic costs. These indicators were compared to the criteria to determine the ratings. The ratings were then charted to determine the overall vulnerability rating for each asset-hazard pair.

Table: Criteria used to determine the level of sensitivity and adaptive capacity.

	Sensitivity	Adaptive Capacity
Low	• Minor repairs and accommodation required. • Slight inconveniences and temporary loss of services. • Minor disruption to business continuity and minimal loss of revenue and wages. • Little to no increase in costs and demands to respond to emergency events.	• Adaptive solutions are innovative but costly. • Adaptive solutions may require coordination with multiple agencies to implement, leading to disruptions in service and longer implementation times. • Solutions require change in lifestyle or changes in political decisions. • The ability to avoid damage is limited.
Medium	• Temporary loss of food production, transportation, and distribution. Temporary loss of functionality and operations closure of emergency response services. • Moderate repairs and replacements required. • Moderate increase in costs and demands to respond to emergency events.	• Impacts can be reduced or mitigated to a certain extent; however, adaptive solutions are only feasible for limited assets. • Some assets may face difficulties in adapting in terms of cost and implementation. • Coordination with third party agencies may be necessary for adaptivity measures. • Solutions require some change in systematic operations but are somewhat executable.
High	• Significant impact requiring reconstruction of parts or an entirety of an asset. • Extensive rehabilitation of assets resulting in long-term or permanent loss of functionality or operations closure. • Significant impact to vulnerable populations due to flooding and extreme precipitation-related deaths and illnesses, population displacement, or migration. • Permanent loss of species is not able to adapt to weather events exacerbated by climate change.	• Assets can adapt with little to no difficulty. • Direct influence on the implementation of strategies or solutions for the asset is apparent. • Adaptive solutions are highly feasible for most, if not all assets with affordable costs. • Solutions are implemented immediately and face little to no resistance.

Risk assessment results

The following section summarizes the risk assessment process and results for each asset-hazard category.

Assessing risk

Determining Risk is a result of multiplying the probability (the likelihood of an event occurring) by the magnitude (the extent of damage). Each hazard is given a probability based on historical data and future projections, then assigned a corresponding score. Magnitude is a result of ranking the vulnerability, redundancy, cost, and criticality. The individual ranks were assigned a corresponding score and totaled to provide a magnitude score. These scores were multiplied to provide a risk score. Risks were categorized into Low, Medium, and High, corresponding to score ranges of 3-11, 12-21, and 13-30, respectively.

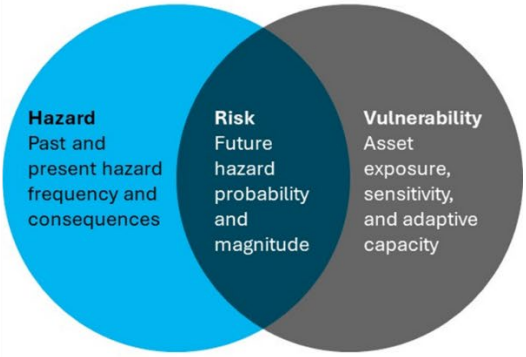
Vulnerability

- Three key components: exposure, sensitivity, and adaptive capacity
- Exposure assesses the degree to which a system is subject to climate-related hazards
- Sensitivity evaluates how inherently affected a system is by these climate impacts
- Adaptive capacity measures a system's ability to adjust to climate change and minimize damage

Risk

- Two key components: probability and magnitude
- Probability evaluates the likelihood of specific climate change impacts occurring in a given region or system
- Magnitude refers to the severity and scale of potential impacts associated with identified climate risks, examining the physical, economic, and social consequences of climate events

Figure 8: Relationship Between Hazard, Vulnerability, and Risk



Source: Washington Department of Commerce

Risk criteria

Probability Likelihood of occurring	Magnitude Extent of damage or loss
Probability includes historical data and future projections **Low** Less than once every 20 years **Medium** Every 5-20 years **High** Within 1-5 years	**Vulnerability** Result from vulnerability assessment **Redundancy** Duplication of systems or components to ensure continued operation in the event of a failure of a single part **Financial Loss** Potential financial impact based on FEMA Risk Index and asset-hazard pair analysis **Criticality** Risk to life and safety

Probability X Magnitude = Risk

Low risk: 3-11
Medium risk: 12-21
High risk: 22-30

Vulnerability and Financial Loss: Low (1) Medium (2) High (3) | Redundancy: Low (3) Medium (2) High (1) | Criticality Yes (1) No (0)

Hazard data used in the risk assessment

Data sources are listed on page two of this document.

Drought and snowpack decline:

Historical conditions	Projected changes
• Between 1955 and 2016, the spring snowpack in the Cascades declined by an average of about 30% (Chelan County) • Chelan County and other parts of the Cascades have seen declines ranging from 50% to 60% since the 1950s (Chelan County) • Extreme drought (D3) conditions in Chelan County 8 of the last 25 years (2000-2025) (Drought.gov)	• 20% chance of snowpack drought on average, with some areas in Chelan County having a 100% likelihood[01] Up to 37% chance of a summertime precipitation drought in any year[01] • Some parts of the county will experience up to 18% less late summer precipitation[01]

Extreme temperatures and weather:

Historical conditions	Projected changes
• In 55 years, the county has experienced 153 severe weather events, averaging 2-3 per year[09] • Common types of storms include thunder, hail, wind, winter-related blizzards, etc.[09] • Federal DR or EM Declaration, 1953-2023: 7 events classified as severe storm[09]	• More unpredictable storms and severe weather events, including wind[01] • Up to 5.2°F increase in summer maximum temperature in some parts of the county[01] • Increased frequency and duration of heatwaves[01]

Extreme precipitation and flooding:

Historical conditions	Projected changes
• Chelan County has received 5 presidential disaster declarations for flooding since 2000[09] Large, damaging floods typically occur every 2-5 years[09] • Regular occurrences of flash flooding, especially in canyons[09]	• Peak streamflow is anticipated to increase 7-30% by mid-century[01] • Likelihood of the 2-year storm rises to 11% by mid-century[01] • 63% of rivers and streams may flood more frequently[01]

Wildfire and smoke:

Historical conditions	Projected changes
• The county sees up to 70 wildfire ignitions each year and an average of 1-6 major wildfires from those[09] • In September 2025 alone, 5 fires started from dry lightning (Chelan County)	• The number of smoke days is projected to increase across the County[07] • Up to 100% chance that any year (2020-2049) will have climate and fuel conditions favorable for wildfire – up to 20% more high fire days in some areas[01] • Up to 201 dry days, with 31 consecutive days (Drought.gov)

Asset hazard pairs assessed for risk

1	Orchards, ranches, vineyards, and other food producers	X	X		X
2	Agriculture-related businesses (fruit processing, storage, equipment suppliers)	X	X		X
3	Power infrastructure (transmission lines, substations), hydroelectricity, natural gas system	X	X	X	X
4	Emergency radio and radio communications, other communication systems			X	X
5	Commercial & businesses, county buildings, medical facilities, schools, churches, community, historical		X	X	X
6	Cultural sites, culturally significant activities	X	X	X	X
7	Recreation areas, tourism, fairgrounds, open spaces, parks	X	X	X	X
8	Sensitive aquatic and terrestrial species and habitats, including waterways, wetlands, shrub-steppe, ESA	X	X	X	X
9	Sheriff Department, Fire Stations, Emergency Management			X	X
10	Community members, vulnerable populations, visitors, farm workers	X	X	X	X
11	Transportation infrastructure including roads, sidewalks/pathways, bridges/culverts		X	X	X
12	Waste hauling, waste management, recycling			X	X
13	Water supply, water infrastructure, irrigation infrastructure	X		X	X
14	Sewer and wastewater infrastructure, stormwater infrastructure			X	X
15	Industrial land, undeveloped land, LAMIRDs				X
16	Residential buildings, farm worker housing		X	X	X

Orchards, ranches, vineyards, and other food producers

Crop loss is a recurring issue in the County, exacerbated by drought, severe weather, and climate change impacts such as snowpack loss, invasive species adaptation, and extreme heat affecting both crops and workers. Orchards dependent on surface water supplied irrigation and middle-elevation lands are especially vulnerable. Some producers are already taking adaptive measures, such as crop covers and frost protection, but occasional crop failures are still expected. Solutions, including investments in irrigation efficiency, watershed-level drought planning, the Voluntary Stewardship Program, and regional strategies like the Icicle Strategy, are essential. Less than 2% of agricultural land is at risk from flooding, and impacts from floods or landslides are generally localized and temporary.

Risk summary

Hazard	Probability	Vulnerability	Redundant	Cost	Critical	Magnitude	Risk
Drought & Snowpack Decline	**High**	Medium	Low	High	No	**High**	**High**
Extreme Temperatures & Weather	**High**	Medium	Low	Medium	No	**Medium**	**Medium**
Wildfire & Smoke	**High**	Medium	Low	High	No	**High**	**High**

Agriculture-related businesses

Agriculture-related businesses, including fruit processing, storage, and equipment suppliers, face long-term vulnerability to drought, primarily through the potential loss of locally provided products and eventual loss of products for businesses dependent on a single source, resulting in reduced demand for equipment and supplies. These drought impacts are less about physical infrastructure and more about the availability of agricultural products moving through these operations. While

flooding can damage facilities and reduce productivity, these instances are comparatively localized. Recent county policies and plans, such as those adopted in Resolution 2022-09, aim to address vulnerability to climate change through updated goals and coordinated actions in the HMP and CFHMP.

Risk summary

Hazard	Probability	Vulnerability	Redundant	Cost	Critical	Magnitude	Risk
Drought & Snowpack Decline	**High**	Medium	Medium	Medium	No	**Medium**	**Medium**
Extreme Temperatures & Weather	**High**	Medium	Medium	Medium	No	**Medium**	**Medium**
Wildfire & Smoke	**High**	Medium	Medium	High	No	**Medium**	**Medium**

Power infrastructure

Chelan County's power infrastructure, including transmission lines, substations, hydroelectric generation, and a small natural gas distribution system in Wenatchee, faces growing vulnerability to extreme weather, wildfires, flooding, and declining river flows that reduce hydropower output. For hydropower, upstream water use and drought further threaten supply stability. Other power infrastructure vulnerabilities include exposure to high heat, ice storms, flooding, and landslides, particularly for facilities located in floodplains, highlighting the need for resilience upgrades such as underground or hardened infrastructure. The county's energy sector is primarily designed to handle winter peak loads, with system loads nearly doubling during this period. Extreme heat can slow maintenance and restoration efforts, while fixed loads increase infrastructure vulnerability. Recent county policy and PUD's Vision 2075 emphasize climate adaptation, infrastructure hardening, and expanding energy diversification (e.g., solar for drought resilience).

Risk summary

Hazard	Probability	Vulnerability	Redundant	Cost	Critical	Magnitude	Risk
Drought & Snowpack Decline	**High**	Medium	High	Medium	Yes	**Medium**	**Medium**
Extreme Temperatures & Weather	**High**	Medium	High	Medium	Yes	**Medium**	**Medium**
Extreme Precipitation & Flooding	**Medium**	Medium	High	Medium	Yes	**Medium**	**Medium**
Wildfire & Smoke	**High**	Medium	High	High	Yes	**Medium**	**Medium**

Emergency radio and radio comms, other comms transmission

Emergency communications infrastructure is vulnerable to temporary disruptions from extreme temperatures, heavy rain, or flooding, particularly for facilities located in floodplains. The resilience of these systems depends on the hardiness of infrastructure, redundancies in the systems, and their capacity to meet increased demands during emergencies. Recent county policies, including the Resolution 2022-09 climate adaptation goals and the HMP and CFHMP, aim to reduce these vulnerabilities.

Risk summary

Hazard	Probability	Vulnerability	Redundant	Cost	Critical	Magnitude	Risk
Extreme Precipitation & Flooding	**Medium**	Medium	Medium	Medium	Yes	**Medium**	**Medium**
Wildfire & Smoke	**High**	High	Medium	High	Yes	**High**	**High**

All public, commercial, and historic buildings

Several schools and numerous buildings in places like Cashmere, Leavenworth, and Wenatchee are at heightened risk due to their location in floodplains or downstream of canyons. Floods and debris flows caused by heavy precipitation can damage buildings, causing expensive repairs and rendering buildings unusable. Structures without adequate heating and cooling are more vulnerable to extreme temperatures, especially in areas of the county that experience significant heat or cold, while those with proper systems have greater resilience. Retrofitting buildings to improve temperature control is possible but may be costly, posing challenges for low-income populations. Recent county policies and plans focus on reducing these vulnerabilities through climate adaptation and management strategies.

Risk summary

Hazard	Probability	Vulnerability	Redundant	Cost	Critical	Magnitude	Risk
Extreme Temperatures & Weather	**High**	Medium	High	Low	Yes	**Medium**	**Medium**
Extreme Precipitation & Flooding	**Medium**	Medium	Medium	High	Yes	**High**	**Medium**
Wildfire & Smoke	**High**	High	Low	High	Yes	**High**	**High**

Cultural sites, culturally significant activities

Riparian areas, culturally significant sites, and sensitive habitats in the county—including Stehekin, The Icicle, Peshastin Pinnacles, Lake Chelan, and the Wenatchee Foothills—are highly vulnerable to drought, reduced streamflow, snowpack loss, and changing water temperatures, all of which can stress plant and animal species (such as huckleberry, balsamroot, and deer) and impact salmonid migration and tribal fishing. Extreme weather events also elevate risks to archaeological sites and historic structures, particularly those in floodplains. Locations and resources managed

by local or federal agencies, such as the Leavenworth National Fish Hatchery, Peshastin Pinnacles, and Cashmere Museum, generally benefit from adaptive management protocols, whereas more natural, undisturbed sites often have lower adaptive capacity. While some drought-tolerant species may adapt, overall habitat and species health are increasingly sensitive as climate stressors intensify.

Risk summary

Hazard	Probability	Vulnerability	Redundant	Cost	Critical	Magnitude	Risk
Drought & Snowpack Decline	**High**	Medium	Low	Medium	No	**Medium**	**Medium**
Extreme Temperatures & Weather	**High**	Medium	Low	Medium	No	**Medium**	**Medium**
Extreme Precipitation & Flooding	**Medium**	Medium	Low	High	No	**High**	**Medium**
Wildfire & Smoke	**High**	High	Low	Medium	No	**High**	**High**

Recreation areas, tourism, fairgrounds, open spaces, parks

Open spaces and parks are moderately vulnerable to drought, snowpack decline, and extreme weather, which can create hazardous recreation conditions and alter aquatic environments due to low streamflow. Flooding threatens a small percentage of open spaces and new trails, particularly in flood-prone areas like Cashmere, Leavenworth, and Wenatchee. Flooding in areas with recreational infrastructure or facilities can have costly, long-term impacts; however, preserving open spaces within floodplains can protect other assets. Extreme events may temporarily restrict public access or safe use, especially due to damage or emergency management use of facilities. Longer, warmer summers may increase park use and maintenance demands, including irrigation. Areas managed by local or federal agencies may have higher adaptive capacity due to planning, protocols, and resources.

Risk summary

Hazard	Probability	Vulnerability	Redundant	Cost	Critical	Magnitude	Risk
Drought & Snowpack Decline	**High**	Medium	Medium	High	No	**Medium**	**Medium**
Extreme Temperatures & Weather	**High**	Medium	High	Medium	No	**Medium**	**Medium**
Extreme Precipitation & Flooding	**Medium**	Medium	High	Medium	No	Medium	Low
Wildfire & Smoke	**High**	High	Medium	High	No	**High**	**High**

All sensitive aquatic and terrestrial species and habitats

Non-irrigated ecosystems and riparian communities in Chelan County are highly sensitive to decreased precipitation, streamflow, and increased temperatures, with many natural habitats holding cultural significance for Native American communities. Drought and snowpack loss threaten habitat complexity and species survival—particularly for aquatic species and migratory fish—while promoting the spread of invasive species over less-adaptive native flora and fauna. Flooding can introduce pollutants into rivers and soils, disrupt natural stream courses, and endanger critical habitats and life stages of fish, potentially affecting key conservation and compliance objectives. Many species lacking adaptive capacity will increasingly depend on human intervention for survival. To address these vulnerabilities, the county relies on recent climate adaptation policies, critical areas ordinances, shoreline management programs, watershed planning, habitat projects such as the Peshastin Fishway, Cashmere Pond, Nason Creek Oxbow, and local fish hatcheries to conserve and restore vital habitats, especially those within floodplains.

Risk summary

Hazard	Probability	Vulnerability	Redundant	Cost	Critical	Magnitude	Risk
Drought & Snowpack Decline	**High**	High	Low	Medium	No	**High**	**High**
Extreme Temperatures & Weather	**High**	Medium	Medium	Medium	No	**Medium**	**Medium**
Extreme Precipitation & Flooding	**Medium**	Medium	Low	Medium	No	**Medium**	**Medium**
Wildfire & Smoke	**High**	High	Low	Medium	No	**Medium**	**Medium**

Sheriff Department, Fire Stations, Emergency Management

Emergency response demand can temporarily increase during flooding and extreme precipitation, especially if evacuations, roadblocks, or rescue are required. Droughts and extreme temperatures can also increase demand, especially due to secondary impacts, such as health emergencies, wildfires, dust storms, and limited access to affected areas. Two protective critical facilities are located within a 100-year floodplain, heightening vulnerability during floods. Recent goals and policies, including actions in the Hazard Mitigation Plan, as well as the County's existing emergency management plans, aim to enhance preparedness, response, and recovery efforts for these climate-related hazards.

Risk summary

Hazard	Probability	Vulnerability	Redundant	Cost	Critical	Magnitude	Risk
Drought & Snowpack Decline	**N/A**	N/A	N/A	N/A	N/A	**N/A**	**N/A**
Extreme Temperatures & Weather	**N/A**	N/A	N/A	N/A	N/A	**N/A**	**N/A**
Extreme Precipitation & Flooding	**Medium**	Medium	Medium	High	Yes	**High**	**Medium**
Wildfire & Smoke	**High**	High	High	High	Yes	**High**	**High**

Community members, vulnerable populations, visitors, farm workers

Drought and snowpack loss in Chelan County primarily have economic impacts on community members, especially those dependent on seasonal jobs, such as agriculture job and summer and winter recreational jobs, with potential for temporary job loss. Extreme weather events most affect people living or working in inadequately heated or cooled buildings, outdoor workers, unsheltered individuals, people with health conditions, and those in poverty or with limited mobility, as they have the least capacity to adapt. Flooding poses significant risks in areas like Cashmere, Leavenworth, and Wenatchee, affecting health and safety through exposure to contaminated floodwaters, hazardous buildings, and long-term psychological impacts, particularly for those with disabilities or other access and functional needs. Community organizations provide crucial support during emergencies, while local governments play a key response role. Recent county policies, the HMP, and resources such as cooling shelters aim to increase resilience among vulnerable populations.

Risk summary

Hazard	Probability	Vulnerability	Redundant	Cost	Critical	Magnitude	Risk
Drought & Snowpack Decline	**High**	Medium	High	Medium	Yes	**Medium**	**Medium**
Extreme Temperatures & Weather	**High**	High	High	Low	Yes	**Medium**	**Medium**
Extreme Precipitation & Flooding	**Medium**	Medium	Medium	Medium	Yes	**Medium**	**Medium**
Wildfire & Smoke	**High**	High	Medium	High	Yes	**High**	**High**

Transportation infrastructure

Chelan County's road infrastructure, including roads, sidewalks, pathways, bridges, and culverts, is highly vulnerable to extreme heat, freeze-thaw cycles, heavy rainfall, and convective storms. Poorly maintained roads deteriorate more quickly under extreme temperatures, while blacktop surfaces remain vulnerable even when new. There is limited grant funding for local road maintenance, which is primarily supported by local budgets, sometimes resulting in deferred maintenance. Major reconstruction or improvement projects are often dependent on grant funding. Seventy-three County-owned bridges (including ten identified as scour critical) are in floodplains, increasing their risk during storms and floods. Mountainous routes are especially vulnerable to heavier winter rainfall, flooding, erosion, and landslides, while stormwater infrastructure is at risk from intense, short-duration storms. Recovery and repair costs can strain agency budgets. Although some mitigation actions have been completed, the climate resilience policies from Resolution 2022-09 have not yet been widely implemented in planning. Integrating future climate projections into transportation planning will be essential to increasing the resilience of the county's transportation network.

Risk summary

Hazard	Probability	Vulnerability	Redundant	Cost	Critical	Magnitude	Risk
Extreme Temperatures & Weather	**High**	High	Medium	Medium	Yes	**High**	**High**
Extreme Precipitation & Flooding	**Medium**	High	Medium	High	Yes	**High**	**Medium**
Wildfire & Smoke	**High**	High	Low	Low	Yes	**High**	**High**

Waste hauling, waste management, recycling

While most of Chelan County's transfer stations are located outside of floodplains, some are situated at the base of slopes and remain vulnerable to flooding or debris flows, while the Wenatchee transfer station is adjacent to a FEMA flood zone. Some hazards can disrupt household waste collection routes, placing additional stress on hauling operation. Many hazards, such as flooding, can create massive quantities of debris, which must be removed and managed by the County. The recently developed Disaster Debris Management Plan increases the County's adaptability to changing conditions. Recent county policies, the HMP, and the CFHMP address these vulnerabilities and emphasize the need for post-disaster debris management plans and adequate financial resources for response and recovery.

Risk summary

Hazard	Probability	Vulnerability	Redundant	Cost	Critical	Magnitude	Risk
Extreme Precipitation & Flooding	**Medium**	Medium	Medium	High	Yes	**High**	**Medium**
Wildfire & Smoke	**High**	Medium	High	Medium	Yes	**Medium**	**Medium**

Water supply, water infrastructure, and irrigation infrastructure

All snowpack-fed drainage basins in Chelan County are highly sensitive to snowpack loss, with areas reliant on snowmelt for groundwater recharge particularly vulnerable to changes in recharge rates and water quality. Reduced snowpack and streamflow, combined with population growth, are likely to increase the demand for groundwater pumping, potentially accelerating groundwater depletion and altering water chemistry. Rising temperatures also increase water demand, and changes in river flows may impact regulatory compliance and water quality standards, particularly for the Chelan River and associated public utility requirements. Increased storm intensity could further degrade groundwater quality by flushing accumulated nitrates into the water table, especially in agricultural zones. Additionally, 25 of the county's 42 inventoried dams are rated as high risk for economic loss and environmental damage, with flooding posing a threat to both infrastructure and habitat. Local watershed management efforts, conservation plans, and recent climate resilience policies are in place to address these vulnerabilities, although high project costs and permitting complexity remain significant barriers.

Risk summary

Hazard	Probability	Vulnerability	Redundant	Cost	Critical	Magnitude	Risk
Drought & Snowpack Decline	**High**	Medium	Medium	High	Yes	**High**	**High**
Extreme Precipitation & Flooding	**Medium**	High	Medium	High	Yes	**High**	**Medium**
Wildfire & Smoke	**High**	High	Medium	Medium	Yes	**High**	**High**

Sewer and wastewater infrastructure, stormwater infrastructure

Stormwater infrastructure in Chelan County, including ditches, culverts, and catch basins, is highly sensitive to heavy rain and flooding, which can cause backups, blockages from debris, and localized urban flooding. When stormwater systems are overwhelmed, the treatment ability is lost, allowing polluted waters to flow directly into waterbodies. Floods can also contaminate drinking water supplies and cause sewer system overflows, leading to wastewater spills into homes, neighborhoods, and waterways. Aging infrastructure, such as wood-bound culverts at Lake Chelan, heightens these risks, while stormwater systems can also be damaged by debris from flooded roads. The Wenatchee Valley Plan and available reactive upgrades help increase adaptive capacity, but full implementation of recent climate resilience policies is still lacking.

Risk summary

Hazard	Probability	Vulnerability	Redundant	Cost	Critical	Magnitude	Risk
Extreme Precipitation & Flooding	Medium	High	Low	High	Yes	High	Medium
Wildfire & Smoke	**High**	Medium	Medium	Medium	Yes	**Medium**	**Medium**

Industrial land, undeveloped land, LAMIRDs

Unlike more developed areas, undeveloped land has qualities that can make it less vulnerable to environmental stressors. Undeveloped land can serve as a natural buffer by absorbing excess water, reducing flood risks, and helping regulate local temperatures to mitigate heat island effects. Natural vegetation and soil can enable effective absorption and filtration of stormwater, preventing pollutants from entering waterways and aiding groundwater recharge. In contrast, development replaces these natural surfaces with impermeable materials, such as pavement, which increases runoff, flood risks, and urban temperatures, while also making the area less resilient to environmental stressors like droughts and flooding. In Chelan County, less than 2% of the county's industrial and undeveloped land is within a 100-year floodplain, reducing vulnerability. Site plan review and regulations can help to ensure that new development in these areas does not increase risk on site or on adjacent properties.

Risk summary

Hazard	Probability	Vulnerability	Redundant	Cost	Critical	Magnitude	Risk
Wildfire & Smoke	**High**	High	Medium	Medium	No	**Medium**	**Medium**

Residential housing, farm worker housing

Housing without adequate heating and cooling is especially sensitive to extreme temperatures, with retrofitting possible but often costly, creating challenges for low-income residents. Structures with proper systems are more resilient, but vulnerability varies across the county, particularly in areas prone to both heat and cold. Cashmere, Leavenworth, and Wenatchee face the highest flood risk, with 14.9% of residential land located in 100-year floodplains and many areas experiencing recurring floods. Current regulatory requirements address only the existing 100-year floodplain, not future flood risks associated with climate change.

Risk summary

Hazard	Probability	Vulnerability	Redundant	Cost	Critical	Magnitude	Risk
Extreme Temperatures & Weather	**High**	Medium	Medium	Low	Yes	**Medium**	**Medium**
Extreme Precipitation & Flooding	Medium	High	Medium	High	Yes	**High**	**Medium**
Wildfire & Smoke	**High**	High	Low	High	Yes	**High**	**High**