Tuolumne County - 2024
Multi-Jurisdictional Hazard Mitigation Plan (MJHMP)

Volume 1: Countywide Elements

TUOLUMNE COUNTY

Office of Emergency Services

TABLE OF CONTENTS

I. ADOPTION RESOLUTION

A. Plan Adoption

44 CFR Requirement §201.6(c)(5) The plan must include the following documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (*e.g.,* City Council, County Commissioner, Tribal Council). For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.

Adoption by the local governing body demonstrates the jurisdiction's commitment to fulfilling the hazard mitigation goals and actions outlined in the plan. Adoption legitimizes the plan and authorizes responsible agencies to execute their responsibilities. Following FEMA approval of the MJHMP, the County of Tuolumne Board of Supervisors will formally adopt the plan.

B. Tuolumne County Board of Supervisors 2024 adoption resolution

Filed: DECEMBER 10, 2024

No. 111-24

By: RACHEL GUMMERSON
Clerk of the Board of Supervisors

RESOLUTION
OF THE BOARD OF SUPERVISORS OF THE COUNTY OF TUOLUMNE

Approving the 2024 Update of the Multi-Jurisdictional Hazard Mitigation Plan

WHEREAS, Tuolumne County Board of Supervisors recognizes the threat natural hazards pose to the people and property within Tuolumne County; and

WHEREAS, Tuolumne County has prepared an update to the existing hazard mitigation plan that was last adopted in 2019, hereby known as the Multi-Jurisdictional Hazard Mitigation Plan Update of 2024 in accordance with federal laws, including the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended, the National Flood Insurance Act of 1968, as amended and the National Dam Safety Program Act, as amended; and

WHEREAS, The Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan Update of 2024 identifies mitigation goals and actions to reduce or eliminate long-term risk to the people and property in Tuolumne County from the impacts of future natural hazards and disasters; and

WHEREAS, Tuolumne County OES in conjunction with other participating jurisdictions concluded a planning process which allowed participation by the local community; and

WHEREAS, Adoption by the Tuolumne County Board of Supervisors demonstrates its commitment to hazard mitigation and achieving the goals outline in the 2024 Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan.

NOW THEREFORE BE IT RESOLVED by the Tuolumne County Board of Supervisors that:

Section 1. The Tuolumne County Board of Supervisors does hereby adopt the 2024 Update to the Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan. While content related to Tuolumne County may require revisions to meet the plan approval requirements, changes occurring after adoption will not require Tuolumne County to re-adopt any further iterations of the plan. Subsequent plan updates following the approval period for this plan will require separate adoption resolutions.

ADOPTED BY THE BOARD OF SUPERVISORS OF THE COUNTY OF TUOLUMNE ON DECEMBER 10, 2024.

AYES:	1st Dist. DAVID GOLDEMBERG	**NOES:** ___	Dist. ___
	2nd Dist. RYAN CAMPBELL	___	Dist. ___
	3rd Dist. DANIEL ANAIAH KIRK	**ABSENT:** ___	Dist. ___
	4th Dist. KATHLEEN HAFF	___	Dist. ___
	5th Dist. JASON BRANNON	**ABSTAIN:** ___	Dist. ___

David Goldemberg
CHAIR OF THE BOARD OF SUPERVISORS

ATTEST: Rachel Gummerson No. 111-24
Clerk of the Board of Supervisors

I hereby certify that according to the provisions of Government Code Section 25103, delivery of this document has been made.
RACHEL GUMMERSON
Board Clerk
By: Rachel Gummerson

II. EXECUTIVE SUMMARY

A. Plan Description

Local hazard mitigation plans form the foundation of a community's long-term strategy to reduce disaster losses and break the cycle of disaster damage, reconstruction and repetitive damage. Plans are investment strategies that communities develop throughout the planning process to identify hazards, asses' risks and vulnerabilities and develop mitigation strategies that can be funded using a wide range of resources. The mounting cost of disaster recovery in our nation over the past decade has engendered a renewed interest in uncovering effective ways to minimize our country's hazard vulnerability. Tuolumne County has joined a nationwide effort to develop a jurisdiction specific hazard mitigation plan that strives to improve resilience through coordinated emergency management practices, capital improvements and innovative planning. This multi-jurisdictional plan has been developed to reduce future loss of life and property damage resulting from natural or man-made disasters. The goal is to arrive at practical, meaningful, attainable, and cost-effective mitigation solutions to minimize each jurisdiction's vulnerability to the identified hazards and ultimately reduce both human and financial losses after a disaster.

The County of Tuolumne has developed a Local Hazard Mitigation Plan (LHMP) to reduce risks from disasters to the people, property, economy, and environment within the county. The plan complies with federal and state hazard mitigation planning requirements to establish eligibility for funding under Federal Emergency Management Agency (FEMA) grant programs.

B. Plan Purpose and Authority

The legislative authority that provides the legal authority for mitigation is derived from the Stafford Act, as amended by the Disaster Mitigation Act of 2000. Section 322 of the Stafford Act specifically addresses mitigation planning. This establishes the requirement that state and local governments prepare hazard mitigation plans as a precondition for receiving FEMA mitigation project grants. FEMA's 2022-26 Strategic Plan identifies empowering risk-informed decision making as a key objective for building a climate resilient nation. The mitigation planning process involves all the critical components of understanding current and future risks, forming partnerships and identifying the most appropriate actions to build climate resilience. The Stafford Act requires State, local, and tribal governmental entities that wish to be eligible for federal hazard mitigation grant funds to submit a hazard mitigation plan, identifying the natural and man-made hazards, risks, and vulnerabilities of each jurisdiction (United States Code [USC] Title 42, Section 5156[a]). FEMA has promulgated Code of Federal Regulations (CFR) Title 44, Part 201 to carry out the hazard mitigation planning requirements in the Stafford Act. These regulations direct the planning process, plan content, and FEMA approval of hazard mitigation plans. This MJHMP complies with the Stafford Act and DMA 2000, along with the appropriate sections of Title 44 of the CFR, including parts 201, 206 and 322.

California Government Code Section 8685.9 (Assembly Bill [AB] 2140) limits the State of California's share of disaster relief funds paid out to local governments to 75 percent of the funds not paid for by federal disaster relief efforts, unless the jurisdiction has adopted a valid hazard mitigation plan consistent with DMA 2000. This MJHMP is consistent with current standards and regulations, as outlined by Cal OES. It uses the best available information, and its mitigation actions reflect best practices and community values. This MJHMP meets the requirements of current State and federal guidelines and ensures the County of Tuolumne is eligible for all appropriate benefits under State and federal law and practices. This MJHMP has been prepared to meet FEMA and Cal OES requirements, thus making the County eligible for funding and technical assistance from State and federal hazard mitigation programs.

FEMA approved the last plan in 2019 and Tuolumne County, as required by FEMA, is now updating this plan with information for 2024. Updating entails adopting, implementing, assigning responsibility, monitoring, and reviewing this hazard mitigation plan over time, to ensure the goals and objectives are being achieved and the plan remains a relevant document.

III. PLANNING PROCESS

A. Code of Federal Regulations Requirements

44 CFR Requirement §201.6(b): In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:

1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;

2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and

3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

44 CFR Requirement §201.6(c)(1): [The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

B. Plan Development and Public Input Process

Tuolumne County started the planning process in early spring of 2023 with meetings held with all existing plan partners and agencies. A full review and revision of the approved 2019 Multi-Jurisdiction Hazard Mitigation Plan occurred during those initial meetings held every month starting in May 2023. Some jurisdictions have changed from the last plan as they decided either

to develop their own standalone plan or not participate altogether. Any new or returning jurisdictions have all participated fully in the local mitigation plan update.
A Hazard Mitigation Planning Group was constructed with representatives from all participating jurisdictions and community stakeholders. Planning group meetings were held which explained the process that was going to be taken to update the plan, reviewed hazards of concern and hazard rankings, and explained the risks and vulnerability to the communities' people, buildings, and infrastructure. Mitigation goals, objectives and actions were discussed and reviewed thoroughly with all planning group members until concurrence was reached. A capability assessment and action plan were developed to ensure mitigation actions were realistic and attainable and to assign funding sources and responsibility for each proposed activity. Planning meetings were held in person and virtually every month starting May 25, 2023.

The group planning process was led by the coordinating entity, Tuolumne County, referred to as the plan owner, and included representatives from each jurisdiction. Tuolumne County took the lead for coordinating across all participants and with the state and FEMA. Each jurisdiction then took the information shared at group meetings, passed the information on, and collected information through their own local planning process. Each participant assessed their unique risk to identified hazards and identify their own capabilities to reduce those risks. Each then developed their own actions to reduce the risks specific to their community or jurisdiction.

An open public involvement process is essential to the development of an effective plan. To develop a more comprehensive approach to reducing the effects of natural disasters, Tuolumne County staff incorporated several public events. Three public meetings were held, on October 26, 2023, November 16, 2023, and December 14, 2023. Two were virtual, these meetings were recorded and posted on the County's website so people unable to attend could view later. The third meeting was held in the Board Chambers and was advertised publicly throughout the county. Those that were unable to attend were also able to provide additional feedback in our Public Survey discussed below. Virtual and in-person events as well as posting of all recordings allowed the opportunity for the public to comment on the plan during the drafting stage and prior to plan approval.

C. Public Input Survey

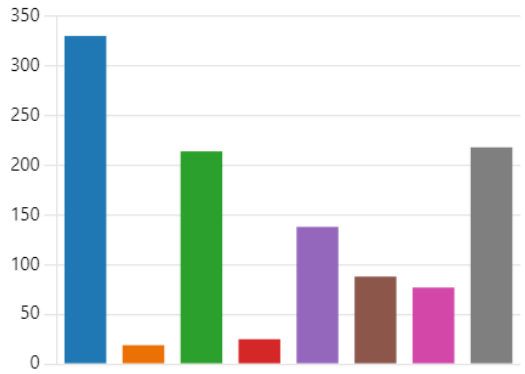
A public survey was created to allow the public to provide input at their convenience. The survey was developed and made available to the public starting in early October 2023. The survey was used to gauge household preparedness for natural hazard and the level of knowledge of tools and techniques that assist in reducing risk and loss from natural hazards. Results of the survey indicate that the public's biggest natural hazard concerns for the County are Wildfire, Severe Weather and Drought. The answers to the questions helped guide the planning committee in defining our hazards, selecting goals, objectives, and mitigation strategies. These concerns identified in the survey responses mirrored the planning team's concerns for the County, which matched well.

The survey was made available on the County's hazard mitigation plan website, promoted heavily on multiple social media platforms, and the planning committee members shared the survey link and QR code with their jurisdictions. A flyer promoting the survey was developed and shared widely across the county, hard copies were provided at Board of Supervisors meetings and at multiple County sponsored meetings. There have been 387 responses received from the public input survey thus far, and the survey remains open so that the County can continue to gather this valuable input. Please see the following examples taken from our public survey

6. Which of the following natural hazards have you been impacted by within Tuolumne County? (check all that apply) (0 point)

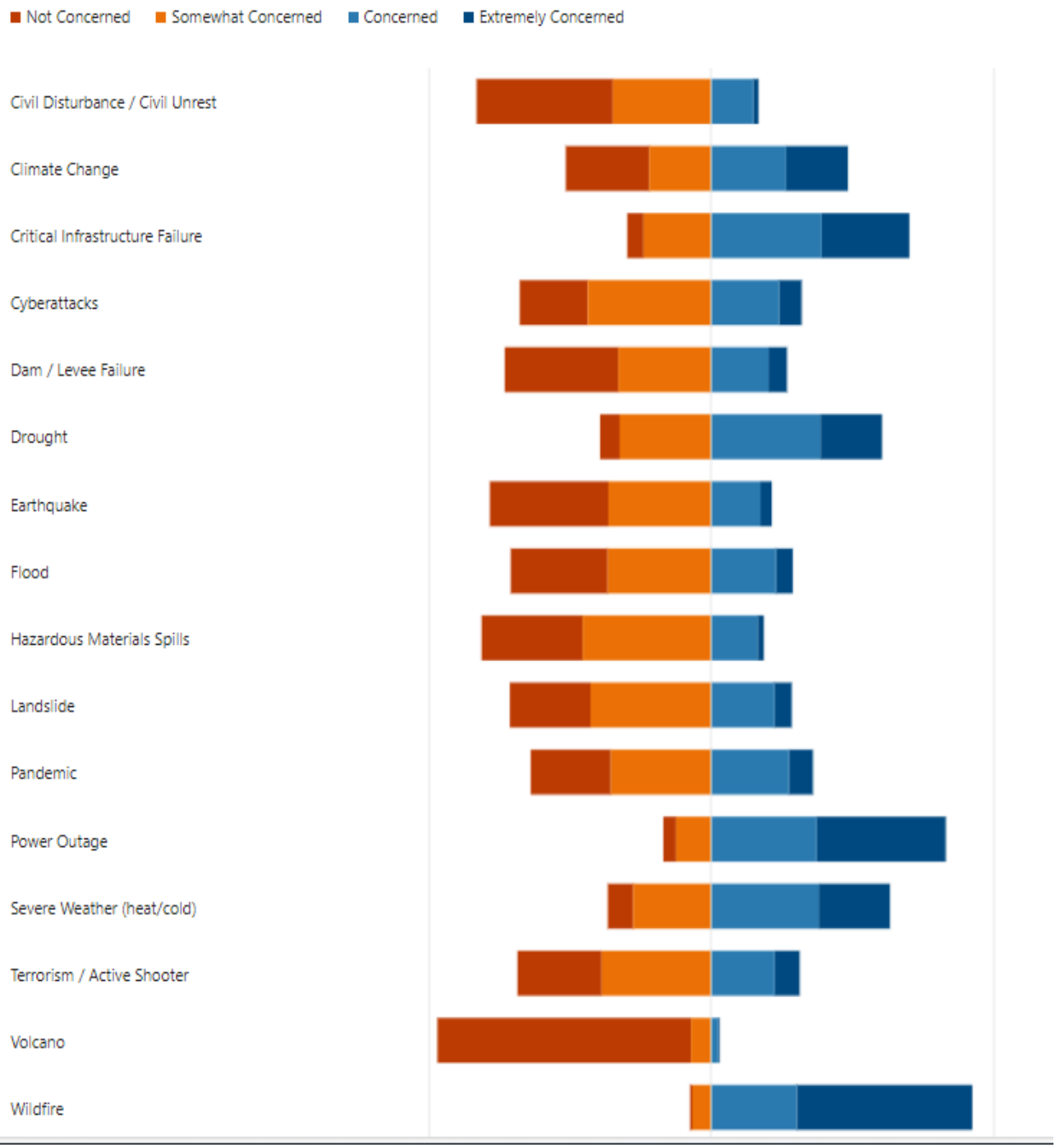
More Details

Adverse Weather (wind, lightnin...	330
Dam Failure	19
Drought	214
Earthquake	25
Extreme Heat	138
Flooding	88
Landslide / Debris Flow	77
Wildfire	218



8. The hazards below could impact Tuolumne County and may be addressed in our Multi-Jurisdictional Hazard Mitigation Plan Update. Please rate your level of concern for each hazard that may impact our county (0 point)

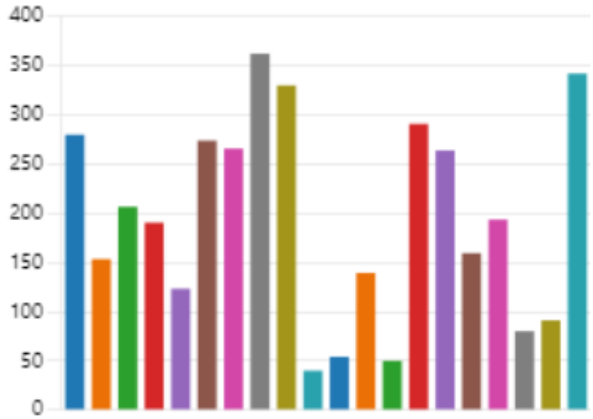
More Details



14. What steps has your household taken to prepare for a disaster? (check all that apply) (0 point)

More Details

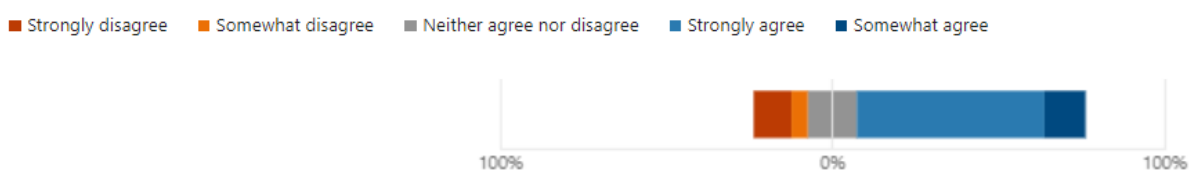
Registered for Tuolumne Count...	279
Created a go bag for each perso...	153
Received First Aid/CPR training	206
Made a fire escape plan	190
Designated an evacuation meeti...	123
Identified utility shut off locations	273
Maintain an emergency supply ...	265
Installed smoke detectors	361
Installed carbon monoxide dete...	329
Written and practiced an individ...	40
Made plans to care for elderly f...	54
Made plans to care for pets duri...	139
Participated in neighborhood pr...	50
Maintain a working fire extingui...	290
Maintain extra medical supplies ...	263
Maintain an additional kit for ca...	159
Maintain an emergency potable...	193
Made retrofits to my home to w...	80
Installed solar panels	91
Purchased homeowners' or rent...	341



20. Please indicate how you feel about the following statement: (0 point)

"I think it is important to provide education and programs that promote community members to take personal responsibility to reduce their exposure and risks to natural hazards."

More Details



D. Opportunities for input from communities and agencies

The lead planning team staff, led by Tuolumne County Office of Emergency Services Assistant Director and Administrative Analyst, provided an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia, and other private and non-profit interests to be involved in the planning process. These opportunities for county wide stakeholders included an invitation to planning meetings where they could hear updated or provide comments. Stakeholders received updates at monthly Board of Supervisors meetings or other local meetings such as the monthly OES Operational Area Briefing, monthly Adventist Health Community Advisory meetings where planning team members updated stakeholders about the project progress as well as provided opportunities to ask questions of comment. While there was not a log kept of phone calls or emails, many calls and emails were sent introducing the project, updating stakeholders on progress and inviting stakeholders to comment on draft components of the plan throughout the process. Planning staff attended and presented the process for updating the plan, taking comments and suggestions on mitigation actions at the following meetings:

- Monthly OES Operational Area Briefing that includes Federal, State and Tribal partners who were asked to comment on updates to the plan.
- Tuolumne Utilities District Board meeting presentation on update to plan.
- Meetings with Tuolumne County Public Works and GIS staff regarding hazard frequency and mapping.
- Meetings with Tuolumne County Community Development Director, Building Inspector and Floodplain Manager regarding increase in occurrence as well as increase in development since last plan update.
- Meetings and outreach to county departments such as Fire, Community Development and Public Works for their concurrence updates.
- Planning Team Staff reports to Tuolumne County Board of Supervisors at public board meetings and in one-on-one sessions.
- Participation in adjoining jurisdictions, Calaveras, Mariposa, Stanislaus County Operational Area meetings or Dam Emergency Tabletops to share hazard mitigation response scenarios and strategies.
- Local School District Board Meetings presentations on importance of plan update.
- Tuolumne Park and Recreation District Board Meeting presentation on mitigation action and strategies.
- Local Area Formation Commission (LAFCO) presentation on plan, long range strategies and opportunities for input.

As a part of the plan update and engagement with county stakeholders, the planning team lead staff attended meetings with the following groups to provide updates, general information about the plan and invite those entities to participate and comment on the plan update.

- Tuolumne County Business Council which represents a diverse group of business leaders committed to taking an active role in identifying key issues.
- For those entities that provide support to underserved communities or our most vulnerable populations, lead planning staff met with the following:
- Tuolumne County Board of Supervisors Committee on Aging which supports and advocates for all matters affecting the aging in Tuolumne County.
- Area 12 Agency on Aging who meet the needs of the people impacted by aging.
- Tuolumne County Homeless committee who meet to provide support for the unhoused in Tuolumne County.
- Tuolumne County Access and Functional Needs Advisory Group to OES, where individuals who work with those demographics provide input into planning documents.
- Tuolumne County Veterans Committee who represents local veterans posts and the Veteran Community within Tuolumne County.

E. Participating Jurisdictions

The following table contains those jurisdictions that have fully participated in the 2024 Tuolumne County Hazard Mitigation planning and approval process. Each entity has fulfilled their obligations towards the preparation and adoption of this hazard mitigation plan. Previously, the City of Sonora was a participating jurisdiction. The City of Sonora has completed their own standalone Local Hazard Mitigation Plan for 2023.

Table 1. Participating Jurisdictions

Participating Jurisdictions
County of Tuolumne
Groveland Community Services District
Jamestown Sanitary District
Tuolumne City Sanitary District
Twain Harte Community Services District
Tuolumne Utilities District
Mi-Wuk/Sugar Pine Fire Protection District
Belleview Elementary School District
Big Oak Flat-Groveland Unified School District
Columbia Union School District
Curtis Creek School District
Jamestown School District
Sonora Elementary School District
Sonora Union High School District
Summerville Elementary School District
Summerville Union High School District
Strawberry Fire Protection District*

Twain Harte Union School District
Tuolumne Band of Me-Wuk Indians
Tuolumne County Superintendent of Schools
Tuolumne Fire Protection District*
Soulsbyville School
Lake Don Pedro Community Services District
Tuolumne Park and Recreation District *
* Denotes New Jurisdiction

The Multi-Jurisdictional Hazard Mitigation Planning Group was comprised of the following agency representatives and key stakeholders:

Table 2. MJMH Planning Group

Name	Agency	Job Title
Dore A. Bietz	Tuolumne County Office of Emergency Services	Assistant Director
Tracey McKnight	Tuolumne County Office of Emergency Services	Senior Administrative Analyst
Sara Daniel	Tuolumne County Office of Emergency Services	Administrative Analyst
Carmel Portillo	Bellview Elementary School	Superintendent/Principal
Wynette Hilton	Big Oak Flat/Groveland Unified School District	District Superintendent
Nicolas Wade	Columbia Union School District	District Superintendent
Kristen Lopez	Curtis Creek School District	Director of Business Services
Jennifer Donabedian	Groveland Community Services District	Administrative Services Manager
Rachel Perlman	Groveland Community Services District	Administrative Services Technician
Nickolas Rivera	Jamestown Sanitary District	Operations Supervisor/Chief Plant Operator
Contessa Pelfrey	Jamestown School District	Superintendent
Dave Savidge	Lake Don Pedro CSD	Assistant General Manager
James Klyn	Mi-Wuk/Sugar Pine Fire Protection District	Fire Chief
Cheryl Griffith	Sonora Elementary School District	Superintendent
Christina Craig	Sonora Elementary School District	Executive Administrative Assistant to the Superintendent
Karen Sells	Sonora Union High School District	Principal
Jeff Winfield	Soulsbyville School	Superintendent
Ben Howell	Summerville Elementary School District	Superintendent
Michael Merrill	Summerville Union High School	Superintendent

	District	
Diana Beasley	Tuolumne Band of Me-Wuk Indians	Planning and Development Manager
Quincey Yaley	Tuolumne County Community Development Department	Director
Jeff Cooley	Tuolumne City Sanitary District	General Manager
Ben Kikugawa	Tuolumne City Sanitary District	Chief Plant Operator
Brenda Bonillo	Tuolumne City Sanitary District	District Secretary / Office Manager
Madeline Amlin	Tuolumne County Public Works / GIS	GIS Coordinator
Renee Adair	Tuolumne County Public Works / GIS	GIS Technician
Michelle Jachetta	Tuolumne County Public Health	Director
Nick Ohler / Jeff Santi	Tuolumne Fire District	Fire Chief
Kelly Bunnell	Tuolumne Park and Recreation District	Office/Finance Manager
Zack Abernathy	Tuolumne Superintendent of Schools	County Superintendent
Abby Parcon	Tuolumne Utilities District	Administrative Services Director
Eric Hall	Tuolumne Utilities District	Operations Director
Tom Trott	Twain Harte CSD	General Manager
Neil Gamez	Twain Harte CSD / Strawberry Fire District	Fire Chief
Gabe Wingo	Twain Harte School District	Superintendent

F. Incorporation of Existing Plans and Other Information

At the onset of and throughout the hazard mitigation planning process, all applicable local emergency operations plans, and geotechnical reports were reviewed and incorporated into this mitigation plan. The following plans were used to inform the risk assessment, mitigation actions, and establish priorities for this mitigation plan. The following sources were used:

Plan	Use
Tuolumne County General Plan	A plan that outlines the physical development of the County. Used to cite ordinances, land use policies. Informed Land Use Policies for plan.
2023 CAL FIRE/Tuolumne Calaveras Unit Strategic Fire Plan	Identify hazards, areas at risk for Wildfire, locations of Wildland Urban Interface, identify local firefighting capabilities
2023 California State Hazard Mitigation Plan	Identify hazards, areas at risk for Wildfire, locations of Wildland Urban Interface, identify local firefighting capabilities
Flood Ordinances	Identify flood plain locations and potential Mitigation locations and actions

Flood Insurance Rate Maps (FIRMs)	Used to identify any Special Flood Hazard Areas, Base Flood Elevations, risk premium zones applicable to the County and potential Mitigation locations and actions
Tuolumne County Community Wildfire Protection Plan	Used to inform MJHMP climate change section and to help identify areas for fuel reductions activities
Tuolumne County Emergency Operations Plan 2024 Update	Used to ensure integration and alignment between both plans
Tuolumne County Climate Action Plan November 2022	Used to inform Climate Change sections of this plan and alignment of priorities
California Office of Environmental Health Hazards Assessment 2022 Report: Indicators of Climate Change in California	Used to inform impact of climate change sections

Additional Resources

- Climate Risk and Resilience Portal (CLIMRR)
- Climate Mapping for Resilience and Adaptation (CMRA)
- FEMA Resilience Analysis and Planning Tool (RAPT)
- FEMA HAZUS Program
- FEMA National Risk Index
- CAL Fire Fire Hazard Severity Zones
- United States Environmental Protection Agency
- California Department of Conservation
- California Climate Adaptation Strategy: Summary of Projected Climate Change Impacts on California
- National Oceanographic and Atmospheric Administration: The Climate Explorer
- National Integrated Heat Health Information System

This plan will be utilized to inform the following plans:

- Tuolumne General Plan including
    - Land Use Element
    - Open Space Element
    - Safety Element
- Tuolumne County Emergency Operations Plan
- CAL FIRE/Tuolumne County Fire Management Plan
- Capital Improvement Plan

G. Hazard Consideration

National Risk Index Natural Hazard	Part of 2024 Tuolumne County Plan Update	Comment
Avalanche	Not included	This is not a concern for the County
Coastal Flooding	Not included	The County has no coastal borders
Cold Wave / Extreme Cold	Included	This hazard is included in a combined discussion of severe weather hazards
Drought	Included	This hazard is included in a combined discussion of severe weather hazards
Earthquake	Included	
Hail	Included	This hazard is included in a combined discussion of severe weather hazards
Heat Wave / Extreme Heat	Included	This hazard is included in a combined discussion of severe weather hazards
Hurricane	Not included	Per CA SHMP, statistical historical improbability
Ice Storm	Included	This hazard is included in a combined discussion of severe weather hazards
Landslide	Included	
Lightning	Included	This hazard is included in a combined discussion of severe weather hazards
Riverine Flooding	Not Included	This is not a concern for the County
Strong Wind	Included	
Tornado	Included	This hazard is included in a combined discussion of severe weather hazards
Tsunami	Not included	The County has no coastal borders that could be impacted by a tsunami
Volcanic Activity	Included	
Wildfire	Included	
Winter Weather	Included	This hazard is included in a combined discussion of severe weather hazards

IV. TUOLUMNE COUNTY PROFILE

A. County History

Tuolumne County is one of the original 18 California Counties. The Central Sierra Me-Wuk Indians were the earliest known settlers to the region. This Native American tribe remains here

and in surrounding counties today. The word Tuolumne is believed to be a transliteration of the MeWuk word “Talmalamne” meaning a cluster of stone dwellings.

Tuolumne County folklore suggests that miners from Sonora, Mexico, arrived here by 1848. These men, who gave the name of their home state to the new settlement of Sonoran Camp, mined for placer gold. Tuolumne County was established by the California Legislature on February 18, 1850. Originally, the area was divided into six townships: Sonora, Mormon Camp, Jacksonville, Don Pedro’s Bar, and Tuolumne. Representative Malcolm M. Stewart of the San Joaquin district in the Assembly went to that first meeting and called the town formerly known as Sonoranian Camp or Sonora “Stewart.” Thus “Stewart” became the county seat of Tuolumne County. Later that year, the name was changed back to Sonora. In March of 1850, gold was found near what is now Columbia.

It did not take long for word to spread that the precious metal was easily found. Soon thousands of men from all over the world migrated to the county in search of gold. The story of Tuolumne County during the first few years of settlement is like other Mother Lode communities. Hordes of miners came. Water systems were developed. Settlements grew up around successful and rich mining areas. Transportation networks connected camps, first as trails, then as wagon roads. Farms, orchards, and truck gardens sprang up. Saloons and fandango halls, along with boarding houses, provided entertainment, beds, baths, and sustenance to the miners. The bare bones of civilization in the form of government, law, newspapers, and social lodges developed, and violence became commonplace. Natural and man-made disasters, such as fires and earthquakes, destroyed many of the structures of those early days.

On September 9, 1850, California became a part of the United States. Tuolumne entered the Union as a “free state” because of the Compromise of 1850. Before statehood, it had been referred to as Oro County. Parts of the County were given to Stanislaus County in 1854 and to Alpine County in 1864.

Placer gold deposits were exhausted by the mid-1850’s causing a major depression. Farms were abandoned, businesses closed and auctioned off, and the mines shut down. Tuolumne County’s population decreased by nearly 50% between 1860 and 1870. Up to the early 1890s, the County suffered hardship and depression, only to have mining again enliven the area. The Lode Gold Rush lasted about 25 years—the County experienced another major period of growth and a population boom when the miners sunk deep shafts into the Mother Lode. Hoisting equipment was developed and pumps forced fresh air into the shafts, while electricity provided power, with the added benefit of providing some residential electricity.

Sonora and Jamestown boomed. A large increase in assessed valuation allowed the County to construct a new courthouse in 1898, build bridges, improve roads, establish a high school, and generally reestablish County services.

B. Geography

Tuolumne County is one of the original 18 California Counties with a total area of 2,220.91 square miles of it is land and 38.90 square miles (101 km²) of it (1.71%) is water. A California Department of Forestry document reports Tuolumne County's 1,030,812 acres (4,171.55 km2) includes approximately 75% federal lands such as Yosemite National Park, Stanislaus National Forest, Bureau of Land Management lands, and Indian reservations.

The County is located at latitude 37.981845 N and longitude 120.232775 W. Located in the eastern portion of Central California, Tuolumne nestles into the Sierra Nevada Mountain Range which runs north-west /south-east in the eastern part of the county. There are two major rivers both running east to west: the Stanislaus River and the Tuolumne River. The County also contains several lakes and reservoirs with the largest being Lake Don Pedro and New Melones Lake. The elevation in the County ranges from 300 feet to greater than 13,000 feet in the Sierra Nevada Mountains along the East.

Tuolumne County can be divided roughly into thirds: one-third is the Stanislaus National Forest; one-third is Yosemite National Park, and the remaining third is the City of Sonora and the unincorporated area of the County. Most of the County's population resides in the unincorporated area, which interfaces with the National Forest and National Park lands. In 2020, there was an average of 25 persons per square mile in the County compared with 253.7 persons per square mile in the State of California.

C. Cities and Communities

Tuolumne County encompasses several cities and communities, including one incorporated City of Sonora (which serves as the County Seat), nine census designated places, 22 unincorporated communities, 27 special districts, and two federally recognized Native American tribes (Tuolumne Band of Me-Wuk Indians and Chicken Ranch Rancheria of Me-Wuk Indians). A list of Tuolumne County cities and communities can be referenced in the following table.

Table 3: Tuolumne County Cities and Communities

Incorporated City and County Seat	
Sonora	
Census Designated Places (CDPs)	
Cedar Ridge	Groveland
Chinese Camp	Jamestown
Cold Springs	Long Barn

Columbia	Mi-Wuk Village
East Sonora	
Other Communities	
Blanchard	Soulsbyville
Buchanan	Strawberry
Bumblebee	Tuolumne City
Confidence	Tuttletown
Dardanelle	Twain Harte
Deadwood	Mather
Groveland-Big Oak Flat	Moccasin
Mono Vista	Phoenix Lake-Cedar Ridge
Phoenix Lake	Pinecrest
Pine Mountain lake	Standard
Sierra Village	Squabbletown
Special Districts in Tuolumne County	
Belleview Elementary School District	Columbia Union Elementary School District
Big Oak Flat-Groveland Unified School District	Curtis Creek Elementary School District
Chinese Camp Elementary School District	Groveland Community Services District
Columbia Fire Protection District	Jamestown Elementary School District
Jamestown Fire Protection District	Tuolumne County Air Pollution Control District
Mi-Wuk Sugar Pine Fire Protection District	Tuolumne Water District No. 1
Sonora Elementary School District	Tuolumne Fire Protection District
Sonora Union High School District	Tuolumne City Sanitary District
Soulsbyville School	Tuolumne Park and Recreation District
Strawberry Fire Protection District	Tuolumne Regional Water District
Summerville Union High School District	Tuolumne Utilities District
Summerville Elementary School District	Twain Harte Community Services District
Yosemite Community College District	Twain Harte Elementary School District
Jamestown Sanitary District	

D. Population and Housing Profile

Tuolumne County is home to a diverse population of 55,620 (U.S. Census Bureau 2020) and consists of various ethnicities and age groups, contributing to its cultural diversity. The following table lists various population demographics for the County.

Table 4: Tuolumne County Population Information

Tuolumne County Population Information (U.S. Census 2020)	
Age and Sex	
Persons under 5 years (%)	4.3%
Persons under 18 years (5)	17.0%
Persons 65 years and over (%)	27.2%
Female persons (%)	47.5%
Race and Hispanic Origin	
White alone (%)	89.8%
Black or African American (%)	2.4%
American Indian and Alaska Native alone (%)	2.2%
Asian along (%)	1.6%
Native Hawaiian and Other Pacific Islander alone (%)	0.3%
Two or More Races (%)	3.7%
Hispanic or Latino (%)	13.7%
White alone, not Hispanic or Latino (%)	78.3%
Language Spoken at Home	
English only (%)	92.0%
Spanish (%)	5.2%
Other Indo-European languages (%)	1.7%
Asian and Pacific Islander languages (%)	1.0%
Other languages (%)	0.2%
Population Characteristics	
Veterans (2017 – 2021)	5,241
Foreign born persons (2017-2021) (%)	5.3%
Housing	
Owner-occupied housing unit rate (2017 – 2021) (%)	74.7%
Median value of owner-occupied housing units (2017 – 2021)	$333,500
Median selected monthly owner costs – with a mortgage (2017 – 2021)	$1,930
Median selected monthly owner costs – without a mortgage (2017 – 2021)	$666
Housing	
Median gross rent (2017 – 2021)	$1,105
Building permits (2022)	74
Families and Living Arrangements	
Households (2017 – 2021)	23,103
Persons per household (2017 – 2021)	2.24
Living in same house 1 year ago, % of persons age 1 year+ (2017 – 2021)	85.3%
Language other than English spoken at home, % of persons age 5 years+ (2017 -2021)	8.0%

Tuolumne County Population Information (U.S. Census 2020)	
Computer and Internet Use	
Households with a computer (2017 – 2021) (%)	92.1%
Households with a broadband Internet subscription (2017 – 2021) (%)	24.6%
Education	
High school graduate or higher, % of persons age 25 years+ (2017 – 2021)	92.1%
Bachelor's degree or higher, % of persons age 25 years+ (2017 – 2021)	24.6%
Health	
With a disability, under age 65 years (2017 – 2021) (%)	13.4%
Persons without health insurance, under age 65 years (%)	6.4%
Economy	
In civilian labor force, total, % of population age 16 years+ (2017- 2021)	50.1%
In civilian labor force, female, % of population age 16 years+ (2017 – 2021)	51.1%
Total accommodation and food services sales, 2017 ($1,000)	172,199
Total health care and social assistance receipts/revenue, 2017 ($1,000)	22,669
Total retail sales, 2017 ($1,000)	660,042
Total retail sales per capita, 2017	$12,234
Transportation	
Mean travel time to work (minutes), workers age 16 years+ (2017 – 2021)	29.3
Income and Poverty	
Median household income (in 2021 dollars) (2017 – 2021)	$66,846
Per capita income in past 12 months (in 2021 dollars) (2017 – 2021)	$37,042
Persons in poverty (%)	13.2%
Businesses	
Total employer establishments (2021)	1,248
Total employment (2021)	12,127
Total annual payroll, 2021 ($1,000)	612,450
Total employment, % change (2020-2021)	-5.2%
Total non-employer establishments (2019)	4,217
All employer firms, Reference year 2017	1,174
Men-owned employer firms, Reference year 2017	668
Businesses	
Women-owned employer firms, Reference year 2017	116
Business	
Minority-owned employer firms, Reference year 2017	126
Nonminority-owned employer firms, Reference year 2017	868
Veteran-owned employer firms, Reference year 2017	54
Nonveteran-owned employer firms, Reference year 2017	925

Tuolumne Residents:
Population: 55,620

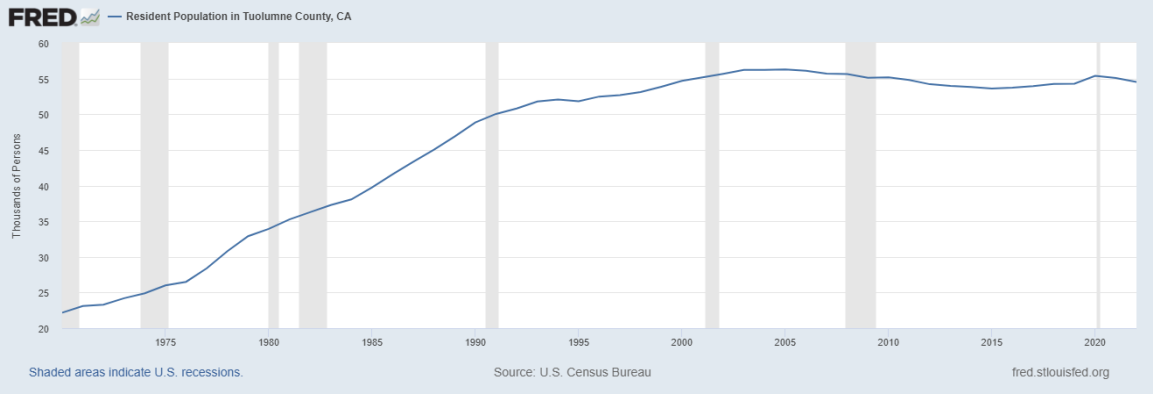
53% urban, 47% rural (2020) 43rd Largest County population in California.

The population fluctuates from the winter to the busy summer season based both on tourist impacts and second home use.

Median resident age as of 2021:	48.6 years
California median age:	37.6 years
Persons 65 years and over:	15,629

Source: 2020 U.S. Census; 2021 American Community Survey

Figure 1 – Resident Population in Tuolumne, CA



Demographics

The 2020 United States Census; American Fact Finder reported that Tuolumne County had a population of 55,620. The racial makeup of Tuolumne County was 44,207 (79.48%) White, 1,009 African American, 984 Native American, 816 Asian, 123 Pacific Islander, 2,808 from other races, and 5,673 from two or more races.

E. Access and Functional Needs (AFN) Populations

The term Access and Functional Needs (AFN) has replaced “special needs,” “high-risk,” and similar terms. People with AFN are those who may have additional needs before, during, or after an incident in functional areas including, but not limited to, maintaining health, independence, communication, transportation, support, services, self-determination, and medical care. AFN populations consist of individuals who have developmental or intellectual disabilities, physical disabilities, chronic conditions, injuries, limited English proficiency or who

are non-English speaking, older adults, veterans, children, people living in institutionalized settings, or those who are low income, homeless, or transportation disadvantaged, including, but not limited to, those who are dependent on public transit or those who are pregnant.

The Annual Disability Statistics Compendium published the 2023 State Report for County-Level Data which includes vital disability statistics for each state. The Annual Disability Statistics Compendium is spearheaded by the Rehabilitation Research and Training Center on Disability Statistics and Demographics, funded by the U.S. Department of Health and Human Services Administration for Community Living National Institute on Disability, Independent Living, and Rehabilitation Research.
The following tables list AFN and diverse population demographics, as well as the prevalence, employment, and poverty statistics regarding Tuolumne County community members with and without disabilities per the State Report.

Table 5: AFN and Diverse Population Demographics

AFN and Diverse Population Demographics	
Population	Percentage/Number
Persons under 5 years, %	4.3%
Persons under 18 years, %	17%
Persons 65 years and over, %	27.2%
Veterans, 2017-2021	5,241
Foreign born persons, %, 2017-2021	5.3%
Language other than English spoken at home, % of persons age 5 years+, 2017-2021	8%
With a disability, under age 65 years, %, 2017-2021	13.4%
Persons without health insurance, under age 65 years, %	6.4%
Persons in poverty, %	13.2%

Table 6: Disability Prevalence Demographics

Disability Prevalence Demographics					
Description	**Total Population**	**Disability**		**No Disability**	
		Count	**Percentage**	**Count**	**Percentage**
Prevalence of people with and without disabilities	52,293	10,337	19.8%	41,866	80.2%

Table 7: Disability Poverty Demographics

Disability Poverty Demographics						
Description	**Disability**			**No Disability**		
	Total	**Count**	**Percentage**	**Total**	**Count**	**Percentage**
Civilians with and without disabilities in poverty ages 18 to 64 years	4,417	911	19.3%	23,647	2,241	9.5%

Table 8: Disability Employment Demographics

Disability Employment Demographics						
Description	**Disability**			**No Disability**		
	Total	**Employed**	**Percentage**	**Total**	**Employed**	**Percentage**
Employment of civilians with and without disabilities ages 18 to 64 years living in the community	4,729	1,747	36.9%	23,877	17,489	73.2%

F. Vulnerable Populations

Vulnerable populations are those that are more likely to be affected or impacted more severely by emergencies and disasters due to factors such as health challenges or disabilities, location, living or working conditions, income level, historical and/or current marginalization, and limited access to resources. These variables can often be the result of historic inequitable planning processes. These factors, among others, can lead to increased susceptibility to and disproportionate harm from emergency response impacts, and the ability to recover from those impacts. Vulnerable populations in the County include individuals experiencing homelessness, individuals with disabilities, senior citizens, communities of color and linguistically isolated communities (i.e., non-English-speaking people), tribal communities (i.e., Tuolumne Band of Me-Wuk Indians and Chicken Ranch Rancheria of Me-Wuk Indians), those living in desolate/isolated areas with transportation challenges, and Legacy Communities (disadvantaged communities). Though certain vulnerable populations represent only a small percentage of the County's total population, it is important to plan for all groups that, for one reason or another, lack available resources or capacity to react or adapt to emergencies and disasters themselves.

Per the 2021 Adaptation and Resilience Report for Tuolumne County, the County has identified 16 Legacy Communities, or disadvantaged communities in the County not within spheres of influence of a city. These communities range from remote settlements to residential neighborhoods surrounded by cities. A Legacy Community is defined as a geographically isolated community inhabited with no less than 10 dwellings adjacent or in close proximity to one another that has existed for at least 50 years. Additionally, Legacy Communities are communities with annual median household incomes less than 80 percent of the statewide annual median household income, defined as $49,306 per year using 2010 U.S. Census Bureau data.

Social Vulnerability

Social vulnerability refers to a community's capacity to prepare for and respond to the stress of hazardous events ranging from natural disasters to human-caused threats. The Centers for Disease Control and Prevention (CDC)/Agency for Toxic Substances and Disease Registry

(ATSDR) Social Vulnerability Index (SVI) 2020 County Map on the following page depicts the social vulnerability of communities, at census tract level, within Tuolumne County. The CDC/ATSDR SVI 2020 groups 16 census-derived factors into four themes that summarize the extent to which the area is socially vulnerable to disaster. The factors include economic data, as well as data regarding education, family characteristics, housing, language ability, ethnicity, and vehicle access. Overall Social Vulnerability combines all the variables to provide a comprehensive assessment.

Table 9: Disability Prevalence Demographics

Disability Prevalence Demographics					
Description	**Total Population**	**Disability**		**No Disability**	
		Count	**Percentage**	**Count**	**Percentage**
Prevalence of people with and without disabilities	52,293	10,337	19.8%	41,866	80.2%

Table 10: Disability Poverty Demographics

Disability Poverty Demographics						
Description	**Disability**			**No Disability**		
	Total	**Employed**	**Percentage**	**Total**	**Employed**	**Percentage**
Civilians with and without disabilities in poverty ages 18-64 years	4,717	911	19.3%	23,647	2,241	9.5%

Table 11: Disability Employment Demographics

Disability Employment Demographics						
Description	**Disability**			**No Disability**		
	Total	**Employed**	**Percentage**	**Total**	**Employed**	**Percentage**
Employment of civilians with and without disabilities ages 18 to 64 years living in the community	4,729	1,747	36.9%	23,877	17,489	73.2%

G. Economy

Income

Households in Tuolumne County earn a median yearly income of $74,949. 35.53% of the households earn more than the national average each year. Household expenditures average $74,565 per year. Most of the earnings get spent on Shelter, Transportation, Food and Beverages, Health Care, and Utilities.

Source: The Community & Place Based Data Tool 2023

Table 12: Employment by Industry

Employment by Industry

OCCUPATION	TOTAL LABOR FORCE	%
Management Occupations	1,180	6.12%
Business and Financial Operations Occupations	656	3.40%
Computer and Mathematical Occupations	170	0.88%
Architecture and Engineering Occupations	181	0.94%
Life, Physical, and Social Science Occupations	342	1.77%
Community and Social Service Occupations	514	2.66%
Legal Occupations	97	0.50%
Education, Training, and Library Occupations	1,337	6.93%
Arts, Design, Entertainment, Sports, and Media Occupations	253	1.31%
Healthcare Practitioners and Technical Occupations	981	5.09%
Healthcare Support Occupations	773	4.01%
Protective Service Occupations	1,075	5.57%
Food Preparation and Serving Related Occupations	1,620	8.40%
Building and Grounds Cleaning and Maintenance Occupations	1,046	5.42%
Personal Care and Service Occupations	824	4.27%
Sales and Related Occupations	2,058	10.67%
Office and Administrative Support Occupations	2,203	11.42%
Farming, Fishing, and Forestry Occupations	198	1.03%
Construction and Extraction Occupations	1,326	6.87%
Installation, Maintenance, and Repair Occupations	818	4.24%
Production Occupations	678	3.52%
Transportation and Material Moving Occupations	958	4.97%
Military-only occupations	38	0.20%

Table 13: Major Employers in Tuolumne County By Industry

MAJOR EMPLOYERS IN TUOLUMNE COUNTY (2023)

INDUSTRY	EMPLOYEES
Accommodation and Food Services	3,131
Administrative and Support and Waste Management and Remediation Services	530

Agriculture, Forestry, Fishing and Hunting	317
Arts, Sports, Entertainment, and Recreation	925
Banking, Finance, and Insurance	363
Construction	1,059
Education	1,743
Health Care and Social Services	4,214
Holding Companies and Managing Offices	6
Information	404
Manufacturing - Chemical, Fuel, Paper, Plastic, Wood	317
Manufacturing - Electronics, Furniture, Machinery, Metal, Transportation, Misc.	309
Manufacturing - Processed Food, Textiles, Clothing	78
Mineral, Oil and Gas Extraction	18
Other Services - Repair, Personal Care, Laundry, Religious, etc.	1,794
Professional, Scientific, and Technical Services	755
Public Administration	3,205
Real Estate and Rentals	680
Retail: Hobby, Media, General Merchandise	1,197
Retail: Home, Food, Automobiles, Personal Care	1,611
Transportation and Warehousing: Couriers and Messengers, Warehousing and Storage	134
Transportation and Warehousing: Private and Public Transportation, Oil and Gas Pipelines, Sightseeing	257
Unclassified	36
Utility Services: Power, Gas, Steam, Water, and Sewage	290
Wholesalers	458

Table 14: Major Employers in Tuolumne County By Company Name

Employer Name	Location	Industry
Adventist Health Sonora	Sonora	Hospitals
ATCAA	Sonora	Non-Profit Organizations
Chicken Ranch Casino	Jamestown	Casinos
Columbia College	Sonora	Schools-Universities & Colleges Academic
Diestel Family Turkey Ranch	Sonora	Ranches
Dodge Ridge Ski Resort	Pinecrest	Skiing Centers & Resorts

Hetch Hetchy Project	Groveland	Government Offices-City/Village & Twp
Hetch Hetchy Water & Power	Moccasin	Water & Sewage Companies-Utility
Jamestown School District	Jamestown	School Districts
Kohl's	Sonora	Department Stores
Lair of the Golden Bear	Pinecrest	Camps
Lowe's Home Improvement	Sonora	Home Centers
Safeway	Sonora	Grocers-Retail
Save Mart	Sonora	Grocers-Retail
Sierra Conservation Center	Jamestown	State Govt-Correctional Institutions
Sierra Pacific Industries	Chinese Camp	Lumber-Manufacturers
Sonora High School	Sonora	Schools
Sonora School District	Sonora	School Districts
Tuolumne County Sheriff	Sonora	Government Offices-County
Tuolumne County Social Svc	Sonora	Government Offices-County
Tuolumne County Special Edu	Sonora	Schools
Tuolumne Mewuk Tribal Council	Sonora	Casinos
Tuolumne Mi Wuk Tribal Council	Tuolumne	Natives Service Organizations
US Forestry Department	Groveland	Government Offices-Federal
Walmart Supercenter	Sonora	Department Stores

Source: America's Labor Market Information System (ALMIS) Employer Database 2024 1st Edition (https://labormarketinfo.edd.ca.gov/majorer/countymajorer.asp?CountyCode=000109)

H. Climate

Climate in Tuolumne County, California

Climate	Tuolumne, CA	United States
Rainfall (in.)	42	39
Snowfall (in.)	5	25
Precipitation Days	40	100
Sunny Days	259	205
Average July High	91	86.5
Average January Low	30.94	22.6
Comfort Index (higher=better)	77	54
UV Index	5.1	4.3
Elevation ft.	5,577	1,443

Tuolumne County, CA, gets an average of 36.7 inches of rain per year. The US average is 39. The average snowfall is 5 inches. The average US city gets 25 inches of snow per year. The number of days with any measurable precipitation is 40.

On average, there are 259 sunny days per year in Tuolumne County, CA. The July high is around 91 degrees. The January low is 30. The comfort index, which is based on humidity during the hot months, is a 77 out of 100, where higher is more comfortable. The US average on the comfort index is 54.

I. Climate Change-Global Warming

Data gathered by NASA and NOAA indicate that the Earth's average surface temperature has increased by about 1.2 to 1.4ºF in the last 100 years. Since 1998 the eight warmest years on record (since 1850) have been recorded, with the warmest being 2005. Most of the warming in recent decades is very likely the result of human activities. For over the past 200 years, the burning of fossil fuels, such as coal and oil, and deforestation have caused the concentrations of heat-trapping "greenhouse gases" to increase significantly in our atmosphere.

This warming trend may well have an impact on the naturally occurring hazards in Tuolumne County. Expected effects will include changes in the range and distribution of plants and animals (pests), longer and hotter/dryer fire seasons, and changes in rainfall and snow patterns/intensities (flooding). Public Health impacts can also be expected. Extreme periods of heat and cold, storms, and smoke from fire will have impacts on climate-sensitive diseases and respiratory illnesses. More detailed information on specific impacts is found in the Risk Analysis section of this plan. The County of Tuolumne has also developed and adopted a Climate Action Plan in November of 2022.

J. Transportation Systems

MAJOR HIGHWAYS

There are three east west state highways in the County: California State Route Highway 108, California State Route 120 and Highway 132. California State Route 49 is the only north south highway in the County. Most of the towns exist on or near these transportation corridors. Highways 120, 49 and 108 are the major transportation routes through this County.

State Route 120 (SR 120), in northern California, runs between the Central Valley near Manteca, through Yosemite National Park, and ends at U.S. Route 6 in Mono County. SR 120 begins as a freeway intersecting Interstate 5 to extend Interstate 205 through Manteca. In east Manteca the freeway ends at SR 99 and becomes a highway which continues to head east through Escalon, Oakdale and other various small towns.

State Route 49 (SR 49) is a north–south state highway that begins at Oakhurst, Madera County, in the Sierra Nevada Mountains, where it diverges from State Route 41. It continues in a generally northwest direction, weaving through the communities of Goldside and Ahwahnee, before crossing into Mariposa County. State Route 49 then continues northward through the counties of Tuolumne, Calaveras, Amador, El Dorado, Placer, Nevada, Yuba, Sierra, and Plumas, where it reaches its northern terminus at State Route 70, in Vinton.

State Route 108, also known as Highway 108, is a numbered state highway in California. SR 108 runs generally northeast across central California from downtown Modesto near the SR 99/SR 132 interchange, crossing the Sierra Nevada at Sonora Pass, to U.S. Route 395 near the Nevada state line.

State Route 132 (SR 132) is a two-lane road important to recreational travelers enroute to Modesto Reservoir, Turlock Reservoir, Don Pedro Reservoir, and the Sierra Nevada foothills.

PUBLIC AIRPORTS

Columbia Airport

Columbia Airport is within walking distance of the historic town of Columbia in the Sierra Nevada foothills at an elevation of 2118 feet. The airport features a lighted 4,650-foot paved runway and a 2,600-foot irrigated turf runway, both well-maintained by the airport staff. . The airport covers approximately 356 acres and contains two runways. The main runway 17/35 is 4,673 x 75 feet. Runway 17/35 is paved and lighted. The second runway, 11/29, is a grass crosswind runway. Runway 11/29 is 2,607 x 50 feet. Columbia has six helicopter parking spaces, two of which can support up to a Type 1 helicopter. Columbia Airport is a non-towered airport.

As of 2021, there were 45,657 annual aircraft operations at Columbia Airport. Of the operations, 94% of aircraft operations come from general aviation and emergency response aircraft; air taxi and military operations makeup 6% of operations.

Traffic Pattern

Columbia Airport's traffic patterns are to the west of the airport to keep the aircraft from flying over Columbia State Park and Columbia Elementary School. The normal traffic patterns are right traffic for Runway 17, left traffic for Runway 35, right traffic for Runway 11, and left traffic for Runway 29. Departures on Runway 11 are prohibited due to sight restrictions of traffic on Runway 17. Columbia Airport is an active Firefighting/Emergency Response airport. Please give right away to landing and departing emergency response aircraft traffic if it is safe. Please abide by all noise abatement procedures.

There are 106 aircraft based at Columbia Airport:

- Single engine aircraft: 93
- Multi engine aircraft: 11
- Jet Aircraft: 0
- Turboprop: 0
- Helicopter: 1

Airport Businesses

Several aviation businesses are located on the Columbia Airport which provides a variety of aviation services:

- Bald Eagle Aviation: Provides pilot and fuel services. Offers both 100LL (AvGas) and Jet A fuels. Fuel is serviced by both truck and a 24 hour fuel island. Provides local transportation services on a first come first served basis.
- Courtney Aviation: Offers chartered service during the non-fire season for local air tours. During the fire season provides wild land fire observation services through contract with both Cal Fire and U.S. Forestry. Also provides limited aircraft maintenance and avionics repair.
- Inter Mountain Helicopters: Provides wild land fire suppression by contract though contracts with the US Forest Service.
- Aero Resources: Provides full-service aircraft maintenance including major airframe service.
- Stenger Aviation: Provides full-service airframe and powerplant maintenance and inspections.
- Springfield Flying Service: Provides flight training services to the general public. Offers local flight tours and aircraft rentals.
- PHI Air Medical: An air medical/ambulance service which provides emergency and air medical services both within and outside of the immediate area.

Airport Emergency Response

Columbia Airport is home to a California Division of Forestry (Cal Fire) Air Attack Base. There are two S2-T Air Tankers, one OV-10 observation aircraft, and a Sikorsky S70i helicopter that operate out of the air attack base. The Cal Fire Air Attack base responds to fires within a 200 NM of the air base. They provide active wildfire suppression throughout the fire season which begins in May and ends in November each year. The air attack base is a valuable resource that has protected an immeasurable amount of life and property in Tuolumne and neighboring counties.

Pine Mountain Lake Airport

Pine Mountain Lake Airport is a public use airport with a residential airpark surrounding the airport. It is located three miles (4.8 km) northeast of the town of Groveland, serving Tuolumne County, California and is the gateway airport for Hwy 120, the northern most route to Yosemite National Park. The airport is used primarily for general aviation aircraft. Pine Mountain Lake Airport covers 52 acres and has one runway. The runway (9/27) is 3,625 x 50 feet, is lighted, and has an asphalt surface.

There are 7 based aircraft at Pine Mountain Lake Airport with an estimated 15,000 operations annually:

- Single engine aircraft: 7

PRIVATE AIRPORTS

Tuolumne County also contains the following private airports and heliports:

- Columbia Heliport
  - Columbia, California
- Hermitage Airport
  - Groveland, California
- Kistler Ranch Airport
  - Jamestown, California
- Peoria Airport
  - Jamestown, California
- Bald Mountain Heliport
  - Long Barn, California

The beauty of the Yosemite Valley and surrounding High Sierra mountains attract a significant amount of both private and commercial aircraft in “high fly-over” visitor air traffic.

PUBLIC TRANSPORTATION

Tuolumne County Transit bus routes radiate from Sonora to serve most of the county. In Columbia, a connection can be made to Calaveras County Transit. Yosemite Area Regional Transportation System (YARTS) serves the Tuolumne Meadows portion of Yosemite National Park, however, there is no direct connection between Tuolumne County Transit and YART.

K. Governing Body

The Board of Supervisors serves as the Legislative body of Tuolumne County for the planning and provision of services related to public needs and the requirements of State and Federal laws. California law provides for five Supervisors to be elected by district.

The City of Sonora is the Tuolumne's only incorporated city and serves as the County seat.

Each Supervisor is elected for a four-year term. Two of the Supervisors' terms are staggered so that all Supervisors are not standing for election at the same time. As the elected representative of the people of Tuolumne County, the Board of Supervisors establishes overall County priorities and sets policy. When development aligns with the County's existing Land Use Policies, the vulnerability to hazards is expected to decrease.

L. Land Use

Existing land use within Tuolumne County is a mosaic of varying types of uses, ownership, character, and intensity. Uses include:

- High Density Residential
- Medium Density Residential
- Low Density Residential
- Estate Residential
- Homestead Residential
- Rural Residential
- Large Lot Residential
- Agriculture
- Timber Production
- Open Space
- Parks and Recreation
- Neighborhood Commercial
- General Commercial
- Heavy Commercial
- Special Commercial
- Business Park
- Light Industrial
- Heavy Industrial
- Mixed Use
- Public

M. Development Trends

While the population of Tuolumne County is not expected to grow significantly in the next five years, there are Land Use policies and elements within the County General Plan to help assure orderly development when it does occur. Because the population in the county is relatively

stable, there are no expected impacts to Tuolumne County Land Use and development. Stable development has steadied the risk of the County's vulnerability to hazards.

Annual Estimates of the Resident Population for Counties in the United States: April 1, 2020 to July 1, 2023					
Geographic Area	April 1, 2020 Estimates Base	Population Estimate (as of July 1)			
		2020	2021	2022	2023
Tuolumne County, California	55,624	55,379	55,131	54,587	54,204
Annual Estimates of the Resident Population for Counties in the United States: April 1, 2020 to July 1, 2023 (CO-EST2023-POP) Source: U.S. Census Bureau, Population Division Release Date: March 2024					

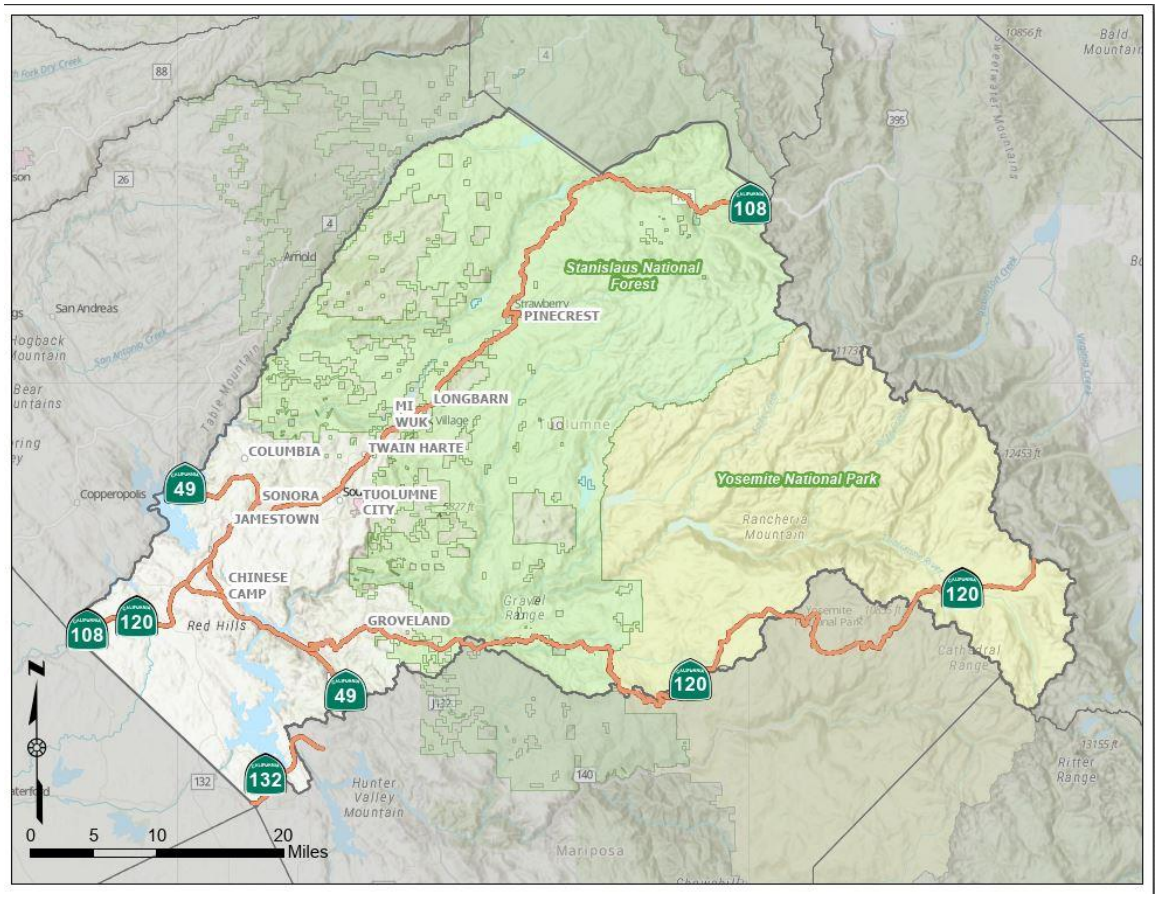
FIPS*	County name	RUC code	Pop. 1990	Pop. 2000	Pop. 2010	Pop. 2020	Pop. 2022	Change 2020-22
6109	Tuolumne	4	48,456	54,522	55,365	55,623	54,531	-2.00%

Source: U.S. Census Bureau, 1990, 2000, 2010, 2020 Censuses of Population, and the population estimate program.

In addition, the Local Agency Formation Commission (LAFCO) of Tuolumne County is tasked with the mission to provide an orderly pattern of growth that reconciles the varied needs of the County. One of the fundamental principles of LAFCO is to ensure the establishment of an appropriate and logical municipal government structure for the distribution of efficient and appropriate public services. LAFCO Land Use Objectives include:

- The discouragement of urban sprawl;
- Preservation of the physical and economic integrity of agricultural lands;
- Preservation of open space within urban development patterns;
- Orderly formation and development of agencies by shaping local agency boundaries;
- The minimization of agencies providing services to a given area; and
- Utilization of Spheres of Influence to guide future development of agency boundaries.

The following map provides a perspective of the size and layout of the County:



V. RISK ASSESSMENT

A. Code of Federal Regulations Requirements

44 CFR Requirement §201.6(c)(2)(i): A *risk assessment* that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards. The risk assessment must include:

(i) A description of the type, location, and extent of all natural hazards that can affect the jurisdiction. The plan must include information on previous occurrences of hazard events and on the probability of future hazard events.

B. Hazard Identification

The following natural hazards can affect the jurisdiction:

- Earthquake:
  - Building/Structure Collapse

- Faulting

- Extreme Weather:
  - Drought
  - Heat
  - Ice, Hail and Snow Storms
  - Thunder/Lightning Storms
  - Windstorms
  - Tornadoes
- Volcano
- Flood:
  - Dam/Levee Failure
- Wildland Fire
- Landslides/Sinkholes

C. Hazard Profiles

MAJOR PAST HAZARD EVENTS

Type of Event	FEMA Disaster #	Date	Incident Description	Effect on Planning Area
Severe Winter Storms, Flooding, Landslides and Mudslides	DR-4434	05/17/2019	On April 13, 2019, Governor Gavin Newsom requested a major disaster declaration due to severe winter storms, flooding, landslides, and mudslides during the period of February 24 to March 1, 2019. The Governor requested a declaration for Public Assistance for 19 counties and Hazard Mitigation statewide. The Countywide per capita impact for Tuolumne County was reported $4.21.	Heavy rain combined with hail contributed to substantial flooding throughout the planning area. Flooding resulted in several power and phone outages, and the public works building was also damaged. Sonora Creek overtopped, resulting in surface water flooding in nearby streets and parking lots. A mudslide occurred on the 200 block of Greenly Road.
California Covid-19	EM-3428	03/13/2020	In accordance with 36 CFR § 800.12(a) of the Section 106 regulations, FEMA, in consultation with the Advisory	Similar to other jurisdictions across California, the County was affected by the

			Council on Historic Preservation, State Historic Preservation Officers, and Tribal Historic Preservation Officers, Indian Tribes and Native Hawaiian organizations (consulting parties), developed emergency procedures to govern its Section 106 responsibilities for approval of direct Federal assistance and funding of emergency protective measures to save lives and to protect improved property and public health and safety in response to COVID-19 pandemic (COVID-19 emergency undertakings).	Covid-19 pandemic.
Wildfire	DR-4558	08/22/2020	On August 20, 2020, Governor Gavin Newsom requested an expedited major disaster declaration due to wildfires beginning on August 14, 2020, and continuing. The Governor requested a declaration for Individual Assistance and assistance for debris removal and emergency protective measures (Categories A and B), including direct Federal assistance, under the Public Assistance program for nine counties and Hazard Mitigation statewide. The countywide per capita impact indicator was reported $3.84.	On August 20, 2020, the Moc Fire ignited at the juncture of SR-120 and SR-49 in the unincorporated community of Moccasin Cal FIRE reported the cause as equipment failure. Approximately 2,800 acres were burned. No damage occurred; impacts primarily involved smoke/ash and diminished air quality.
Severe Winter Storms, Flooding, Landslides and Mudslides	DR-4683	01/14/2023	On January 12, 2023, Governor Gavin Newsom requested an expedited major disaster declaration due to severe winter storms, flooding, landslides, and mudslides beginning on December 24, 2022, and continuing. The Governor requested a declaration for Individual Assistance and Public Assistance for 49 counties and Hazard Mitigation	A series of storms hit the County during December 2022 and extended into April 2023. Impacts included roadway flooding, downed trees, and downed powerlines; impacts are further discussed in the Hazard Profiles

			statewide. The Countywide per capital impact indicator was reported $4.44.	
Severe Winter Storms, Flooding, Landslides and Mudslides	EM-3592	03/10/2023	FEMA announced that federal disaster assistance has been made available to the state of California to supplement state, tribal and local response efforts due to emergency conditions resulting from severe winter storms, flooding, landslides, and mudslides beginning March 9, 2023, and continuing.	A series of storms hit the County during December 2022 and extended into April 2023. Impacts included roadway flooding, downed trees, and downed powerlines; impacts are further discussed in the Hazard Profiles
Severe Winter Storms, Straight-Line Winds, Flooding, Landslides and Mudslides	DR-4699	04/03/2023	On March 28, 2023, Governor Gavin Newsom requested a major disaster declaration due to severe winter storms, straight-line winds, flooding, landslides, and mudslides beginning on February 21, 2023, and continuing. The Governor requested a declaration for Individual Assistance for seven counties, Public Assistance for four counties, and Hazard Mitigation statewide. The Countywide per capital impact indicator was reported $4.44.	A series of storms hit the County during December 2022 and extended into April 2023. Impacts included roadway flooding, downed trees, and downed powerlines; impacts are further discussed in the Hazard Profiles

Hazard Type	Annualized Frequency	Events on Record	Period of Record
Avalanche	0 events per year	1	1960-2019
Coastal Flooding	--	--	--
Cold Wave	0 events per year	0	2005-2021
Drought	66.7 events per year	1498	2000-2021
Earthquake	0.334% chance per year	n/a	2021 dataset
Hail	0.1 events per year	4	1986-2021
Heat Wave	1.1 events per year	18	2005-2021
Hurricane	--	--	--
Ice Storm	--	--	--
Landslide	0.1 events per year	9	2010-2021
Lightning	4.1 events per year	91	1991-2012
Riverine Flooding	1.1 events per year	27	1996-2019
Strong Wind	0 events per year	2	1986-2021
Tornado	0.2 events per year	0	1950-2021
Tsunami	--	--	--

Volcanic Activity	0 events per year	1	9310BC-2022
Wildfire	0.957% chance per year	n/a	2021 dataset
Winter Weather	16.7 events per year	270	2005-2021

Source: The National Risk Index, Community Report – Tuolumne County, California https://hazards.fema.gov/nri/

For the purpose of this plan, a Low Probability indicates a 0%-50% chance of an event occurring, a Medium Probability indicates a 50%-75% of an event occurring, and a High Probability indicates a 75%-100% chance of this event occurring in an annual period.

1. HAZARD: EARTHQUAKE

Severity: High	Probability: 0-50%

Hazard Definition

An earthquake is a sudden, rapid shaking of the ground caused by the breaking and shifting of rock beneath the earth's surface or along fault lines. For hundreds of millions of years, the forces of plate tectonics have shaped the Earth as the huge plates that `form the Earth's surface move slowly over, under, and past each other. Sometimes the movement is gradual. At other times, the plates are locked together and unable to release the accumulating energy. When the amassed energy grows strong enough, the plates break free causing the ground to shake. Most earthquakes occur at the boundaries where the plates meet, commonly called faults. However, some earthquakes occur in the middle of plates.

A fault is a fracture in the earth’s crust along which movement has occurred either suddenly during earthquakes or slowly during a process called creep. Cumulative displacement may be tens or even hundreds of miles if movement occurs over geologic time. However, individual episodes are generally small, usually less than several feet, and are commonly separated by tens, hundreds, or thousands of years. Damage associated with fault-related ground rupture is normally confined to a fairly narrow band along the trend of the fault. Structures are often not able to withstand fault rupture and utilities crossing faults are at risk of damage. Fault displacement involves forces so great that it is generally not feasible (structurally or economically) to design and build structures to accommodate this rapid displacement.

Fault displacement can also occur in the form of barely perceptible movement called “fault creep.” Damage by fault creep is usually expressed by the rupture or bending of buildings, fences, railroads, streets, pipelines, curbs, and other linear features.

History

Historically, earthquake activity in Tuolumne County is significantly below the California state average. In fact, it has one of the lowest earthquake risks in the State. However, it still remains 735% greater than the overall U.S. average.

A total of 5 historical earthquake events with recorded magnitudes of 3.5 or greater occurred in or near (50 Miles) Tuolumne County this past century

Tuolumne County Earthquake History 1930-2011

Distance (miles)	Date	Magnitude	Depth (km)	Latitude	Longitude
Epicenter Unknown	March 26, 1872	7.6 – 8.0	N/A	Lone Pine	Inyo County
49.6	June 25, 1933	6.1	N/A	38.08	-119.33
42.6	June 10, 1965	3.5	N/A	38.2	-119.5
44.3	August 10, 1975	4	N/A	37.37	-119.99
40.8	August 9, 1983	4	2	37.9	-119.49

Hazard Potential

The Hazard Potential for earthquakes is dependent on a multitude of factors. A brief description of those factors is presented below:

- **Earthquake Magnitude:** The US Geological Survey currently reports earthquake magnitudes using the Moment Magnitude Scale (Mw). According to the USGS Moment is a physical quantity proportional to the slip on the fault multiplied by the area of the fault surface that slips; it is related to the total energy released in the earthquake. The moment can be estimated from seismograms (and from geodetic measurements). The moment is then converted into a number like other earthquake magnitudes by a standard formula. The result is called the moment magnitude. (https://www.usgs.gov/faqs/moment-magnitude-richter-scale-what-are-different-magnitude-scales-and-why-are-there-so-many)

The scale is as follows:

Great – Mw > 8	Light – Mw = 4.0 – 4.9
Major – Mw = 7.0 – 7.9	Minor – Mw = 3.0 – 3.9
Strong – Mw = 6.0 – 6.9	Micro – Mw < 3
Moderate Mw = 5.0 – 5.9	

- **Distance from Epicenter:** Earthquake energy generally dissipates (or attenuates) with distance from a fault. Over long distances, this loss of energy can be significant, resulting in a significant decrease in ground shaking with increased distance from the epicenter.

- **Duration of Strong Shaking:** The duration of the strong ground shaking constitutes a major role in determining the amount of structural damage and the potential for ground failure that can result from an earthquake. Larger magnitude earthquakes have longer durations than smaller earthquakes.

  The primary effect of ground shaking is the damage or destruction of buildings, infrastructure, and possible injury or loss of life. Building damage can range from minor cracking of plaster to total collapse. Disruption of infrastructure facilities can include damage to utilities, pipelines, roads, and bridges. Ruptured gas and water lines can result in fire and scour/inundation damage, respectively, to structures. Secondary effects can include geologic impacts such as co-seismic fault movement along nearby faults, seismically induced slope instability, liquefaction, lateral spreading, and other forms of ground failure and seismic response.

- **Local Geologic Conditions:** The geologic and soil conditions at a particular site have the potential to substantially increase the effects of ground shaking. The thickness, density, and consistency of the soil, as well as shallow ground water levels, have the potential to amplify the effects of ground shaking depending on the characteristics of the earthquake. In general, the presence of unconsolidated soils above the bedrock surface can amplify the ground shaking caused by an earthquake.

- **Fundamental Periods:** Every structure has its own fundamental period or natural vibration. If the vibration of ground shaking coincides with the natural vibration period of a structure, damage to the structure can be greatly increased. The extent of damage suffered during an earthquake can also depend on non-geologic factors. The type of building and its structural integrity will influence the severity of the damage suffered. Generally, small, well-constructed, one and two-story wood and steel frame buildings have performed well in earthquakes because of their light weight and flexibility. Reinforced concrete structures also usually perform well. Buildings constructed from non-flexible materials, such as unreinforced brick and concrete, hollow concrete block, clay tile, or adobe, are more vulnerable to earthquake damage.

Impacts on People and Housing (including vulnerable populations): In any earthquake, the primary consideration is saving lives. Time and effort must also be dedicated to providing for mental health by reuniting families, providing shelter to displaced persons, and restoring basic needs and services. Major efforts will be required to remove debris and clear roadways, demolish unsafe structures, assist in reestablishing public services and utilities, and provide continuing care and temporary housing for affected citizens. All vulnerable populations in the County may be impacted by this hazard and require more assistance in recovering from earthquake effects.

Unreinforced Masonry Buildings: Unreinforced masonry building type structures consist of buildings made of unreinforced concrete and brick, hollow concrete blocks, clay tiles, and adobe. Buildings constructed of these materials are heavy and brittle, and typically provide little earthquake resistance. In small earthquakes, unreinforced buildings can crack, and in strong earthquakes, they have a tendency to collapse. These types of structures pose the greatest structural risk to life and safety of all general building types. Non-structural items and building components can also influence the amount of damage that buildings suffer during an earthquake. Unreinforced parapets, chimneys, facades, signs, and building appendages can all be shaken loose, creating a serious risk to life and property.

A considerable number of these structures can be found in the historic districts of Jamestown and the City of Sonora. Compliant with the State of California's Alquist-Priolo Special Studies Zone Act, the inventorying and public notification of these structures, based on the low probability of a damaging quake occurring, is not required.

Effects on commercial and industrial structures: After any earthquake, individuals are likely to lose wages due to the inability of businesses to function because of damaged goods and/or facilities. With business losses, Tuolumne County will lose revenue. Economic recovery from even a minor earthquake will be critical to the communities involved.

Effects on infrastructure: The damage caused can lead to the paralysis of the local infrastructure. Electrical distribution system, water and sewer systems, and the historic flume system are all very susceptible to damage. The impacts on law enforcement, fire, medical and governmental services can be significant.

Relationship to Other Hazards – Cascading Effects

Earthquakes can cause many cascading effects such as fires, flooding, hazardous materials spills, utility disruptions, landslides, and transportation emergencies. Ground shaking may cause seiche, the rhythmic sloshing of water in lakes or bays.

Plans and Programs in Place

The Tuolumne County Office of Emergency Services (OES), in coordination with local, state, and federal emergency response organizations, works continually to better prepare the County's residents for the impact of major emergency events.

The planning and building divisions of both the City of Sonora and the County of Tuolumne ensure that all new construction complies with current codes and ordinances regarding earthquake safety.

First responder agencies regularly train on building collapse awareness, heavy rescue techniques, mass casualty triage and treatment, and have a limited amount of equipment and resources available to facilitate heavy rescue operations.

Earthquake Probability in Tuolumne County

The largest earthquake within 100 miles of Tuolumne, California was a 6.2 (Strong) Magnitude in 1984. *The 76% probability of one or more magnitude 7.0 earthquakes striking Northern California is based on a 30-year period, beginning in 2014. Climate change does not appear to have an impact on the occurrence of this hazard.

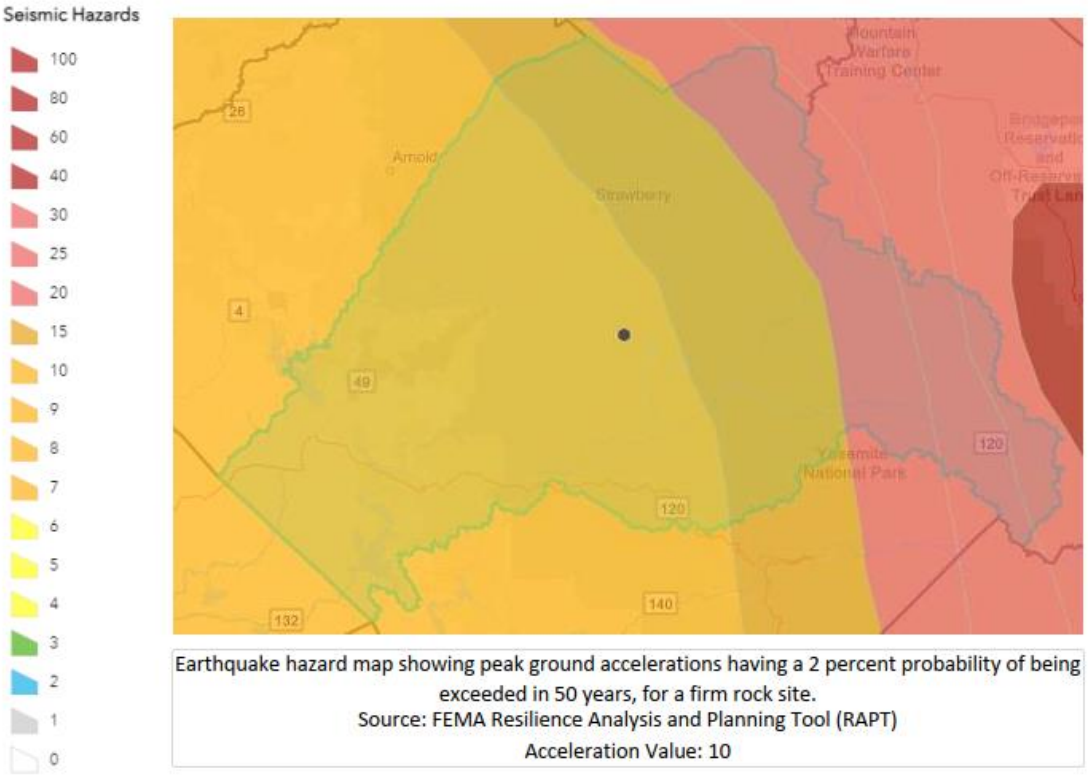
Major Faults in the County

Only one major "active fault" is found in Tuolumne County, the New Melones fault, which transects the County running roughly north to south along the western boundary and is part of the Foothill fault system which runs along the west base of the Sierra Nevada mountain range. The estimated maximum capability for this fault is Magnitude 6.5.

In addition to the New Melones fault, the Foothill fault system also contains four "capable" faults located in Tuolumne County:

- Negro Jack Point
- Bowie Flat
- Rawhide Flat West (estimate maximum Magnitude 6.2 quake capability)
- Rawhide Flat East (estimate maximum Magnitude 6.2 quake capability)

The Bear Mountain fault runs nearly parallel with the New Melones and is considered to "indeterminable inactive"

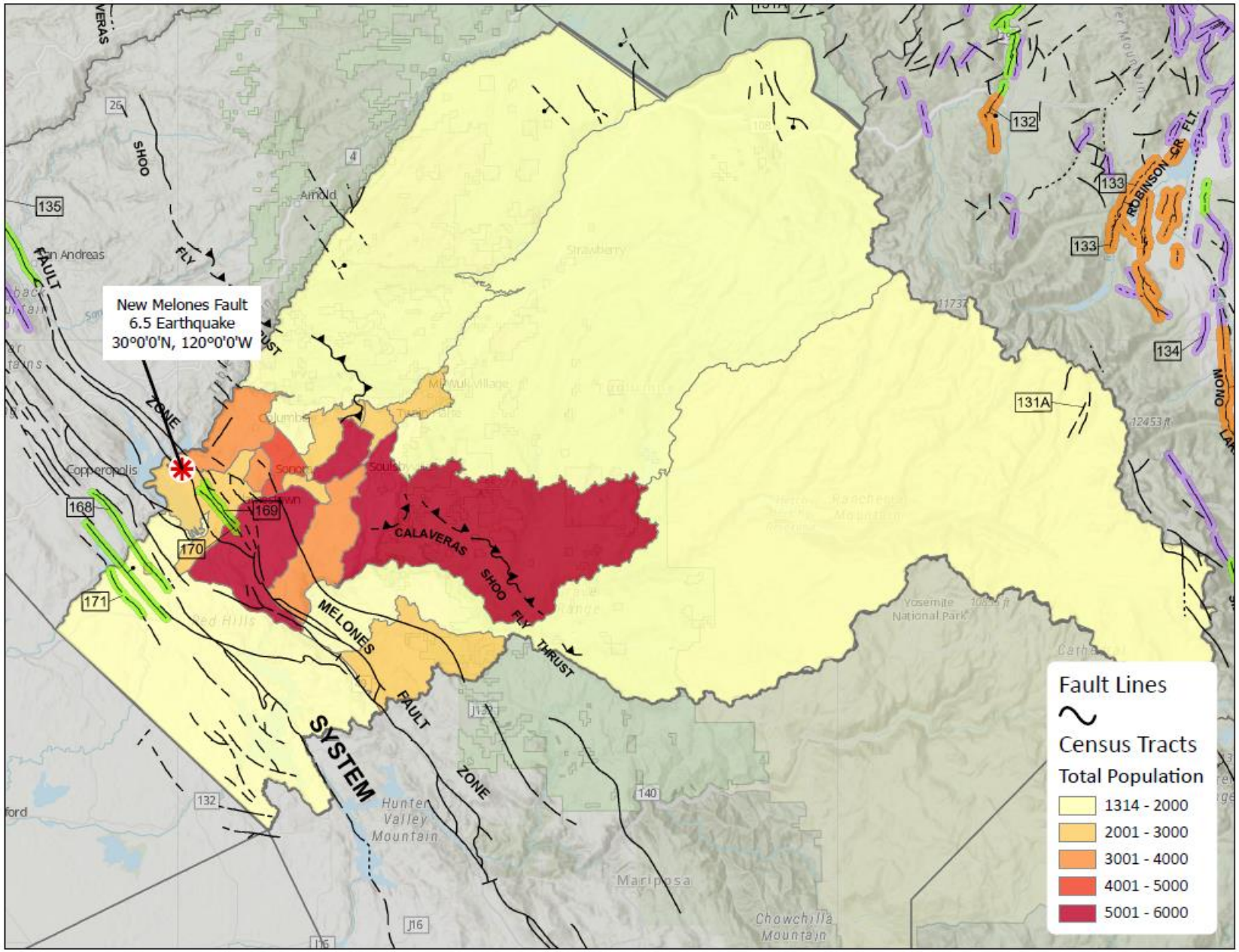


Earthquake hazard map showing peak ground accelerations having a 2 percent probability of being exceeded in 50 years, for a firm rock site.
Source: FEMA Resilience Analysis and Planning Tool (RAPT)
Acceleration Value: 10

FEMA HAZUS - Natural Loss Analysis

Scenario earthquake damage assessments implemented for this study utilized the Federal Emergency Management Agency's HAZUS® natural hazard loss estimation software. HAZUS® (HAZards U.S.), developed for FEMA by the National Institute of Building Sciences (NIBS), is a geographic information system (GIS) based, standardized, nationally applicable multi-hazard loss estimation methodology and software. Local, state and federal government officials use HAZUS® for preparedness, emergency response, and mitigation planning.

The following HAZUS analysis involves a loss estimation assessment if a 6.5 magnitude earthquake were to occur on the New Melones Fault in Tuolumne County at latitude 38 degrees and longitude of -120.5 degrees. It should be noted that the loss estimates are based on the reported critical infrastructure costs from the involved jurisdictions at 100% loss. Given the lack of historical earthquake data for the region, the software was unable to predict actual losses.


New Melones Fault
6.5 Earthquake
30°0'0"N, 120°0'0"W
SHOO FLY
CALAVERAS
MELONES
FAULT
SYSTEM
ZONE
THRUST
ROBINSON SR FLT.
MONO
Arnold
Copperopolis
Hunter Valley Mountain
Mariposa
Chowchilla Mountain
Yosemite National Park
Fault Lines
Census Tracts
Total Population
1314 - 2000
2001 - 3000
3001 - 4000
4001 - 5000
5001 - 6000

Utility System Dollar Exposure

December 01, 2023

All values are in thousands of dollars

	Potable Water	Waste Water	Oil Systems	Natural Gas	Electric Power	Communication	Total
California							
Tuolumne							
Facilities	0	171,952	0	0	6,609,129	826	6,781,907
Pipelines	113,576	68,146	0	45,431			227,153
Total	**113,576**	**240,098**	**0**	**45,431**	**6,609,129**	**826**	**7,009,060**
Total	**113,576**	**240,098**	**0**	**45,431**	**6,609,129**	**826**	**7,009,060**
Region Total	**113,576**	**240,098**	**0**	**45,431**	**6,609,129**	**826**	**7,009,060**

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/states were selected at the time of study region creation.

Study Region : Tuolumne_v1
Scenario : NewMelones_6.5

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Building Stock Exposure By General Occupancy

December 01, 2023

All values are in thousands of dollars

	Residential	Commercial	Industrial	Agriculture	Religion	Government	Education	Total
California								
Tuolumne	8,964,506	1,968,134	620,091	72,321	197,656	280,398	368,626	12,471,732
Total	**8,964,506**	**1,968,134**	**620,091**	**72,321**	**197,656**	**280,398**	**368,626**	**12,471,732**
Region Total	**8,964,506**	**1,968,134**	**620,091**	**72,321**	**197,656**	**280,398**	**368,626**	**12,471,732**

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/states were selected at the time of study region creation.

Study Region : Tuolumne_v1

Scenario : NewMelones_6.5

Building Damage by Count by General Occupancy

December 01, 2023

	# of Buildings					
	None	Slight	Moderate	Extensive	Complete	Total
California						
Tuolumne						
Single Family	*17,084*	*3,426*	*1,011*	*119*	*6*	*21,645*
Religion	*76*	*20*	*17*	*6*	*1*	*121*
Industrial	*200*	*68*	*75*	*34*	*7*	*383*
Commercial	*835*	*298*	*299*	*121*	*23*	*1,576*
Other Residential	*2,913*	*1,001*	*731*	*268*	*49*	*4,962*
Agriculture	*55*	*13*	*10*	*4*	*1*	*82*
Education	*38*	*8*	*7*	*3*	*1*	*57*
Government	*109*	*15*	*13*	*5*	*1*	*143*
Total	**21,312**	**4,849**	**2,162**	**559**	**87**	**28,969**
Region Total	**21,312**	**4,849**	**2,162**	**559**	**87**	**28,969**

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/states were selected at the time of study region creation.

Study Region : Tuolumne_v1

Scenario : NewMelones_6.5

Waste Water Pipeline Damage

December 01, 2023

	Pipeline Length (KM)	Total Number of Leaks	Total Number of Breaks
California			
Tuolumne	3,407	78	19
Total	**3,407**	**78**	**19**
Region Total	**3,407**	**78**	**19**

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/states were selected at the time of study region creation.

Study Region : Tuolumne_v1
Scenario : NewMelones_6.5

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Waste Water Facility Damage

December 01, 2023

	# of Facilities	Average for Damage State				
		None	Slight	Moderate	Extensive	Complete
California						
Tuolumne	1	0.12	0.37	0.38	0.11	0.01
Total	**1**	**0.12**	**0.37**	**0.38**	**0.11**	**0.01**
Region Total	**1**	**0.12**	**0.37**	**0.38**	**0.11**	**0.01**

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/states were selected at the time of study region creation.

Study Region : Tuolumne_v1

Scenario : NewMelones_6.5

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Potable Water Pipeline Damage

December 01, 2023

	Pipeline Length (KM)	Total Number of Leaks	Total Number of Breaks
California			
Tuolumne	5,679	155	39
Total	**5,679**	**155**	**39**
Region Total	**5,679**	**155**	**39**

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/states were selected at the time of study region creation.

Study Region : Tuolumne_v1
Scenario : NewMelones_6.5

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Potable Water System Facility Damage

December 01, 2023

	# Facilities	Average for Damage State				
		None	Slight	Moderate	Extensive	Complete
Total						
Region Total						

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/states were selected at the time of study region creation.

Study Region : Tuolumne_v1

Scenario : NewMelones_6.5

HAZUS EARTHQUAKE - WIND - FLOOD - TSUNAMI

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Direct Economic Loss For Transportation

December 01, 2023

All values are in thousands of dollars

	Highway	Railway	Light Rail	Bus Facility	Ports	Ferries	Airport	Total
California								
Tuolumne								
Segments	0	0	0					0
Bridges	3,478	496	0					3,974
Tunnels	0	0	0					0
Facilities		0	0	0	0	0	1,636	1,636
Total	**3,478**	**496**	**0**	**0**	**0**	**0**	**1,636**	**5,610**
Total	**3,478**	**496**	**0**	**0**	**0**	**0**	**1,636**	**5,610**
Region Total	**3,478**	**496**	**0**	**0**	**0**	**0**	**1,636**	**5,610**

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/states were selected at the time of study region creation.

Study Region : Tuolumne_v1
Scenario : NewMelones_6.5

HAZUS
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Direct Economic Losses For Buildings

December 1, 2023

All values are in thousands of dollars

	Capital Stock Losses					Income Losses				
	Cost Structural Damage	Cost Non-struct. Damage	Cost Contents Damage	Inventory Loss	Loss Ratio %	Relocation Loss	Capital Related Loss	Wages Losses	Rental Income Loss	Total Loss
California										
Tuolumne	77,379	279,522	103,314	6,101	2.86	42,721	22,228	29,879	23,455	584,599
Total	**77,379**	**279,522**	**103,314**	**6,101**	**2.86**	**42,721**	**22,228**	**29,879**	**23,455**	**584,599**
Region Total	**77,379**	**279,522**	**103,314**	**6,101**	**2.86**	**42,721**	**22,228**	**29,879**	**23,455**	**584,599**

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/states were selected at the time of study region creation.

Study Region : Tuolumne_v1

Scenario : NewMelones_6.5

Page : 1 of 1

Earthquake Hazard Report

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Shelter Summary Report

December 01, 2023

	# of Displaced Households	# of People Needing Short Term Shelter
California		
Tuolumne	335	171
Total	**335**	**171**
Region Total	**335**	**171**

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/states were selected at the time of study region creation.

Study Region : Tuolumne_v1
Scenario : NewMelones_6.5

HAZUS EARTHQUAKE - WIND - FLOOD - TSUNAMI

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Transportation System Dollar Exposure

December 01, 2023

All values are in thousands of dollars

	Highway	Railway	Light Rail	Bus Facility	Ports	Ferries	Airport	Runway	Total
California									
Tuolumne									
Segments	1,125,989	68,178	0						1,194,167
Bridges	314,835	113,800	0						428,635
Tunnels	0	0	0						0
Facilities		0	0	0	0	0	15,900	10,332	15,900
Total	**1,440,824**	**181,978**	**0**	**0**	**0**	**0**	**15,900**	**10,332**	**1,649,034**
Total	**1,440,824**	**181,978**	**0**	**0**	**0**	**0**	**15,900**	**10,332**	**1,649,034**
Region Total	**1,440,824**	**181,978**	**0**	**0**	**0**	**0**	**15,900**	**10,332**	**1,649,034**

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/states were selected at the time of study region creation.

Study Region : Tuolumne_v1
Scenario : NewMelones_6.5

Highway Bridge Damage

December 01, 2023

	# of Bridges	Average for Damage State				
		None	Slight	Moderate	Extensive	Complete
California						
Tuolumne	119	0.98	0.01	0.00	0.00	0.00
Total	**119**	**0.98**	**0.01**	**0.00**	**0.00**	**0.00**
Region Average	**119**	**0.98**	**0.01**	**0.00**	**0.00**	**0.00**

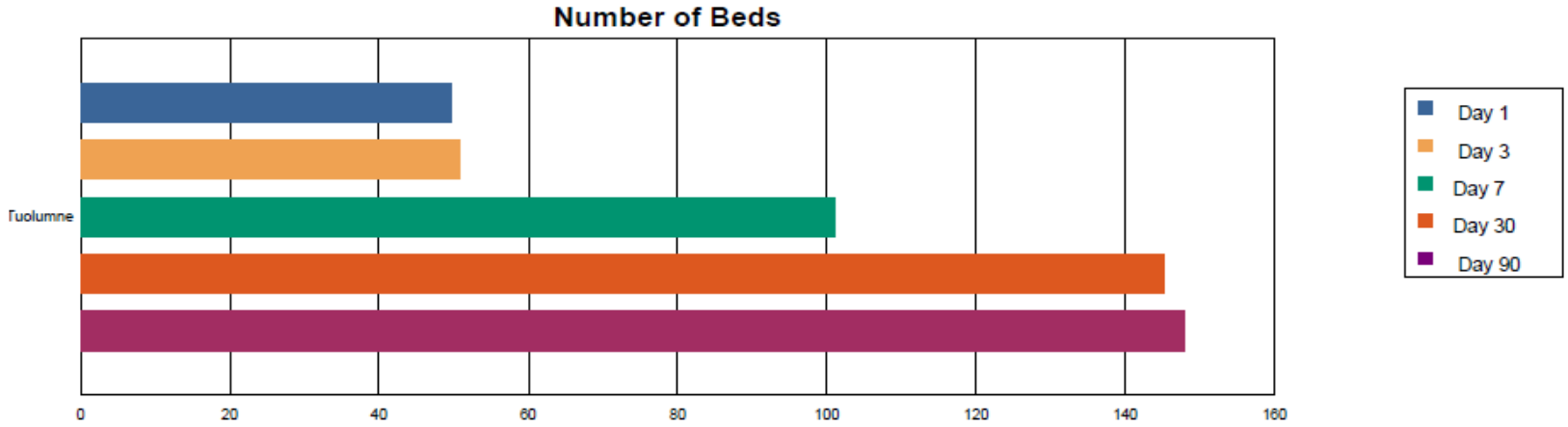
Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/states were selected at the time of study region creation.

Study Region : Tuolumne_v1

Scenario : NewMelones_6.5

Hospital Functionality

December 1, 2023



	Total # of Beds	At Day 1		At day 3		At day 7		At day 30		At day 90	
		# of Beds	%	# of Beds	%	# of Beds	%	# of Beds	%	# of Beds	%
California											
Tuolumne											
Medium Hospital	140	52	37.13	53	37.93	100	71.10	135	96.60	137	98.00
Small Hospital	12	3	28.20	3	29.00	7	61.80	11	94.50	12	96.70
Total	**152**	**50**	**32.70**	**51**	**33.50**	**101**	**66.50**	**145**	**95.60**	**148**	**97.40**

Study Region : Tuolumne_v1
Scenario : NewMelones_6.5

Impact of Climate Change

Climate change is not expected to affect the frequency of earthquakes.

Vulnerability

Both direct and indirect consequences of a major earthquake will severely stress the resources of the County and will require a high level of self-help, coordination and cooperation. Outside assistance from other local, regional, state, federal and private agencies may be delayed by more than 72 hours, depending upon the regional severity of the earthquake.

Probability

Based on the history of damaging earthquakes and the fact that Tuolumne County is located within a seismically inactive region, the probability of experiencing an earthquake with a magnitude of 3.5 or greater is approximately 3%, rated as **Low.** Given the properties at risk and the cascading effects, the extent is rated as **High.**

2. HAZARD: FLOODING

Severity: Low	Probability: 50-75%

Hazard Definition

A flood is defined as an overflowing of water onto an area of land that is normally dry. Floods generally occur from natural weather-related causes, such sudden snow melts, often in conjunction with a wet or rainy spring or with sudden and very heavy rain fall. Floods can also result from human causes such as a dam impoundment bursting.

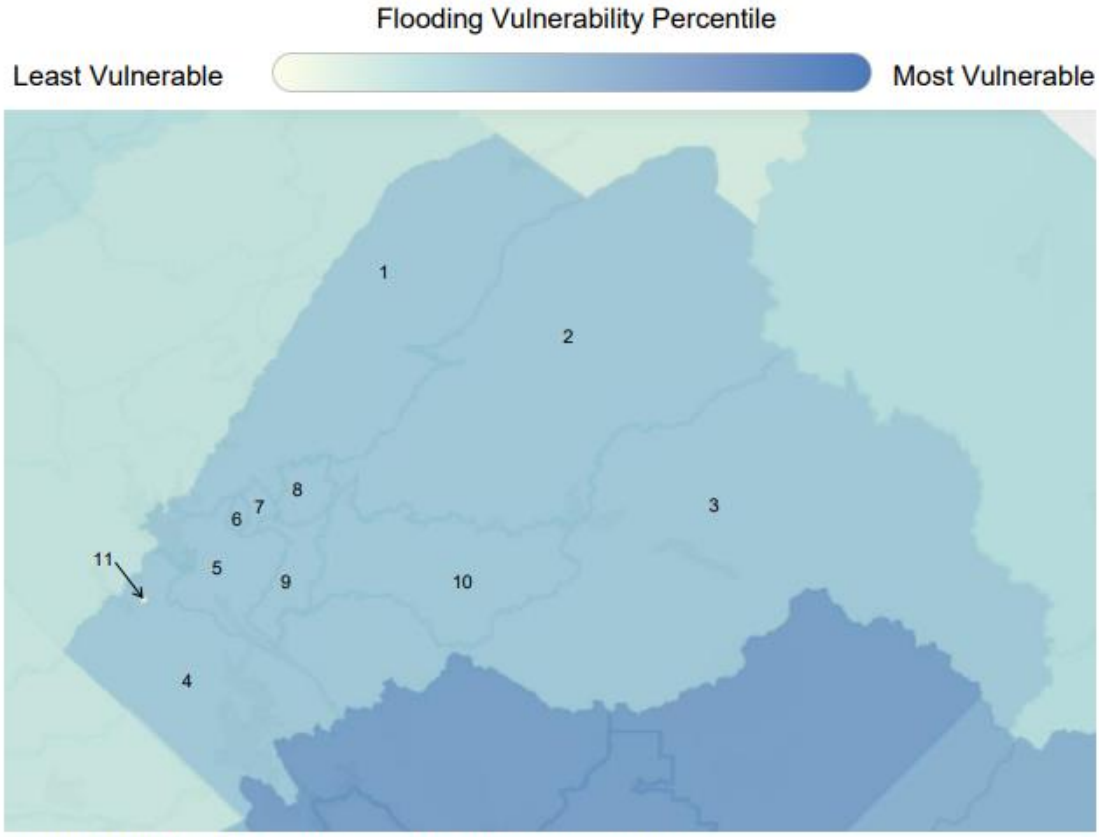
Flooding occasionally occurs in Tuolumne County particularly during the winter and springtime following heavy periods of rainfall when excessive runoff causes streams and tributaries from the Stanislaus River and Tuolumne River to overrun their banks. The physical geography of the County impacts their flood potential. Tuolumne County crosses seven watersheds. Because of the high elevation of many of these watersheds, much of the precipitation is in the form of snowfall. The overall slope of the watersheds is relatively steep.

The two main watersheds that form the County are the upper Tuolumne River, and a significant portion of the upper Stanislaus River. Both are dammed in the lower elevations along much of the stream courses and are mostly contained within government or special district ownership. Thus, excluding a few tributaries, the larger rivers and the immediate environs are not in areas where private development can

occur. Further, the rivers and streams reside within relatively steep canyons or valleys, where very little floodplain has been formed.

The below percentile map was calculated based on the U.S Climate Vulnerability index which combines environmental, social, economic, and infrastructure effects on neighborhood-level stability.

History



Source: https://www.sfchronicle.com/projects/2023/california-extreme-weather-map/

Flooding Vulnerability by Tract

1	2	3	4	5	6	7	8	9	10	11
34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%

Past flood/storm events of significance for the County are delineated in the table below:

DATE	EVENT DETAILS
Winter of1887	The earliest record rainfall amount found in The Union Democrat indicates that 67 inches of rain fell. No damages were noted.
December 1964	The County Board of Supervisors declares a state of emergency based on localized flooding within the County.
Winter1969	A series of cold storms dropped 8 inches of snow on the City of Sonora, elevation 1800 feet. The snow stayed on the ground for a full week as a cold front moved in behind the last storm. The County came to a standstill as the limited numbers of snowplows were unable to keep the roads open. Flooding was reported as snow melted.
February 1986	Early season storms completely saturated the soils. A fast moving rain storm in February caused Sonora Creek to overbank flooding the Mother Lode Fairgrounds.
March 1995	The Governor of California request federal assistance after the County Board of Supervisors declares a state of emergency based on localized flooding within the County.
April 2006	On April 11, the Board of Supervisors passed an Emergency Resolution proclaiming the existence of a local emergency due to a series of winter storms that had “caused conditions of extreme peril to the safety of persons and property because of localized flooding in the County of Tuolumne”.
March 2011	With seasonal rainfall accumulations of nearly 60 inches, a late season storm, accompanied by extremely high winds, caused nearly $750,000 in damages across the county. Damages to the flume systems, roadways, electrical distribution system and tree damage to numerous residences resulted in a request for a Federal Disaster Declaration.
Jan/Feb 2017	A series of storms bringing heavy precipitation and snowfall to Tuolumne County causing culverts and ditches to fail and flood. A number of roads eroded causing major damage and inaccessible lanes to be closed; some remain closed due to the high cost of repair. A Local State of Emergency was declared by the Board of Supervisors due to flooding and damage to roads, bridges, and culverts
March 2018	Extensive flooding in downtown Groveland due to torrential rain from an atmospheric river, as floodwaters ran down the main street, Highway 120. Property was damaged and water rescues for stranded residents. There was significant damage done to Groveland Community Hall and Mary Laveroni Community Park. Preliminary estimates from Tuolumne County are approximately $8 million for 16 damaged sites along county-maintained roads. A very large portion of these damages are seen in the sinkhole at Ferretti Road and slides and embankment loss on Priest Coulterville Road
March 2019	Heavy rain from training thunderstorms caused flash flooding, particularly in the Sonora area.

December 2022	Heavy rain caused localized flooding, with several inches of water reported at Via Este Road and State Route 108
January 2023	a Major Winter Storm brought strong winds with moderate to heavy rain bringing renewed flooding of already elevated waterway. Caltrans reports a Westbound SR120 lane closure at Tulloch Road Crossover due to roadway wash out.

Flood Hazard Potential

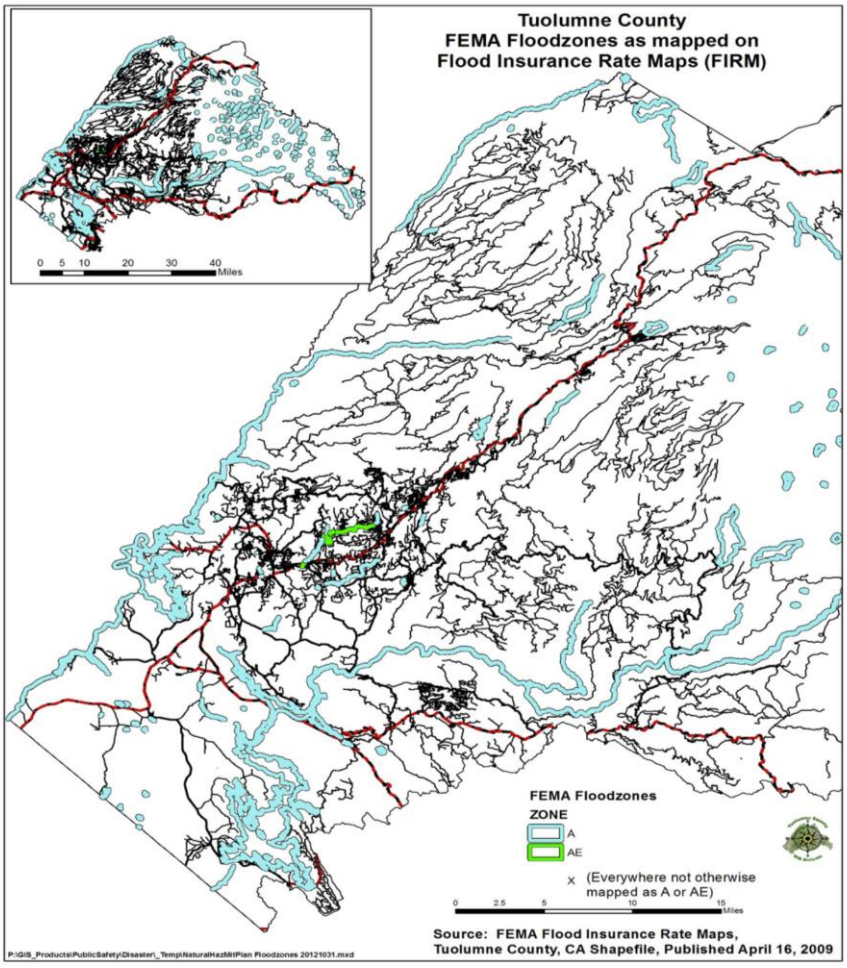
For floodplain management purposes, the Federal Emergency Management Agency (FEMA) will often use the term “100-year flood” or “500-year flood” to describe the size or magnitude. These terms are misleading. It is not a flood that occurs once every 100 or 500 years. Rather, it is the flood elevation that has a 1 percent chance of being equaled or exceeded each year. Thus, a 100-year flood could occur more than once in a relatively short period of time.

The 100-year flood, which is the standard used by most federal and state agencies, is used by the National Flood Insurance Program (NFIP) as the standard for floodplain management and to determine the need for flood insurance. It should be noted that within the County, which is an NFIP participating agency is, there are no NFIP insured structures that have been repeatedly flooded.

The FIRM map below indicates Flood Zones A and AE.

- Flood Zone A indicates special flood areas subject to inundation by the 1%-annual-chance flood event generally determined using approximate methodologies.

- Flood Zone AE indicates areas subject to inundation by the 1%-annual-chance flood event determined by detailed methods.



As illustrated below in the tables, the average annual total precipitation is expected to increase due to climate change and thus increase the impacts of future flooding events. The tables below are indicative of the potential risks faced by the County based on levels of greenhouse gas emissions. According to the Environmental Protection Agency, these gasses from human activities are the most significant driver of observed climate change since the mid-20th century (https://www.epa.gov/climate-indicators/greenhouse-gases).

Flooding Climate Projections for Tuolumne County

Early Century (2015-2044)	Lower Emissions	Higher Emissions
Average annual total precipitation	43.6 inches +.1 since 1976-2005	44.7 inches +1.2 since 1976-2005
Days per year with precipitation (wet days)	107.8 days -2.7 since 1976-2005	108.0 days -2.4 since 1976-2005

Maximum number of consecutive wet days	12.4 days -0.1 since 1976-2005	12.7 days +0.1 since 1976-2005
Annual days with total precipitation >1	11.8 days +0.3 since 1976-2005	12.4 days +0.8 since 1976-2005
Annual days with total precipitation >2	2.5 days +0.1 since 1976-2005	2.7 days +0.3 since 1976-2005
Annual days with total precipitation >3	0.6 days +0.1 since 1976-2005	0.6 days +1.1 since 1976-2005
Annual days that exceed 99th percentile precipitation	9.1 days +0.6 since 1976-2005	9.6 days +1.1 since 1976-2005
Days with maximum temperature below 32F°	16.6 days -4.7 since 1976-2005	15.7 days -5.7 since 1976-2005
Mid Century (2035-2064)	**Lower Emissions**	**Higher Emissions**
Average annual total precipitation	43.2 inches -0.3 since 1976-2005	44.7 inches +1.1 since 1976-2005
Days per year with precipitation (wet days)	105.6 days -4.8 since 1976-2005	105.1 days -5.4 since 1976-2005
Maximum number of consecutive wet days	12.1 days -0.5 since 1976-2005	12.4 days -0.2 since 1976-2005
Annual days with total precipitation >1	11.9 days +0.3 since 1976-2005	12.6 days +1.0 since 1976-2005
Annual days with total precipitation >2	2.6 days +0.2 since 1976-2005	2.9 days +0.5 since 1976-2005
Annual days with total precipitation >3	0.6 days +0.1 since 1976-2005	0.7 days +0.2 since 1976-2005

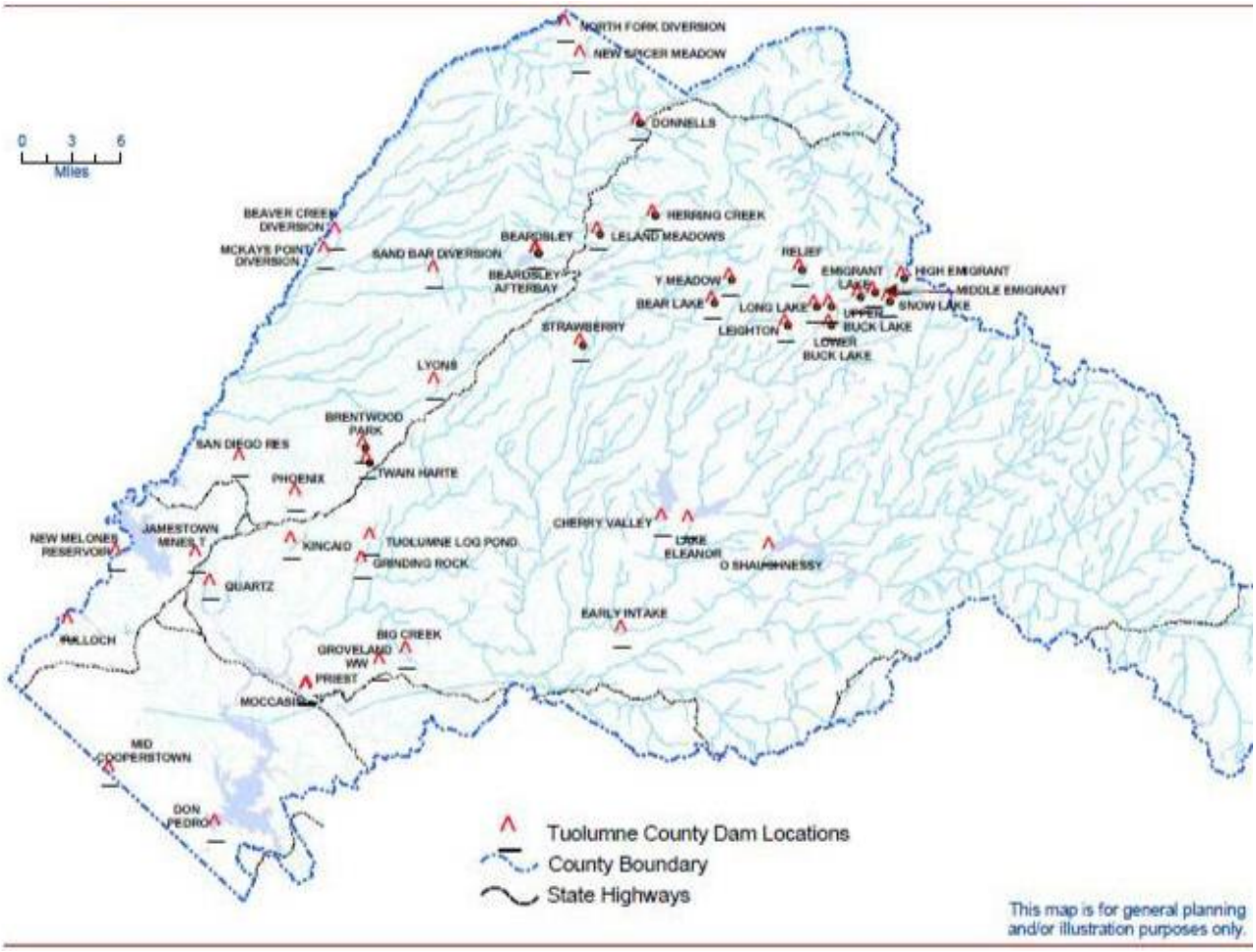
Annual days that exceed 99th percentile precipitation	9.3 days +0.9 since 1976-2005	10.4 days +2.0 since 1976-2005
Days with maximum temperature below 32F°	13.9 days -7.4 since 1976-2005	12.4 days -9.0 since 1976-2005

Late Century (2070-2099)	Lower Emissions	Higher Emissions
Average annual total precipitation	44.0 inches +0.5 since 1976-2005	45.3 inches +1.8 since 1976-2005
Days per year with precipitation (wet days)	105.2 days -5.3 since 1976-2005	101.2 days -9.3 since 1976-2005
Maximum number of consecutive wet days	12.4 days -0.2 since 1976-2005	12.1 days -0.5 since 1976-2005
Annual days with total precipitation >1	12.3 days +0.7 since 1976-2005	13.2 days +1.6 since 1976-2005
Annual days with total precipitation >2	2.8 days +0.4 since 1976-2005	3.3 days +0.9 since 1976-2005
Annual days with total precipitation >3	0.2 days +0.1 since 1976-2005	0.9 days +0.4 since 1976-2005
Annual days that exceed 99th percentile precipitation	10.2 days +1.7 since 1976-2005	11.9 days +3.5 since 1976-2005
Days with maximum temperature below 32F°	11.5 days -9.8 since 1976-2005	6.8 days -14.6 since 1976-2005

Source: Climate Mapping for Resilience and Adaptation v1.3.1

3. Dam Failure

There are 44 dams in Tuolumne County ranging from those that create large reservoirs for irrigation, water supply, or power generation, to smaller impoundments which are part of water distribution or treatment systems or intended to provide a recreational amenity. A description of the larger dams and their impact if failure occurs is described in the following pages.



LOCATION OF DAMS OF SIGNIFICANT SIZE IN TUOLUMNE

Table IV-3: Major Dams in Tuolumne County

Name	Location	Dam Type	Initial Reservoir Elevation	Time to Complete Failure	Consequences of Dam Failure
Beardsley Dam	Middle Fork of the Stanislaus River below Donnell Dam	Earth and rock fill with gated spillway	3,397 feet	60 minutes	Reservoir contents would flow into New Melones Dam

Big Creek Dam (aka Pine Mountain)	On Big Creek off HWY 120 in Groveland, 30 miles south of Sonora, 26 miles west of entrance to Yosemite National Park	Homogenous earth filled dam with an internal granular cement drain and downstream drainage system and clay core	120 feet, crest width 555 feet	Unknown	Big Creek flows approximately 4 miles from the dam to Tuolumne Rover. Failure could potentially impact people and property on Deerbrush Ct., Cottonwood St., and Wells Fargo Dr.
Cherry Valley Dam	Cherry Creek approximately 3 miles upstream from the confluence of Cherry Creek and Eleanor Creek and 7 miles upstream from Tuolumne River	Earth and rock fill with gated spillway	4,702 feet	45 minutes	Reservoir contents would drain into Cherry Creek, past Holm Powerhouse and into the Tuolumne River where it would likely back up past the bridge to Early Intake
Donnell's Dam	Middle Fork of the Stanislaus River below Donnell Dam	Concrete arch dam with gated spillway	4,915 feet	12 minutes	Flood waters would overtop Beardsley Dam by more than 30 feet likely causing Beardsley Dam to immediately fail. Beardsley would then empty into New Melones Reservoir. Water would flow down to the Tuolumne River to its confluence with the San Joaquin River. Major flooding would occur along the entire Tuolumne River basin, including the towns of La Grange, Modesto and Waterford
Don Pedro Dam	Approximately 30 miles east of Modesto. The dam and reservoir are on the Tuolumne River	Earth and rock fill structure in a V-shaped gorge	855 feet	90 minutes	

Early Intake Dam	Tuolumne River, approximately 3 miles upstream from confluence of Cherry Creek and 15 miles downstream of O'Shaughnessy Dam	Concrete arch dam	2,341 feet	6 minutes	Damage to several manmade facilities downstream of the dam
Goodwin Dam	Approximately 1.9 miles downstream of Tulloch Dam and 3.8 miles northeast of Knights Ferry on the Stanislaus River at the Tuolumne and Calaveras County line	Concrete gravity with a gated spillway	359 feet	6 minutes	Failure would not pose a major threat to property or human lives.
Lake Eleanor Dam	Located in Yosemite National Park at its Western edge approximately 5 miles west of O'Shaughnessy Dam and 2 miles east of Cherry Valley Dam	Concrete multiple arch	4,660 feet	15 minutes	Reservoir contents would drain down Eleanor Creek to Cherry Creek, past Holm Powerhouse and into Tuolumne River a mile beneath the bridge to Early Intake
McKay's Point Diversion Dam	North Fork of the Stanislaus River	Concrete double curvature arch	3,370 feet	6 minutes	Failure would engender a wave of water down the Stanislaus River into the New Melones Reservoir
Moccasin Dam	Moccasin Creek approximately 3 miles upstream of the confluence of Moccasin Creek	Earth and rock fill	918 feet	18 minutes	Damage to many man-made facilities downstream of the dam

New Melones Dam	Stanislaus River near the City of Sonora	Earth and rock fill	808 feet	Unknown	Water would flow down Highland Creek and then to the North Fork of the Stanislaus River. This would cause the McKays Point Diversion Dam to fail engendering a wave of water down the Stanislaus River into the New Melones Reservoir
New Spicer Meadow Dam	On the Stanislaus River	Concrete gravity dam	6,614 feet	60 minutes	Water would flow down Highland Creek and then to the North Fork of the Stanislaus River. This would cause the McKays Point Diversion Dam to fail engendering a wave of water down the Stanislaus River into the New Melones Reservoir.
O'Shaughnessy Dam	On the Tuolumne River approximately 11 miles upstream from the confluence of Cherry Creek	Concrete gravity	3,812 feet	15 minutes	Dam failure would engender large depths in the narrow, step canyon downstream with rapid wave travel times. Depths as great as 325 feet would occur in some reaches of the Tuolumne River between Hetch Hetchy and Don Pedro Reservoirs. Peak of flood wave would reach the headwaters of the downstream reservoir about 90 minutes after the dam failure
Priest Dam	On Rattlesnake Creek, a tributary to Moccasin Creek, approximately 7 miles upstream from the confluence of	Earth fill with a central concrete core	2,240 feet	Unknown	Rattlesnake Creek, Big Jackass Creek, and Moccasin Creek will be affected, flowing on down to the Don Pedro Reservoir on the Tuolumne River.

	Moccasin Creek				
Lyons Dam	On the South Fork of the Stanislaus River about 13.7 miles northeast of Sonora	Concrete arch dam	4,226 feet	6 minutes	Italian Bar and Melones Reservoir will be inundated with water traveling at speeds of 62-95 MPH
Strawberry Dam aka Pinecrest Dam	On the South Fork of the Stanislaus River about 31 miles northeast of Sonora	Concrete faced rockfill	5,623 feet	30 minutes	The areas of Strawberry, Boy Scouts of America camp, Philadelphia Ditch, Lyons Dam and Italian Bar would be inundated with swift water flow
Phoenix Dam	At Phoenix Lake to Sullivan Creek and eventually to Don Pedro	Earthen	2,370 feet	Varies depending on time of year, but less than 2 minutes	Flooding to residents along the Sullivan Creek to Don Pedro
Quartz Dam	Quartz Reservoir to impound entire reservoir without spilling	Earthen	1.390 feet	Unknown	Minimal water would travel to and reach Don Pedro

Ordinances and Regulations

Both the City of Sonora and the County of Tuolumne have Planning and Land Use Ordinances in place which outline development standards in areas that have the potential to be inundated by a 100-year flood. The County adopted a Flood Damage Prevention Ordinance in 2008 and has developed a Storm Drainage Master Plan to assist in long range plan efforts for the improvement of flood control efforts. These ordinances will help decrease the impact of flood on the County.

Plans and Programs

The County will continue to:

- Strictly enforce both current and revised flood hazard regulations. FEMA regulations and other requirements for the placement of structures in flood plains, which are based on predicted flooding levels at various elevations, shall be followed.

- Maintain standards for development in flood-prone and poorly drained areas and establish mitigation actions for new development where flooding is a concern.

- Work to improve flood prone areas through a combination of vegetation management and storm drain improvements. (i.e. Sonora, Curtis, Sullivan, and Woods Creeks)

- Fire, Community Development Department, and law enforcement agencies will maintain and improve their ability to respond to water hazard emergencies throughout the County.

- Participate in the Flood Insurance Program.

The California Department of Water Resources, Division of Safety of Dams is charged with the inspection of all dams if the height is more than 6 feet and it impounds 50 acre-feet or more of water, or if the dam is 25 feet or higher and impounds more than 15 acre-feet of water. Federally owned dams are exempted.

Should the County incur a substantial damage event, the Public Works Department would be brought in to assess and repair damages. The Community Development Department, which houses the Floodplain Administrator, would be notified as their responsibility includes reducing flood losses and minimizing the need for rescue and relief efforts associated with flooding.

Relationship to Other Hazards - Cascading Effects

While there are some benefits associated with flooding, such as the scouring of riverbeds, replenishment of beach sands, and the depositing of nutrients to agricultural lands, it is generally considered a hazard to development in floodplains. Floods can cause a wide range of cascading effects. Fires can break out as a result of dysfunctional electrical equipment. Hazardous materials can also get into floodways, causing health concerns and polluted water supplies. In many instances during a flood, the drinking water supply will be contaminated. Other flooding impacts include:

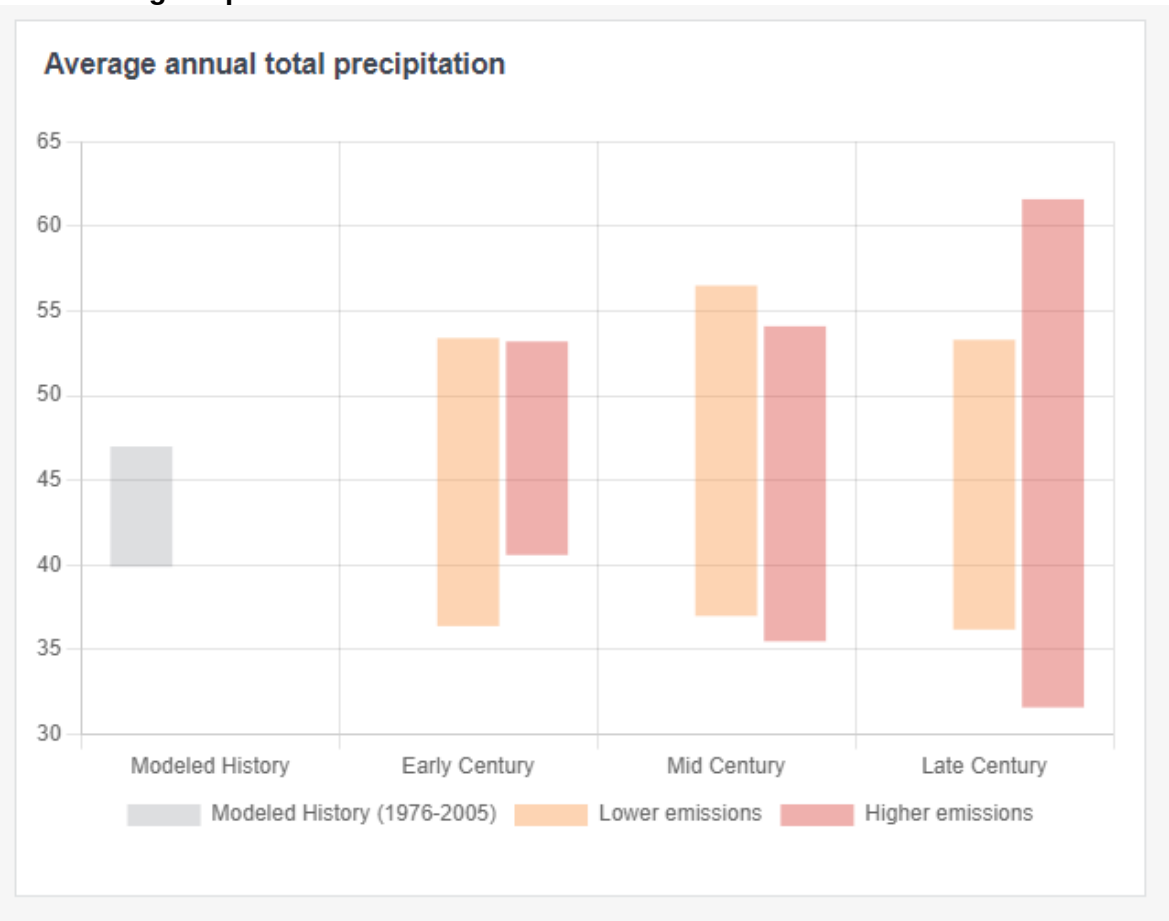
- **Effects on people, housing and commerce (including vulnerable populations).** Direct impacts of flooding can include injuries and loss of life, damage to property and health hazards from ruptured sewage lines and damaged septic systems. Secondary

impacts include the cost and commitment of resources for flood mitigating services, clean-up operations, and the repair or replacement of damaged structures and industrial equipment. Interruption of business cycles and loss of tax revenues are associated impacts

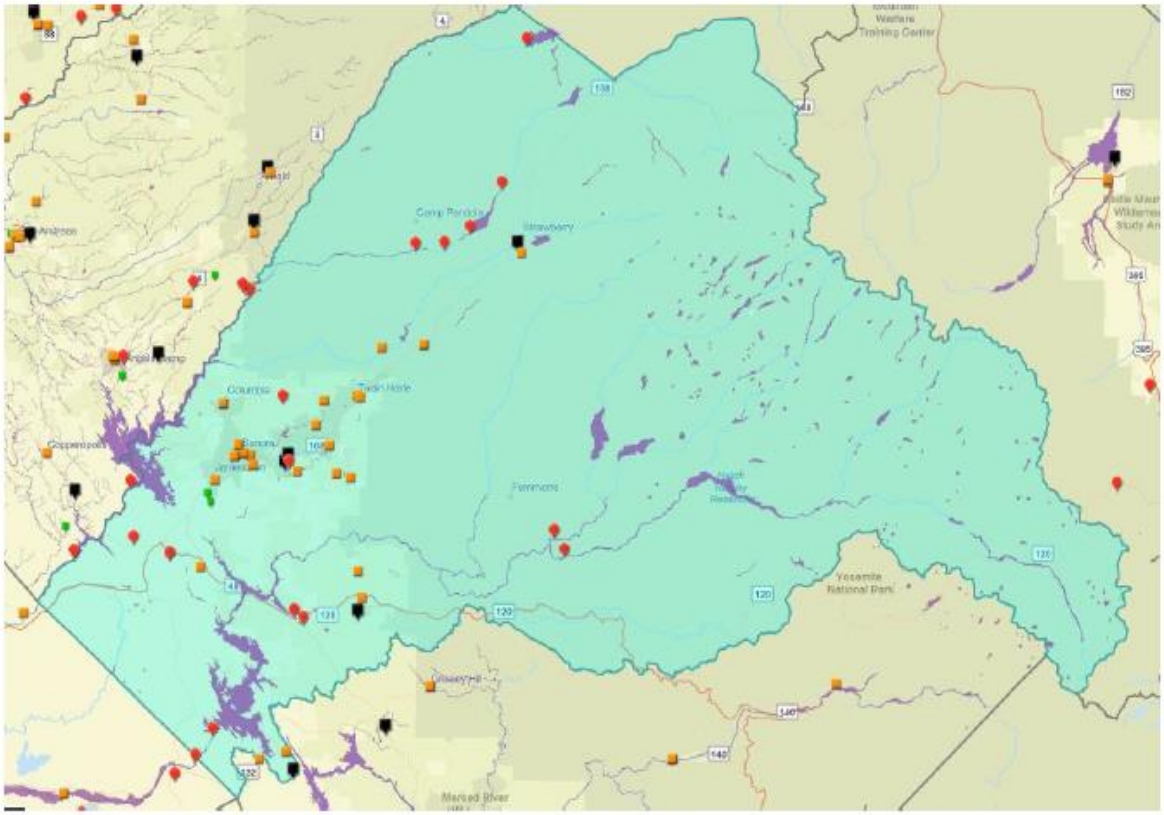
- **Effects on infrastructure.** Flooding can cause damage to roads, communication facilities and other infrastructure.

- **Effects on agriculture.** Effects on agriculture can be devastating. Flooding can damage crops, livestock and dairy stock. In addition to the obvious impacts on crops and animals, flooding can have deleterious effects on soil and the ability to reinvigorate the agricultural activities impacted once the flood waters recede. Damage to water resources such as underground irrigation systems, water storage reservoirs, springs and other natural water bodies could have a serious effect upon agriculture operations

Climate Change Impacts



Source: Climate Mapping for Resilience and Adaptation



Source: FEMA Resilience Analysis and Planning Tool (RAPT)

Building Damage Count by General Occupancy

	Count of Buildings (#) by Range of Damage (%)							
	< 1	1-10	11-20	21-30	31-40	41-50	Substantial	Total

Special Notice Regarding Building Count:

Unlike the earthquake and hurricane models, the flood model performs its analysis at the census block level. This means that the analysis starts with a small number of buildings within each census block and applies a series of distributions necessary for analyzing the potential damage. The application of these distributions and the small number of buildings make the flood model more sensitive to rounding errors that introduces uncertainty into the building count results. Please use these results with suitable caution.

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region: Tuolumne_Flood_v1
Scenario: TuolumneFlood_v1
Return Period: 100

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Building Stock Exposure by Building Type

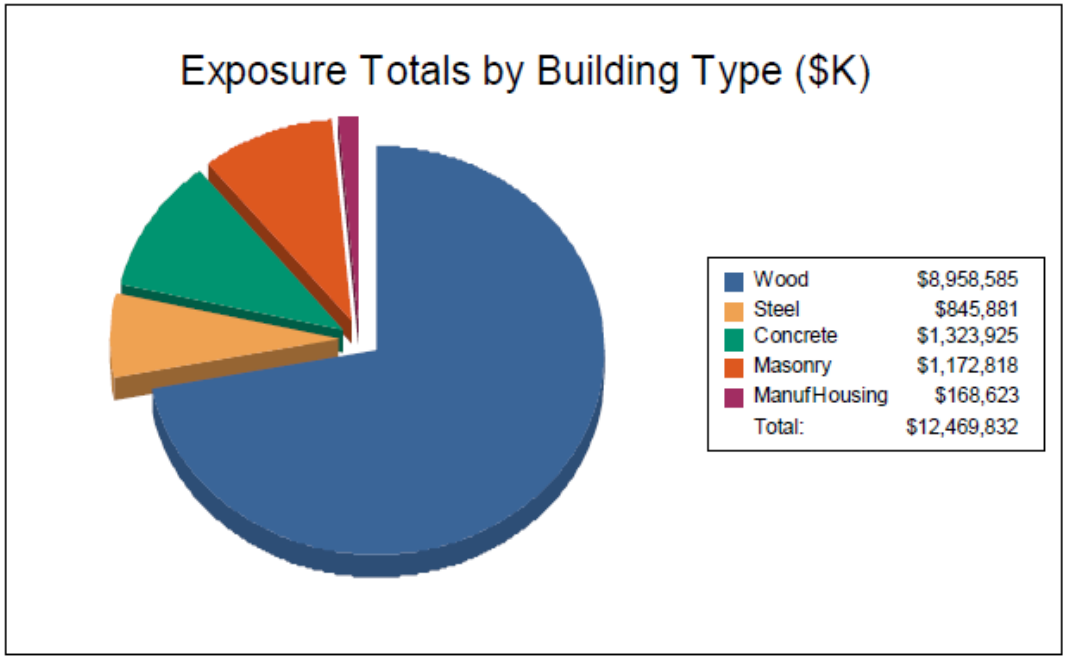
December 06, 2023

All values are in thousands of dollars

	Wood	Steel	Concrete	Masonry	Manuf. Housing	Total
California						
Tuolumne	8,958,585	845,881	1,323,925	1,172,818	168,623	12,469,832
Total	**8,958,585**	**845,881**	**1,323,925**	**1,172,818**	**168,623**	**12,469,832**
Study Region Total	**8,958,585**	**845,881**	**1,323,925**	**1,172,818**	**168,623**	**12,469,832**

Study Region: Tuolumne_Flood_v1
Scenario: TuolumneFlood_v1
Return Period: 100

Building Stock Exposure by Building Type



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Study Region: Tuolumne_Flood_v1
Scenario: TuolumneFlood_v1
Return Period: 100

Building Stock Exposure by General Occupancy

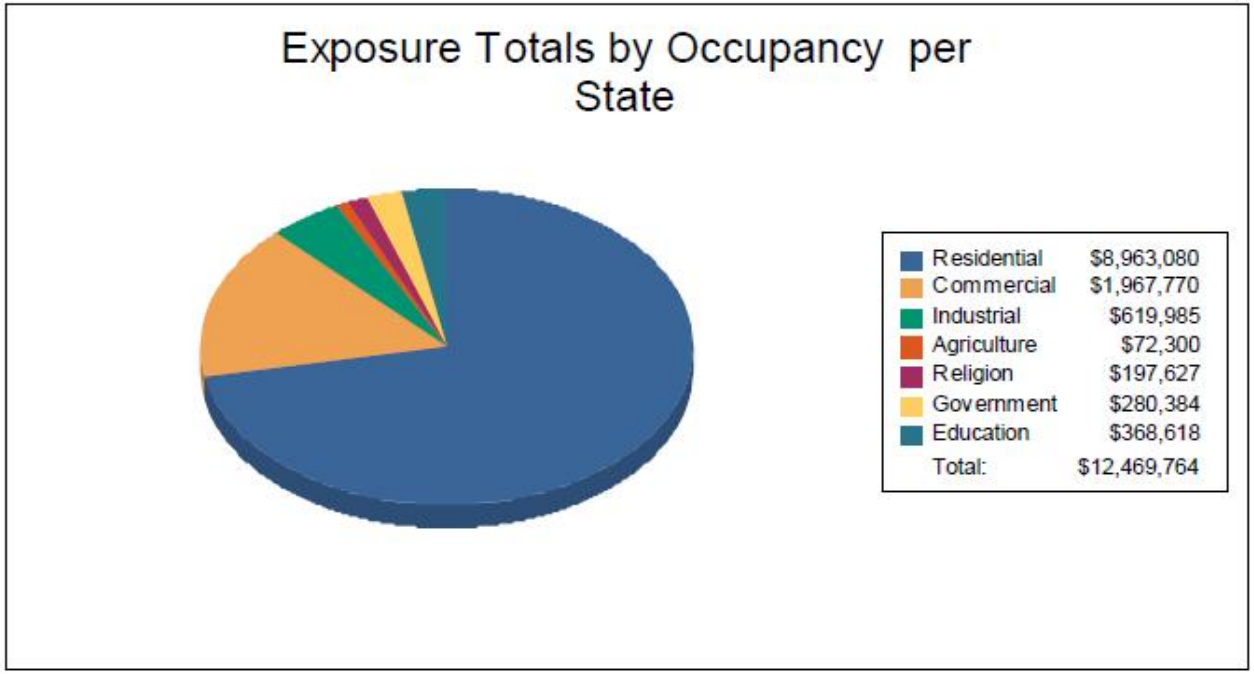
December 06, 2023

All values are in thousands of dollars

	Residential	Commercial	Industrial	Agriculture	Religion	Government	Education	Total
California								
Tuolumne	8,963,080	1,967,770	619,985	72,300	197,627	280,384	368,618	12,469,764
Total	**8,963,080**	**1,967,770**	**619,985**	**72,300**	**197,627**	**280,384**	**368,618**	**12,469,764**
Study Region Total	**8,963,080**	**1,967,770**	**619,985**	**72,300**	**197,627**	**280,384**	**368,618**	**12,469,764**

Study Region: Tuolumne_Flood_v1
Scenario: TuolumneFlood_v1
Return Period: 100

Building Stock Exposure by General Occupancy



Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region: Tuolumne_Flood_v1
Scenario: TuolumneFlood_v1
Return Period: 100

Debris Summary Report

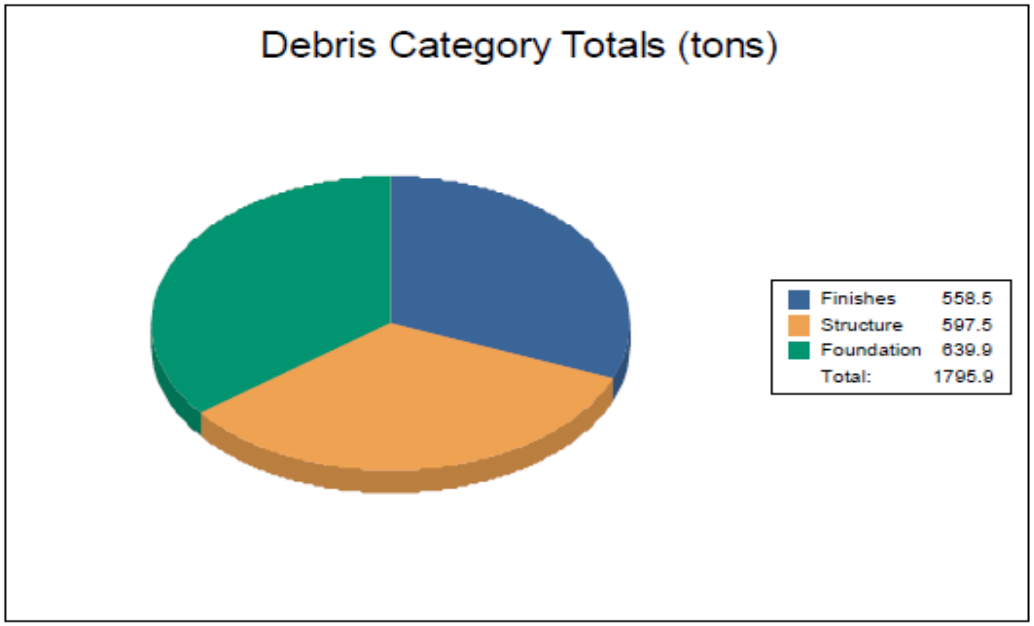
December 06, 2023

All values are in tons.

	Finishes	Structures	Foundations	Total
California				
Tuolumne	559	598	640	1,796
Total	**559**	**598**	**640**	**1,796**
Scenario Total	**559**	**598**	**640**	**1,796**

Study Region: Tuolumne_Flood_v1
Scenario: TuolumneFlood_v1
Return Period: 100

Debris Summary Report



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Study Region: Tuolumne_Flood_v1
Scenario: TuolumneFlood_v1
Return Period: 100

Direct Economic Losses for Buildings

December 06, 2023

All values are in thousands of dollars

	Capital Stock Losses				Income Losses				
	Building Loss	Contents Loss	Inventory Loss	Building Loss Ratio %	Relocation Loss	Capital Related Loss	Wages Losses	Rental Income Loss	Total Loss
California									
Tuolumne	39,610	61,607	2,227	2.90	12,235	17,938	102,003	6,407	242,027
Total	**39,610**	**61,607**	**2,227**	**2.90**	**12,235**	**17,938**	**102,003**	**6,407**	**242,027**
Scenario Total	**39,610**	**61,607**	**2,227**	**2.90**	**12,235**	**17,938**	**102,003**	**6,407**	**242,027**

Study Region: Tuolumne_Flood_v1
Scenario: TuolumneFlood_v1
Return Period: 100

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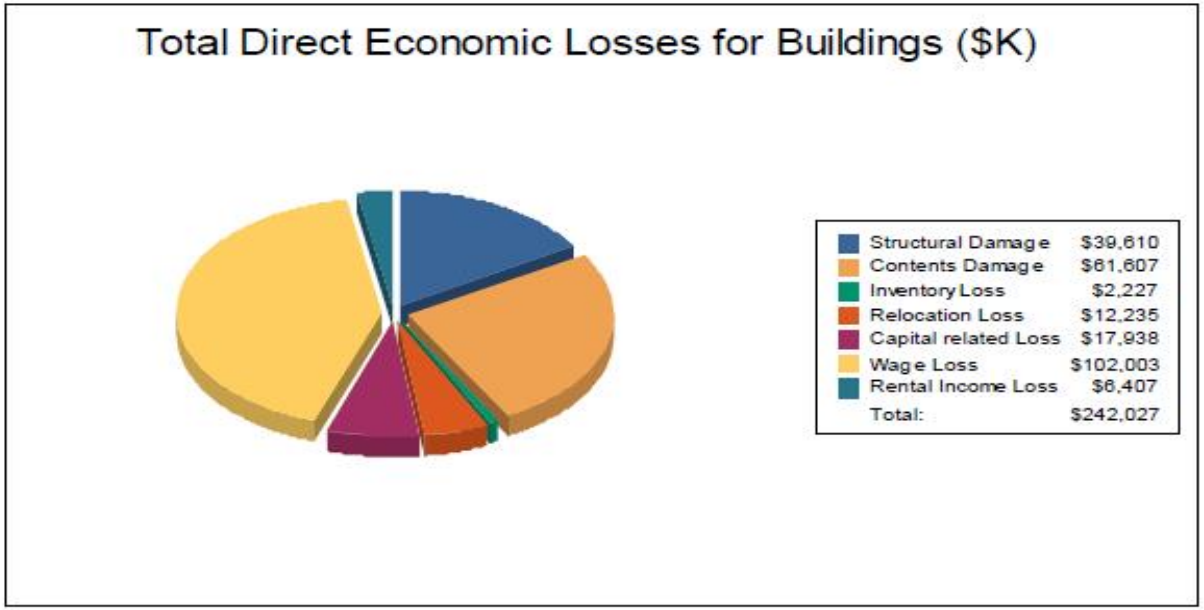
Direct Economic Losses for Buildings

December 06, 2023

All values are in thousands of dollars



Study Region: Tuolumne_Flood_v1
Scenario: TuolumneFlood_v1
Return Period: 100

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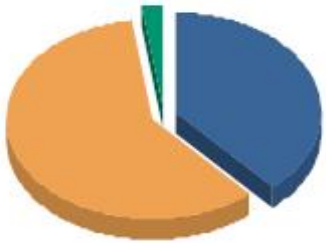
Direct Economic Losses for Buildings

RiskMAP
Increasing Resilience Together

December 06, 2023

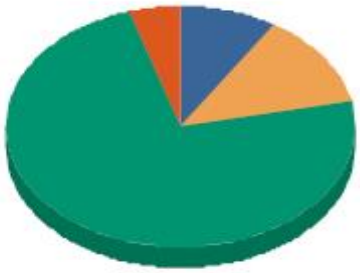
All values are in thousands of dollars

Loss by Capital Stock Categories ($K)



Structural Damage	$39,610
Contents Damage	$61,607
Inventory Loss	$2,227
Total:	$103,444

Income Losses by Categories ($K)



Relocation Loss	$12,235
Capital Related Loss	$17,938
Wage Loss	$102,003
Rental Income Loss	$6,407
Total:	$138,583

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region: Tuolumne_Flood_v1
Scenario: TuolumneFlood_v1
Return Period: 100

Page : 3 of 3

Direct Economic Loss For Transportation

December 06, 2023

All values are in thousands of dollars

	Highway	Railway	Light Rail	Bus Facility	Ports	Ferries	Airport	Total
California								
Tuolumne								
Segments	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Bridges	$7.88	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$7.88
Tunnels	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Facilities	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total	**$7.88**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$7.88**
Total	**$7.88**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$7.88**
Scenario Total	**$7.88**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$7.88**

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region: Tuolumne_Flood_v1
Scenario: TuolumneFlood_v1
Return Period: 100

Page : 1 of 1

Direct Economic Losses for Utilities

December 06, 2023

All values are in thousands of dollars.

	Potable Water	Waste Water	Oil Systems	Natural Gas	Electric Power	Communication	Total
California							
Tuolumne							
Facilities	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Pipelines	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**
Total	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**
Scenario Total	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region: Tuolumne_Flood_v1
Scenario: TuolumneFlood_v1
Return Period: 100

Highway Bridge Damage and Functionality

December 06, 2023

Dollar values are in thousands.

	# of Bridges	Average Damage (%)	Total Loss ($)	Count-Non-Functional
California				
Tuolumne	1	1.25	8	0
Total	**1**	**1.25**	**8**	**0**
Scenario Total	**1**	**1.25**	**8**	**0**

If this report displays all zeros, two possibilities can explain this.
(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.
(2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results .

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region: Tuolumne_Flood_v1
Scenario: TuolumneFlood_v1
Return Period: 100

HAZUS
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Care Facilities (Hospital) Damage and Functionality

December 06, 2023

Dollar values are in thousands.

	Total # of Beds	Total Building Damage ($)	Total Content Damage ($)	Non-Functional Hospitals	Average Restoration Time
Total					
Total					
Scenario Total					

If this report displays all zeros, two possibilities can explain this.

(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.

(2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results .

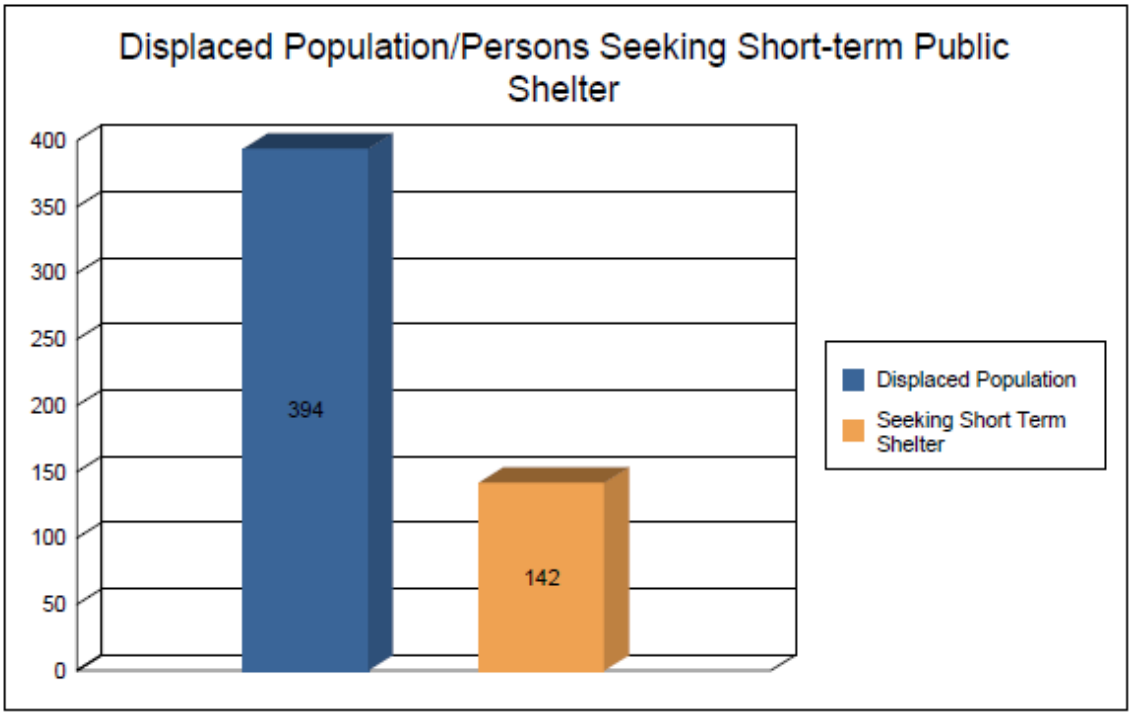
Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region: Tuolumne_Flood_v1
Scenario: TuolumneFlood_v1
Return Period: 100

Shelter Summary Report

December 06, 2023

	# of Displaced People	# of People Needing Short Term Shelter
California		
Tuolumne	394	142
Total	**394**	**142**
Scenario Total	**394**	**142**



Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region: Tuolumne_Flood_v1
Scenario: TuolumneFlood_v1
Return Period: 100

Transportation System Dollar Exposure

December 06, 2023

All values are in thousands of dollars

	Highway	Railway	Light Rail	Bus Facility	Ports	Ferries	Airport	Total
California								
Tuolumne								
Segments	1,125,989	68,178	0	0	0	0	10,332	1,204,499
Bridges	314,835	113,800	0	0	0	0	0	428,635
Tunnels	0	0	0	0	0	0	0	0
Facilities	0	0	0	0	0	0	15,900	15,900
Total	**1,440,824**	**181,978**	**0**	**0**	**0**	**0**	**26,232**	**1,649,034**
Total	**1,440,824**	**181,978**	**0**	**0**	**0**	**0**	**26,232**	**1,649,034**
Study Region Total	**1,440,824**	**181,978**	**0**	**0**	**0**	**0**	**26,232**	**1,649,034**

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region: Tuolumne_Flood_v1
Scenario: TuolumneFlood_v1
Return Period: 100

Page : 1 of 1

Utility System Dollar Exposure

December 06, 2023

All values are in thousands of dollars.

	Potable Water	Waste Water	Oil Systems	Natural Gas	Electric Power	Communication	Total
California							
Tuolumne							
Facilities	0	171,952	0	0	6,609,129	826	6,781,907
Pipelines	0	0	0	0	0	0	0
Total	**0**	**171,952**	**0**	**0**	**6,609,129**	**826**	**6,781,907**
Total	**0**	**171,952**	**0**	**0**	**6,609,129**	**826**	**6,781,907**
Study Region Total	**0**	**171,952**	**0**	**0**	**6,609,129**	**826**	**6,781,907**

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region: Tuolumne_Flood_v1
Scenario: TuolumneFlood_v1
Return Period: 100

Page : 1 of 1

HAZUS
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FEMA

RiskMAP
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Waste Water Facility Damage

December 06, 2023

Dollar values are in thousands.

	# of Facilities	Average Damage (%)	Total Loss ($)	Non-Functional Facilities
Total				
Scenario Total				

If this report displays all zeros, two possibilities can explain this.
(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.
(2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results .

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region: Tuolumne_Flood_v1
Scenario: TuolumneFlood_v1
Return Period: 100

Page : 1 of 1

Impact on Vulnerable Populations

Flooding and its aftermath can threaten vulnerable populations by impacting access to clean water for washing, potable water for drinking, issues with sanitation, transportation due to flooded roads.

Risk Assessment Conclusion

The physical geography of the County impacts and limits the flooding potential. The overall slope of the watersheds is relatively steep, and the rivers and streams move run off away quickly and therefore very little flood plain has been formed. The Tuolumne and Stanislaus rivers are dammed in the lower elevations and well controlled. In addition, these water courses are contained in government or special district ownership and private development is very limited and well regulated. In older developed areas, such as the City of Sonora and Jamestown, the overflowing of smaller creeks and waterways does occasionally occur, however the damage is limited and is not typically life threatening.

While it is impossible to predict future long range weather patterns, it is certain that the County will continue to have exposure to major winter storms and flooding. Therefore, the probability is **Medium** and the severity, because only limited areas of the developed areas of the County are exposed, is **Low.**

44 CFR Requirement §201.6(c)(3) [The plan shall include the following:] A mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs, and resources, and its ability to expand on and improve these existing tools. [The hazard mitigation strategy shall include a(n)]

(ii) section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure. All plans approved by FEMA after October 1, 2008, must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.

National Flood Insurance Program Compliance	
Criterion	**Response**
What local department is responsible for floodplain management?	Community Development Department
Who is your floodplain administrator? (department/position)	Community Development Department, Community Development Director
Are any certified floodplain managers on staff in your jurisdiction?	No
What is the date that your flood damage prevention ordinance was last amended?	2008
Latest FIRM Map adopted	2009

Does your floodplain management program meet or exceed minimum requirements? *If exceeds, in what ways?*	Meets
When was the most recent Community Assistance Visit or Community Assistance Contact?	2022
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? *If so, state what they are.*	No
How does your jurisdiction make Substantial Damage determinations?	If the cost to repair is 50% or more of the market value, the structure is Substantially Damaged
How many substantial damage closed paid losses?	0 Source: Division of Flood Management, CA Dept of Water Resources
Are any RiskMAP projects currently underway in your jurisdiction? *If so, state what they are.*	No
Do your flood hazard maps adequately address the flood risk within your jurisdiction? Yes *If no, state why.*	Yes
Does your floodplain management staff need any assistance or training to support its floodplain management program? *If so, what type of assistance/training is needed?*	Certification
Does your jurisdiction participate in the Community Rating System (CRS)? *If yes, is your jurisdiction interested in improving its CRS Classification?* *If no, is your jurisdiction interested in joining the CRS program?*	No
How many flood insurance policies are in force in your jurisdiction? *What is the insurance in force?* *What is the premium in force?*	45 polices Total Premium: $37,957 Total Coverage: $12,957,000 Source: Division of Flood Management, CA Dept of Water Resources
How many total loss claims have been filed in your jurisdiction? *What were the total payments for losses?*	Total Loss Claims: 11 Total Payments: $189,488.31 Source: Division of Flood Management, CA Dept of Water Resources

3. HAZARD: LANDSLIDES AND SINKHOLES

Severity: Low	Probability: 0-50%

Hazard Definition

Landslides are a geologic hazard where the force of gravity combines with other factors to cause earth material to move or slide down an incline. Some landslides move slowly and cause damage gradually, whereas others move so rapidly that they can destroy property and take lives

suddenly and unexpectedly. Slopes with the greatest potential for sliding are between 34 degrees and 37 degrees. Although steep slopes are commonly present where landslides occur, it is not necessary for the slopes to be long.

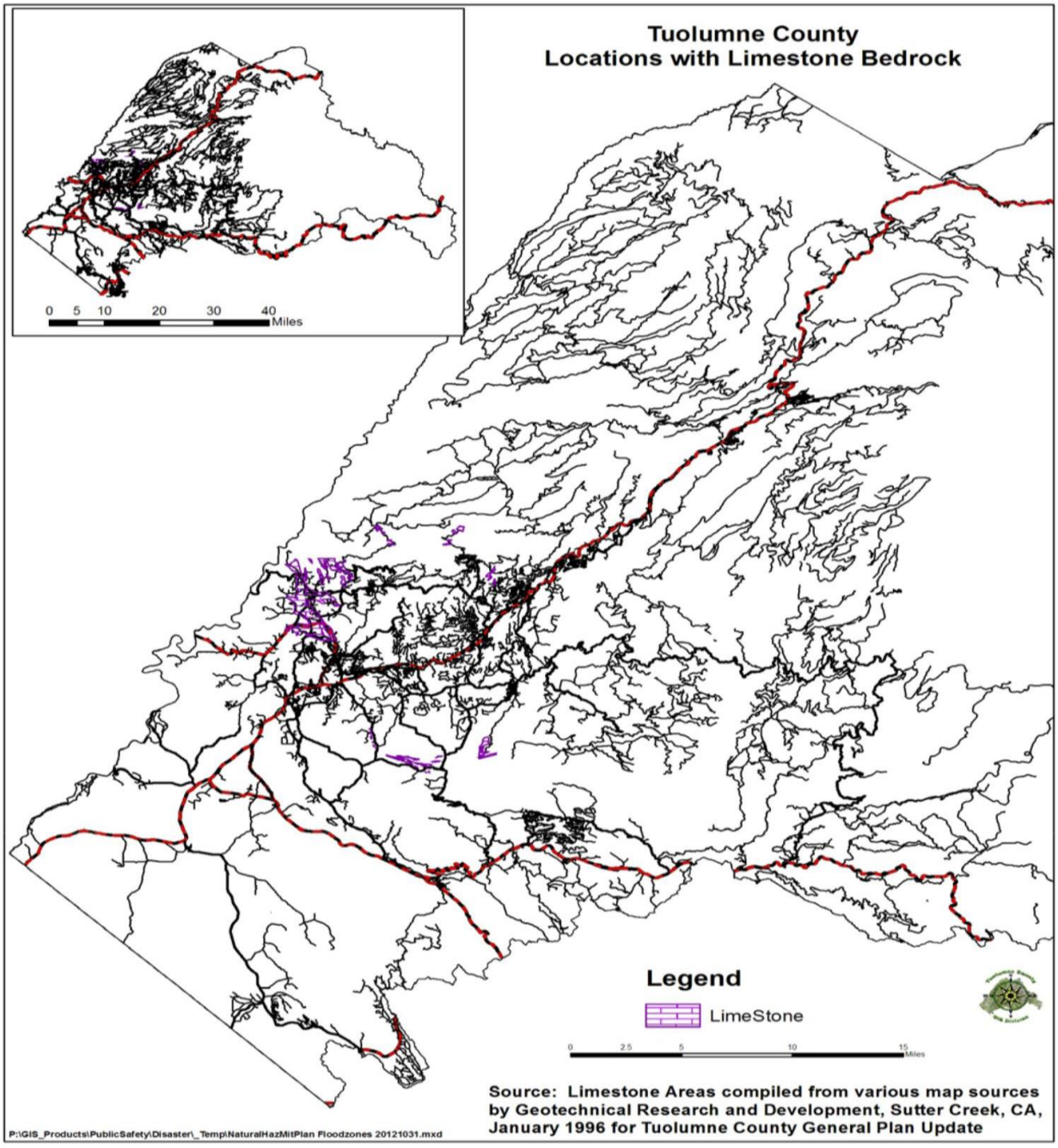
Landslides, rockslides, and debris flows occur continuously on all slopes; some processes act very slowly, while others occur very suddenly, often with disastrous results. As human populations expand over more of the land surface, these processes become an increasing concern.

There are predictable relationships between local geology and landslides, rockslides, and debris flows. The down-slope movement of earth material, either as a landslide, debris flow, mudslide, or rockslide, is part of the continuous, natural process of erosion. This process, however, can be influenced by a variety of causes that change the stability of the slope. Slope instability may result from natural processes, such as the erosion of the toe of a slope by a stream, or by ground shaking caused by an earthquake. Slopes can also be modified artificially by grading, or by the addition of water or structures to a slope. Development that occurs on a slope can substantially increase the frequency and extent of potential slope stability hazards. Knowledge of these relationships can improve planning and reduce vulnerability. Slope stability is dependent on many factors and their interrelationships, including rock type, moisture content, slope steepness, and natural or man-made undercutting.

A sinkhole, also known as a sink, or cenote, is a natural depression or hole in the earth's surface caused by a process known as karst — the chemical dissolution of carbonate rocks; more commonly known as limestone and marble. Rainfall absorbs small amounts of some carbon dioxide as it falls through the atmosphere, and even more from organic matter in the soil through which it percolates, thus forming weak carbonic acid. This acidic water slowly dissolves carbonate rocks and over long periods of time, spaces and caverns develop underground. The surface land above these caverns usually stays intact, until there is not enough support and then a sudden dramatic collapse of the land surface can occur.

Sinkholes may also develop as a result of previous mining activity. Miles of abandoned tunnels and shaft exist in the Mother Lode areas west of Jamestown and portions of the City of Sonora. As ground water seeps into these man-made caverns, the supporting timbers decay and rot away. As supports fail, the result can be a sudden collapses or subsidence.

Location of significant carbonate rock deposits (limestone) are found in Tuolumne County

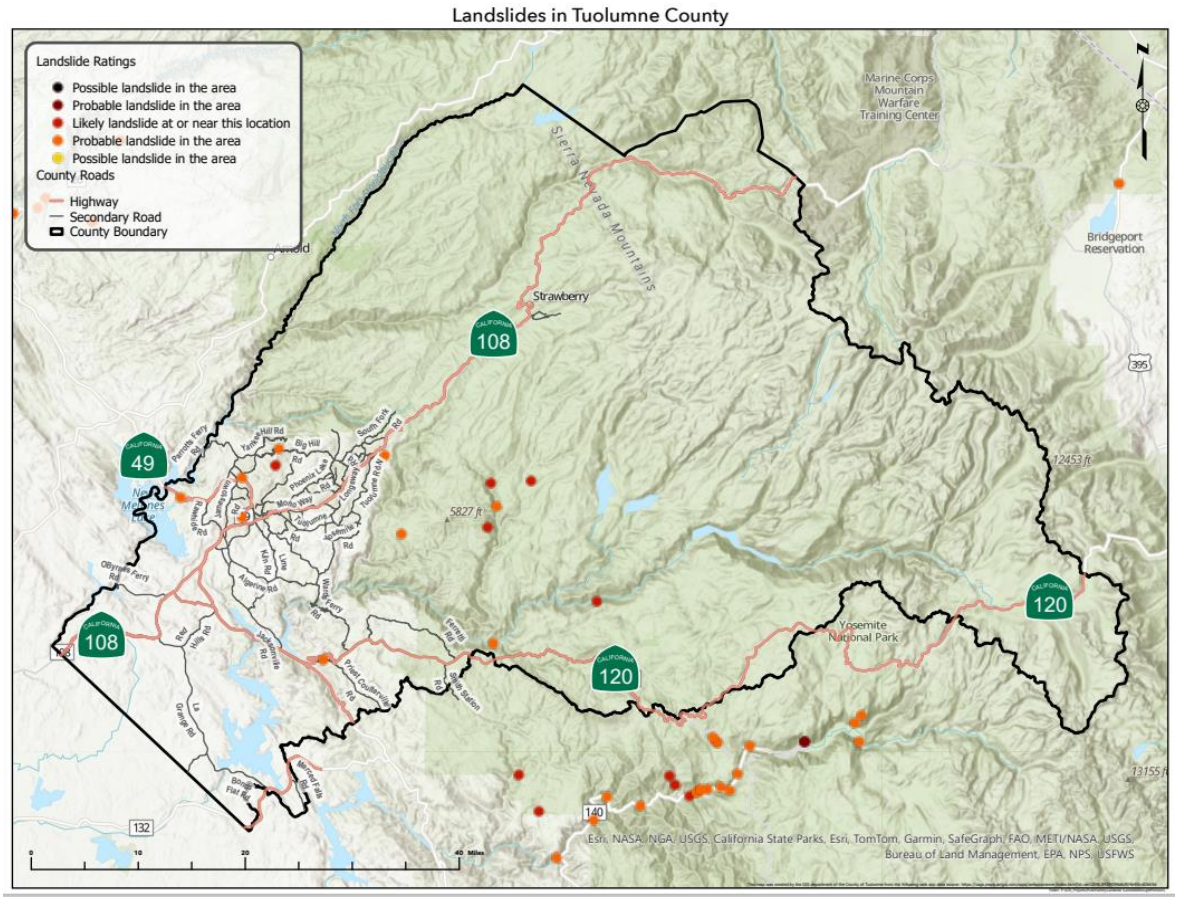


History

While there have been no significant or declared past events of landslides in the County, below is a list of minor landslides the County has experienced. Sinkhole activity from abandoned mining activity has and could possibly occur again in the Jamestown and Sonora areas. There is no documented sink-hole damage from karst activity in the underlying carbonate rock formations found in the vicinity of Columbia and Sonora.

January 2023	A rockslide impacted Kelly Grade Road rendering it temporarily impassable
January 2023	CHP reported that rocks are blocking eastbound lane of SR 120 at bottom of New Priest Grade
March 2023	Mud and debris covering South Fork Road between Quaker Lane and center Camp Road
March 2023	Debris and trees broke through residential hillside retaining wall
March 2023	CHP reported mud, dirt, rock blocking a section of roadway at Marble Quarry Road in the Gold Springs Subdivision area
March 2023	Mudslide reports on SR-49 between Fairview Ln and Mill Villa Court in Sonora
March 2023	CHP reported large boulders in roadway before Parrotts Ferry Bridge
March 2023	CHP reported a slide blocking the right lane of Longeway Road
March 2023	Landslide impacted roads and homes along Italian Bar Road. At least one home severely damaged and about 50 properties were cut off due to slide covering road
March 2023	CHP reported that rocks have fallen on to the roadway at the bottom of New Priest Grade/Highway 120 intersection, blocking the eastbound lane of the roadway

Source: https://www.conservation.ca.gov/cgs/landslides



Source: USGS U.S. Landslide inventory

Plans and Programs in Place

The Uniform Building Code, which has been adopted by Tuolumne County, requires that site specific investigations be performed for development located in hillside areas. Investigations and practices typically required for hillside development include the following:

- Conduct thorough geologic/geotechnical studies by qualified geotechnical engineers and engineering geologists.

- Require both engineering geologists and geotechnical engineers during construction to confirm preliminary findings reported during initial studies.

- Require certification of the proposed building site stability in relation to the adverse effects of rain and earthquakes prior to the issuance of building permits.

- Mandate coordination between the civil engineer and the project engineering geologist and geotechnical engineer during construction grading.

- Require mitigation of on-site hazards caused by grading that may affect adjoining properties, including erosion and slope instability.

Impact to Vulnerable Populations

Landslides and sinkholes can inhibit delivery of services to vulnerable populations, they can hinder ingress and egress routes for public safety access, and therefore delay access to emergency medical help.

Impact from Climate Change

Sinkholes: According to the United States Geological Society, there is a risk of sinkholes forming where certain rock types (evaporites and carbonates) that are susceptible to dissolution in water occur. Limestone is a carbonate rock and is at risk of forming sinkholes in the case of increased precipitation (see map above for limestone rock locations throughout the county). This indicates an increased probability of sinkhole formation during wetter months.

Landslides: Climate change can cause broad swings in precipitation and landslides can be triggered by precipitation, therefore increasing the probability of landslide development during wetter months.

Risk Assessment Conclusion

Within the County, there is a considerable amount of area where the topography can be considered steep to very steep. In the vast majority of this area, the underlying rock formation is very stable, and the soil found on these slopes is shallow and held in place by deep rooted vegetation. These slopes do not typically fail unless disturbed by grading or development. In the western foothills portion of the county an area of exception is found. Here the underlying rock is serpentine, which is more prone to slope failure. These areas do not typically slide unless disturbed. (i.e., roadways around Don Pedro Reservoir).

The steep slopes of the Table Mountain area, as they naturally erode, will very occasionally shed large boulders and rocks, but major landslides are not common and there is very little if any development in the area.

The carbonate rock formations in the Columbia and Sonora areas and the abandoned shafts and tunnels in the “Mother Lode” mining district (Jamestown and portions of Sonora) present a potential for sinkhole occurrence.

Slopes disturbed by grading or development have failed, especially during periods of heavy rainfall, and have resulted in the destruction of infrastructure such as water and sewer lines, electrical and telecommunications utilities, and transportation routes. These manmade

landslides can result in a considerable inconvenience. During significant winter storm events, the County has experienced several landslides. The majority of our slides were on roads that were never engineered but rather developed as wagon trails. These roads are often on steep terrain, where the inside lane of the road was cut into the bank and the resulting soil was flipped over to create the outside lane of the road. The soil was not compacted by machine nor was the downslope bank prepared to receive the fill soil, and therefore these grading panes are often sites of failures. This type of "construction" is seen throughout the County as roads were developed during and after the "Gold Rush" and ultimately coated with oil or asphalt and brought into the County-maintained Road system. Some prominent examples of these roads are Wards Ferry Road, Old Priest Grade, Italian Bar Road, Yankee Hill Road and Big Hill Road. Unfortunately there is no funding to reconstruct these roads to current standards, nor any affordable way to armor them against future failures other than drainage maintenance.

Given the history and the naturally occurring conditions, both the probability and severity have been rated as **Low.**

4. HAZARD: VOLCANO

Severity: Low	**Probability: 50-75%**

Hazard Definition

Volcanoes are openings or ruptures in the earth's crust which allow hot magma, volcanic ash and gases to escape from below the surface. Once on the surface, magma, which is then known as lava, can flow across the earth's surface destroying everything in its path. Lava flows rarely move faster than walking speed, so one can usually out maneuver and avoid them. During an eruption, volcanoes can release vast amounts of poisonous water vapor, carbon dioxide and sulfur dioxide at tremendous heights into the atmosphere where, depending on the jet stream, it can travel considerable distances and cause a significant health risk to down-wind populations.

History and Location

There currently is no volcanic activity in Tuolumne County; however neighboring Mono County, 77 air miles to the southeast, is known to be very active. There have been no volcanic events since 2011. There has never been a declared volcano event in the County. The following table outlines both the location and history of volcanic activity for the local area:

Volcanic Activity near Tuolumne County

Distance (miles)	Name	Region	Latitude	Longitude	Elevation (foot)	Type	Status	Last Eruption
65.5	Mono Lake Vol. Field	California, United States	38	-119.03	2121	Cinder cone	Tephro-chronology	Last known eruption 1700-1799
67.5	Mono Craters	California, United States	37.88	-119	2796	Lava dome	Radiocarbon	Last known eruption A.D. 1-1499
69.1	Inyo Craters	California, United States	37.692	-119.02	2629	Lava dome	Radiocarbon	Last known eruption A.D. 1-1499
70.3	Red Cones	California, United States	37.58	-119.05	2748	Cinder cone	Holocene	Undated, but probable Holocene eruption
76.8	Long Valley	California, United States	37.7	-118.87	3390	Caldera	Pleistocene-Fumarol	Quaternary eruption(s) with the only known Holocene activity being Hydrothermal
								Quaternary

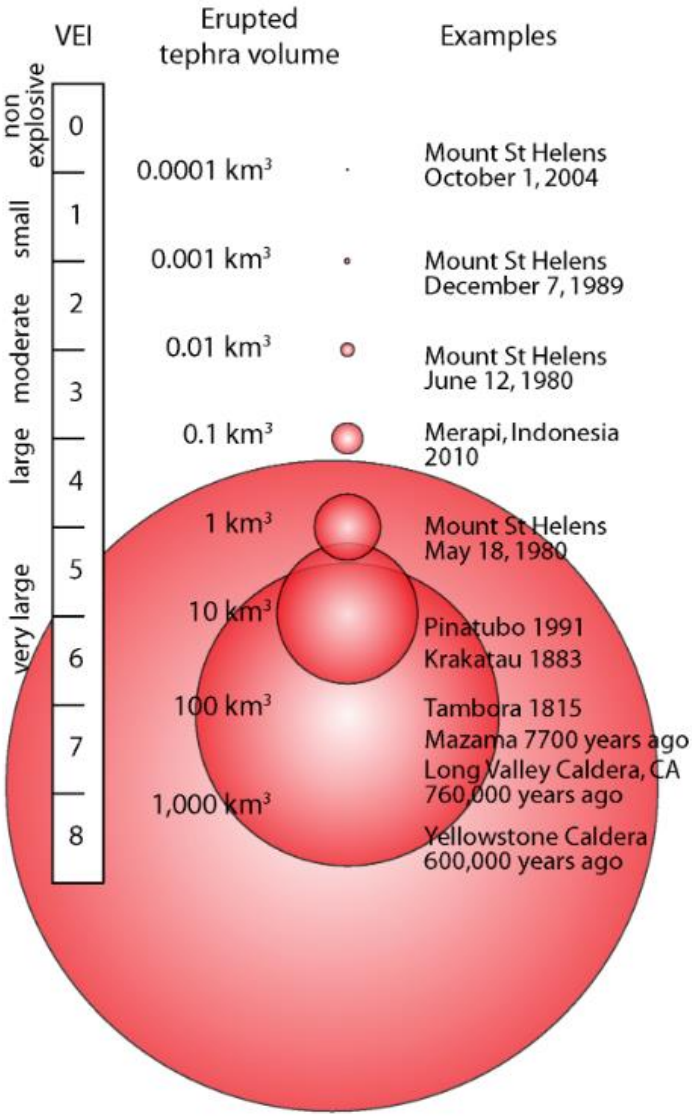
100.1	Steamboat Springs	Nevada, United States	39.375	-119.72	1415	Lava dome	Pleistocene - Fumarol	eruption(s) with the only known Holocene activity being hydrothermal

Volcano Hazard Potential

The volcano index value is calculated based on the currently known volcanoes and the current activity level and past history. It is an indicator of the possibility of a region being affected by a volcanic eruption. A higher volcano index value means a higher chance of being affected. As noted above six active volcanic areas are found in close proximity to Tuolumne County making the areas volcano index higher than the country's and the state's.

Extent of Volcanic Damage Potential

According to the National Park Service (https://www.nps.gov/subjects/volcanoes/volcanic-explosivity-index.htm#:~:text=The%20Volcanic%20Explosivity%20Index%20(VEI,for%20the%20size%20of%20earthquakes.) the Volcanic Explosivity Index is a scale that describes the size of explosive volcanic eruptions based on magnitude and intensity. The numerical scale (from 0 to 8) is a logarithmic scale and is generally analogous to the Richter and other magnitude scales for the size of earthquakes.



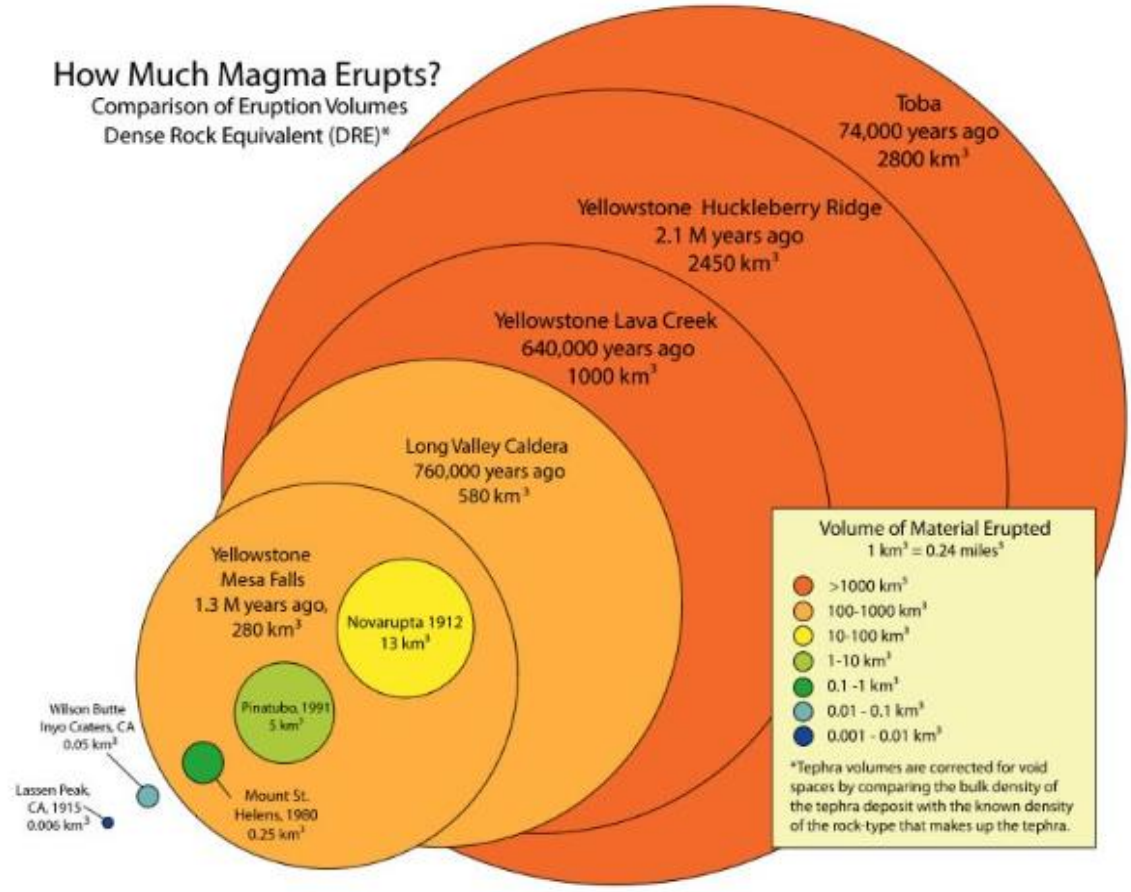


Diagram showing size comparison of selected historic and prehistoric volcanic eruptions.
Public domain image via USGS.

Plans and Programs

The U.S. Geological Survey and its partners monitor volcanoes, and issue warnings of impending eruptions. Real-time monitoring of volcanoes, with the use of volcano seismology, gas, thermal, and surface deformation measurements, permits scientists to anticipate with varying degrees of certainty, the style and timing of an eruption. While the present state of knowledge does not allow for the prediction of the exact time and place of eruptions, scientists can detect changes from usual behavior that precede impending eruptions and issue warnings to state and local officials. Because volcanoes can erupt with little warning, continuous monitoring is important even if a volcano is not showing signs of activity.

Impact of Climate Change

While volcanic events may impact climate change, climate change is not known to increase the probability of volcanic events.

Impact to Vulnerable Populations
All populations in the area are vulnerable to impacts from volcanoes. Particularly at risk are residents with respiratory issues (including the very young and the elderly population).

Vulnerability

Distance and topography would protect Tuolumne County from lava flows from the known volcano active areas of Mono County. Eruptions in Mono County, which is located to the east of Tuolumne County, would more than likely produce and deposit significant amounts of poisonous gases and ash into the atmosphere. The jet stream pattern above California follows the movement of the sun as it heats the earth therefore, it will always flow to the east. It can vary north to south in its exact position but the eastward flow would move these particulates away from the planning area. This reduces the risk of a significant ash event from affecting Tuolumne County.

Probability

Given the proximity of the County to a very active volcanic area the probability of an event occurring is rated as **Medium**. According to the U.S Geological Survey, The County's topography and jet stream will limit the severity to **Low.**

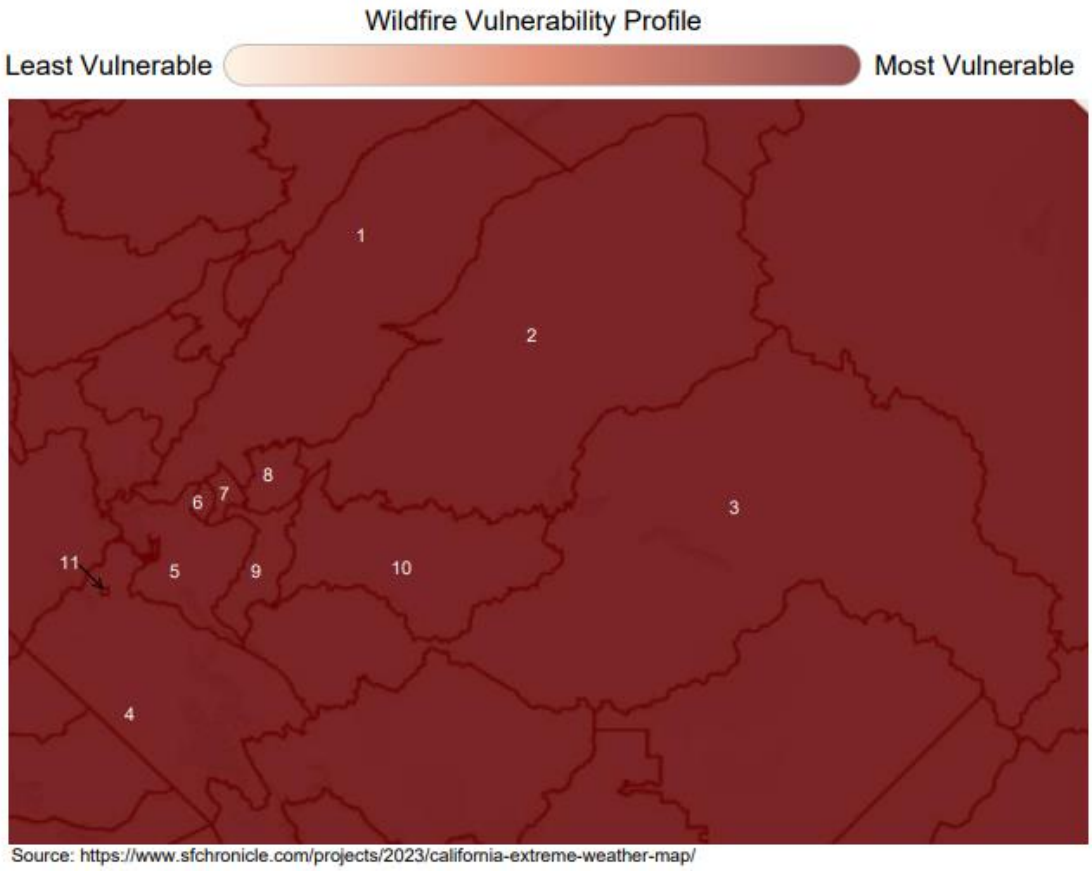
5. HAZARD: WILDFIRE

Severity: High	Probability: 75-100%

Hazard Definition

A wildfire is an uncontrolled fire spreading through vegetative fuels, posing danger and destruction to property. Outbreaks of wildfire occur routinely during Tuolumne's dry season and are predominantly, four out of every five times, generated by humans. As a natural hazard, a wildfire is often the direct result of a lightning strike. These lightning induced fires often occur in remote undeveloped areas and spread to urban areas where structures and other human development are more concentrated.

The predominant dangers from wildfires are:
- The destruction of vegetation, property, wildlife, and
- Injury or loss of life to people living in the affected area or using the area for recreational facilities



Source: https://www.sfchronicle.com/projects/2023/california-extreme-weather-map/

Wildfire Vulnerability by Tract

1	2	3	4	5	6	7	8	9	10	11
99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%

The above percentile map was calculated based on the U.S Climate Vulnerability index which combines environmental, social, economic, and infrastructure effects on neighborhood-level stability.

History

The County has a significant wildfire history. The following is a listing of major wildfires in the CAL Fire Tuolumne – Calaveras Unit:

- 1987 Stanislaus Complex. In what is commonly known as the “Siege of 87” August lightning storms started 6 major fires in just a few days. The total burned area was 145,950 acres. 28 structures and 1 life was lost.

- 1992 Old Gulch Fire. In late August 54 homes were lost in this fire that burned approximately 18,000 acres.
- 1996 Keystone Fire. Started by lightning, this fire burned 7000 Acres and destroyed 20 homes.
- 2001 Darby Fire. This early September fire burned 14,280 acres and destroyed portions of an historic wooden water flume.
- 2004 Copperopolis Fire. Burned 3,444 acres and destroyed one home.
- 2004 Pattison Fire. Destroyed 17 homes and burned 2676 acres.
- 2004 Tuolumne Fire. Burned 750 acres and took the life of a CAL FIRE fighter.
- 2006 Pedro Fire. Burned 1997 acres at Hwy. 49 and the Moccasin Power House.
- 2008 LaGrange Fire. This arson caused fire burned 3445 acres.
- 2010 Vernon Fire. This lightning caused fire burned 909 acres.
- 2010 Pinecrest Fire. This lightning caused fire burned 799 acres
- 2012 Seven Fire. The cause of this fire is undetermined and burned 840 acres.
- 2013 Power Fire. The cause of this fire is undetermined and burned 1,070 acres.
- 2013 Rim Fire. The fire was caused by an illegal campfire and burned 257,314 acres. This fire is the third largest wildfire in California history.
- 2016 Marshes Fire. The cause of the fire was a vehicle and burned 1,080 acres.
- 2017 Douglas Fire. The cause of this fire was lightning and burned 311 acres on Stanislaus National Forest land
- 2017 Falls Fire. The cause of this fire was unknown, and it burned 20 acres of State Responsibility Area land.
- 2017 Jacksonville Fire. The cause of this fire is unknown and burned 675 acres on State Responsibility Area land
- 2017 Twist Fire. The cause of this fire is unknown and burned 124 acres on State Responsibility Area land.
- 2017 Table Fire. The cause of this fire was a powerline and it burned 39 acres on State Responsibility Area land.

- 2017 McCormick Fire. The cause of this fire was lightning and burned 4423 acres on Stanislaus National Forest land
- 2017 Creek Fire. The cause of this fire was lightning and burned 1748 acres on Stanislaus National Forest land.
- 2017 Bummers Fire. The cause of this fire was lightning and burned 510 acres on Stanislaus National Forest land.
- 2017 Red Fire. The cause of this fire was unknown, and it burned 38 acres on Stanislaus National Forest land
- 2018 Willow Fire. The cause of this fire was lightning and burned 134 acres on Stanislaus National Forest land.
- 2018 Flat Fire. The cause of this fire was unknown and burned 163 acres on State Responsibility Area land.
- 2018 Donnell Fire. The cause of this fire was an unattended campfire and burned 36,461 acres on Stanislaus National Forest land.
- 2018 Wildcat Fire. The cause of this fire is listed as “miscellaneous” and burned 26 acres on State Responsibility Area land
- 2018 South Fire. The cause of this fire was vehicle related and burned 292 acres
- 2018 Lost Fire. The cause of this fire was miscellaneous and burned 6 acres on the Stanislaus National Forest
- 2018 Rancheria Fire. The cause of this fire was lightning and burned 54 acres on National Park Service land.
- 2018 Tilltill Fire. This fire was caused by lightning and burned 14 acres on National Park Service land
- 2018 Unicorn Fire. This fire was caused by lightning and burned 2 acres on National Park Service land
- 2019 Rosasco Fire. The cause of this fire is unknown and burned 732 acres on Stanislaus National Forest land.
- 2019 Preston Fire. The cause of this fire was playing with fire and burned 21 acres on State Responsibility Area land.
- 2019 Tulloch Fire. The cause of this fire was vehicle related and burned 574 acres on State Responsibility Area land.

- 2020 Walker Fire. The cause of this fire was equipment use and burned 1398 acres on State Responsibility Area land.

- 2020 Bell Fire. The cause of this fire was lightning and burned 45 acres on Stanislaus National Forest land.

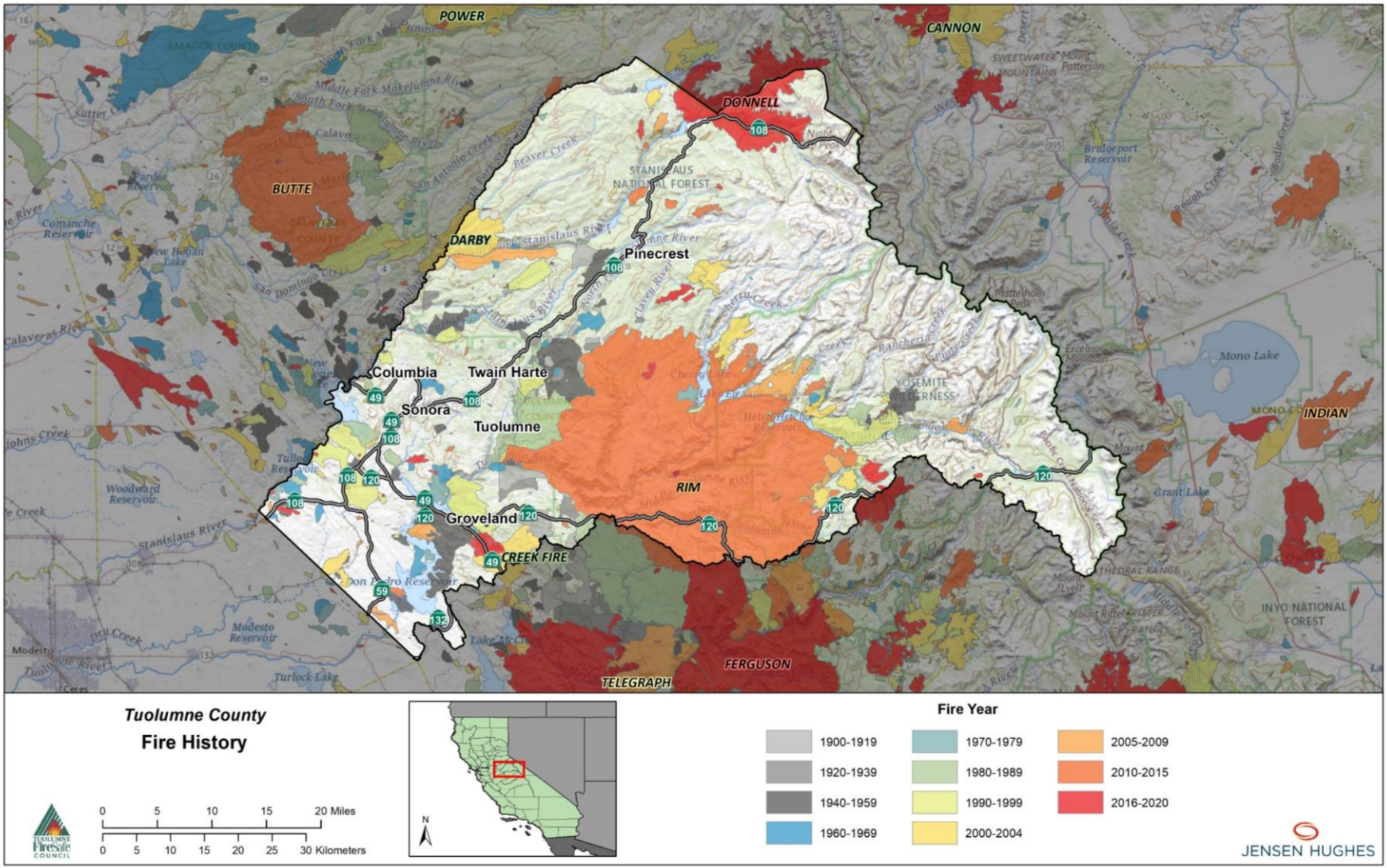
- 2020 Salt Fire. The cause of this fire was equipment use and burned 1593 acres on State Responsibility Area land.

- 2020 Moccasin Fire. The cause of this fire was equipment use and burned 2857 acres on State Responsibility Area land.

- 2021 Abernathy Fire. The cause of this fire was a powerline and burned 373 acres on Stanislaus National Forest land.

- 2021 Washington Fire. The cause of this fire was unknown and burned 135 acres on State Responsibility Area land.

- 2022 Woods Fire. The cause of this fire is listed as “under investigation” and burned 21 acres on State Responsibility Land.


POWER
CANNON
DONNELL
BUTTE
DARBY
Pinecrest
STANISLAUS NATIONAL FOREST
Columbia
Twain Harte
Sonora
Tuolumne
RIM
Groveland
CREEK FIRE
FERGUSON
TELEGRAPH
Mono Lake
INDIAN
INYO NATIONAL FOREST
Tuolumne County
Fire History
0 5 10 15 20 Miles
0 5 10 15 20 25 30 Kilometers
N
Fire Year
1900-1919
1920-1939
1940-1959
1960-1969
1970-1979
1980-1989
1990-1999
2000-2004
2005-2009
2010-2015
2016-2020
JENSEN HUGHES

Risk Assessment

Outbreaks of wildfire occur routinely during Tuolumne's dry season threatening human life, wildlife, and property. The local topography contains rugged terrain including many steep canyons, some of which are inaccessible. Severe fire weather occurs on 35% of the days during the fire season in much of the County. These factors, coupled with a wide range of fuel types, increases the probability that large damaging fires will occur.

When considering the risk from wildfire the County's weather, fuels, and topography must be reviewed:

Weather can have complex and important effects on wildfire intensity and behavior. Wind is of prime importance because as wind velocity increases, the rate of fire spread also increases. Gusty and erratic wind conditions can cause a fire to spread irregularly, making it difficult to predict its path and effectively deploy fire suppression forces. Relative humidity is also an important fire-related weather factor. As humidity levels drop, the dry air causes vegetation moisture levels to decrease, thereby increasing the likelihood that plant material will ignite and burn.

Fire season in the foothill portions of the County typically starts in spring of each year as the lighter fuels, (i.e. grass) dry out with warmer temperatures and diminishing winter rainfall. As the elevation increases the fuel loading becomes heavier (i.e. brush) due to increased precipitation, and it takes longer for the fuels to dry out to the point that they will support combustion. In the higher elevations of the County, the winter precipitation is much greater, and the fuels are considerably heavier (i.e., timber). The fire season here will typically start in early summer as it takes longer for the fuels to dry to the point where they readily burn.

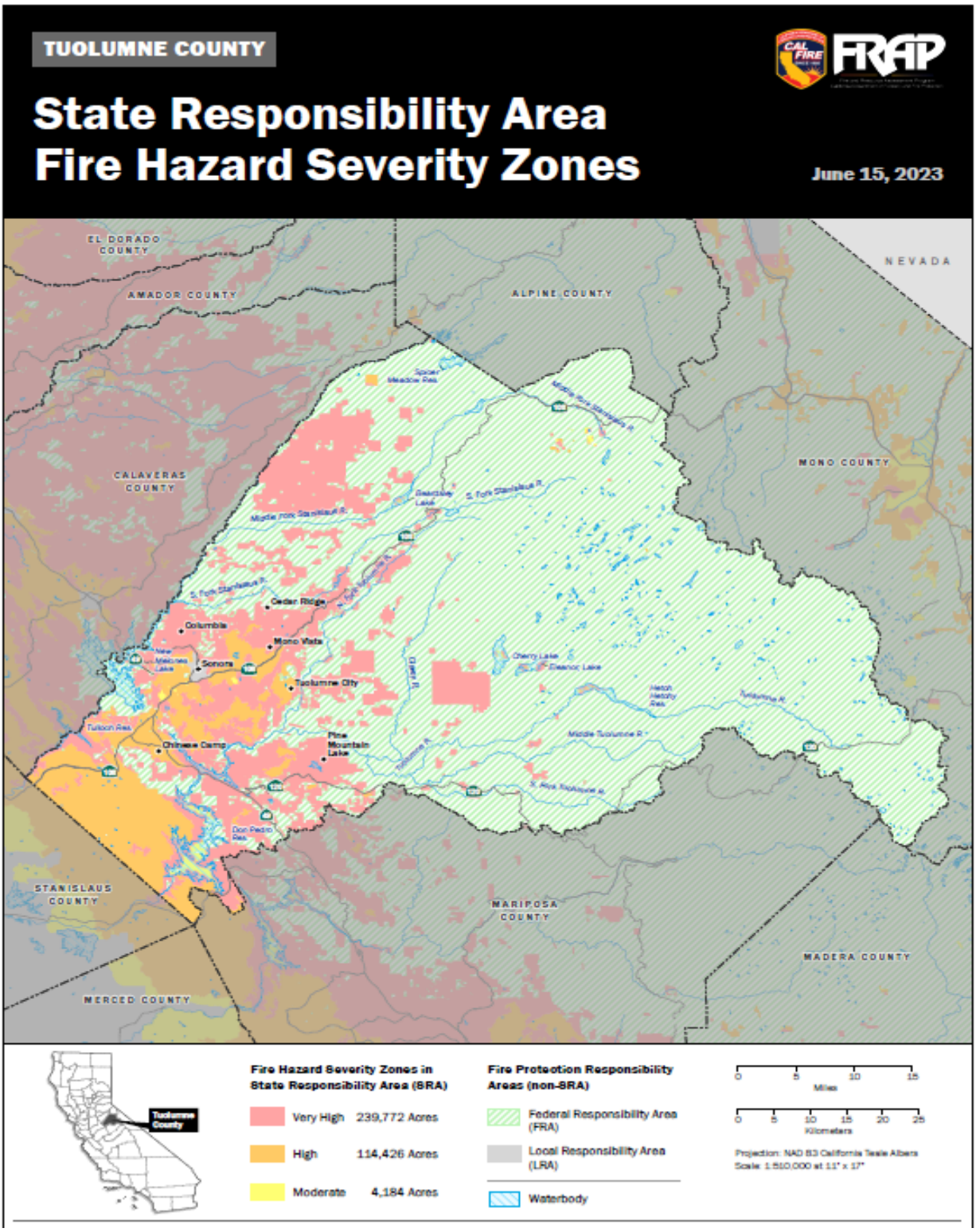
Topography refers to canyons, hillsides, river bottoms, ridges and other "lay of the land" features. These all have a dramatic effect on fire spread. Aspect or orientation of the fuel beds also plays an important role. In general, south-facing slopes are subject to greater solar radiation, making them drier and thereby intensifying wildland fire behavior. The local topography in the higher elevations of the County contains rugged terrain including many steep canyons, some of which are inaccessible by fire apparatus. The lower elevations of the County, or foothills, have a wide variety of topography features, from rolling grasslands to severe bluffs and tabletop benches.

Fuels are classified into three risk categories: Very High, High and Moderate. Depending upon the elevation and aspect, all three categories can be found in abundant supply within the planning area. Approximately 70% of the 2216 square miles of the County are controlled by either the Stanislaus National Forest or Yosemite National Park. The vast majority of these lands are covered by high hazard fuels (brush and timber).

Fuel Hazards in Tuolumne

Fuel Hazards in Tuolumne County		
Fuel	**Fire Hazard Ranking**	**Location in Tuolumne County**
Grass	Moderate to High	West of Highway 49 in the lower foothills with elevations typically less than 1000 feet
Woodland	High to Very High	Areas with elevations 1000 to 4000 feet. Examples found surrounding the communities of Columbia, Sonora, and Jamestown
Brush	Very High	Large fuel beds along Highway 49 in the southwest portions of the County (Moccasin area) as well as the Stanislaus and Tuolumne River drainages
Brush / Hardwood	High	Oak woodland areas generally found east of Highway 49 in elevations of 1000 feet to 4000 feet
Heavy Timber	Very High	Primarily found above 3,500 feet, Twain Harte, Mi-Wuk, Sugar Pine, Pinecrest, Long Barn and Groveland

Tuolumne County Wildfire High-Value High-Risk Map



According to the 2023 Draft Community Wildfire Protection Plan (CWPP), Fire Hazard Severity Zones (FHSZ) maps identify geographic areas of significant fire hazard in both State and Local Responsibility Areas and are produced by CAL FIRE. Designation of areas into FHSZs is based on parameters including vegetation, terrain, weather, and other factors relevant to wildfire likelihood and behavior. There are three categories of FHSZ based on relative degree of severity: moderate, high, and very high. All State Responsibility Areas (SRA) are classified into one of these three categories, while only very high FHSZs in Local Responsibility Areas (LRA) are categorized. FHSZs are based on wildfire hazards over a 30- to 50-year period, but do not consider how recent wildfire activity or fuel modification actions may have influenced potential fire severity. CAL FIRE is required to produce FHSZ maps under California Public Resources Code 4201-4204, California Code of Regulations Title 14, Section 1280, and California Government Code 51175-89.

While FHSZs do not predict when or where a wildfire may occur, they do identify areas where wildfire hazards are likely more severe and of greater concern. As such, FHSZs identify areas where increased wildfire safety provisions for various building and site components (e.g., defensible space, fire or ignition resistant materials including vents, decks, and windows) are required for all new construction per California Building Code Chapter 7A. The FHSZ designation of a property must also be included in real estate disclosures and is used by local governments to support wildfire risk analysis and hazard mitigation planning (https://osfm.fire.ca.gov/divisions/community-wildfire-preparedness-and-mitigation/wildfire-preparedness/fire-hazard-severity-zones/).

Much of the planning area (approximately 16.0%) is classified as being in very high FHSZ (VHFHSZ) under the currently adopted 2007-2008 FHSZ maps. Approximately 5.3% of the planning area is classified as SRA high FHSZ and approximately 3.4% is classified as moderate FHSZ. 75.3% of the county is Federal Responsibility Area (FRA), but is not classified into FHSZs. CAL FIRE is in the process of producing revised FHSZs for all SRA and LRA lands, which will be reviewed, modified (as needed) and adopted by local jurisdictions in 2023-2024. Note: The updated 2023 SRA map, which is currently under regulatory review, increased 0.3% (985 acres) of the county's area from moderate and high FHSZ designations to very high FHSZ.

Table 1. Percentage Breakdown of Fire Hazard Severity Zones in the County

Responsibility Area	Fire Hazard Severity Zone (% of total area)			Direct Protection Area in acres (% of total area)
	Very High	High	Moderate	
FRA[1]	N/A	N/A	N/A	1,097,495 (75.3%)
SRA	15.9%	5.3%	3.4%	358,544 (24.6%)
LRA	0.1%	N/A	N/A	1,457 (0.1%)

[1] *Note: The federal government has a different fire hazard scoring system to CAL FIRE's FHSZ classification system.*

Locations/Communities at Risk

According to the CWPP, to help protect people and property from potential catastrophic wildfire, the 2000 National Fire Plan (NFP) identified communities in the wildland-urban interface (WUI) - the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels (NWCG, 2018). Those communities that are at high risk of damage and/or loss from wildfire and abut federal lands have been identified as Communities at Risk (CAR) in the Federal Register in 2001 (National Archives and Records Administration Federal Register, 2001). Responsibility for maintaining this list was then turned over to the states.

In California, CAL FIRE is responsible for managing the CARs list and use three main factors to determine any additional communities as follows: 1) high fuel hazard, 2) probability of a fire, and 3) proximity of intermingled wildland fuels with urban environments (https://www.cafirealliance.org/communities_at_risk/communities_at_risk_history/). CAL FIRE has also expanded the definition to include communities which are not adjacent to federal lands.

In Tuolumne County, the following communities are considered CARs.

- Arastraville
- Buck Meadows
- Bumblebee
- Chinese Camp
- Cold Springs
- Columbia
- Confidence
- Cow Creek
- Dardanelle
- Harden Flat
- Jamestown
- Jupiter
- Kennedy Meadow
- Lake Don Pedro
- Long Barn
- Mather
- Mi-Wuk Village
- Moccasin
- Sierra Village No.1
- Smith Station
- Sonora
- Selbyville
- Standard
- Stent
- Tuolumne City
- Tuolumne Rancheria
- Tuttletown

- East Sonora
- Groveland-Big Oak Flat
- Mono Vista
- Phoenix Lake-Cedar Ridge
- Twain Harte

Additional communities may be added to the list of CARs by CAL FIRE based on changes in risk and understanding of risk. Existing and new communities on land designated as WUI or very high FHSZ may also be added as CARs.

Ordinances and Regulations

California Fire Code

This code may be adopted by local jurisdictions, with amendments, and provides minimum standards for many aspects of fire prevention and suppression activities. These standards include provisions for access, water supply, fire protection systems, and the use of fire-resistant building materials. Tuolumne County has adopted the latest revision of the California Fire Code.

California Health and Safety Code and the California Building Code

The Health and Safety Code contains regulations pertaining to the abatement of fire-related hazards. It also requires that local jurisdictions enforce the California Building Code, which provides standards for fire-resistant building and roofing materials, and other fire-related construction methods. Tuolumne County has adopted the latest revision of the California Building Code.

Title 19 of the California Code of Regulations

These regulations pertain to fire prevention and engineering measures for State Fire Marshal regulated occupancy.

Public Resources Code and Title 14 of the California Code of Regulations

These regulations contain statewide fire prevention and suppression standards in the State Responsibility Areas (SRA).

Assembly Bill 337 (Bates Bill)

In response to the Oakland Hills fire of 1991, this bill was passed in 1992 and requires brush clearance and fire-resistant roof material (Class A or B) to be used on all new construction that is in areas designated as being a “Very High Fire Hazard Severity Zone”.

Tuolumne County Hazardous Vegetation Management Ordinance

This ordinance applies to the abatement of the growth and/or accumulation of hazardous vegetation on all parcels within the unincorporated area of Tuolumne County and to the maintenance of those parcels to prevent regrowth of hazardous vegetation.

Plans and Programs

Existing Fire Protection Services

Within the County, Tuolumne County Fire/CAL FIRE along with seven fire districts, one tribal fire department, and one city fire department provide life and property emergency response. In addition to services traditionally provided by most fire protection agencies nationwide, these local fire agencies work cooperatively with state and federal wildland fire agencies in providing wildfire response throughout the county.

FireSafe Council

The Highway 108 and Yosemite Foothills (South County) FireSafe Councils have now been combined for one county-wide council: Tuolumne FireSafe Council is operated entirely by volunteers and is a 501(C)3 non-profit organization incorporated in 2001/2003. The FireSafe Council is composed of individuals, public and private businesses, and governmental agencies that share a common interest in preventing and reducing loss from wildfires. The Tuolumne FireSafe Council is a member of the California State FireSafe Council.

The Mission of the FireSafe Council is to protect Tuolumne County citizens, property, and natural resources from the effects of catastrophic wildland fires.
The intent of the Council is to:

- Educate the public to increase awareness to further fire safety in Tuolunme County
- Develop creative ways to make compliance with fire safe regulations easier and more effective for property owners.
- Reduce the wildfire risk and loss of life and property through fire prevention, fire safety, fuel reduction, and community preparedness
- Build community support for gaining additional funding, programs, and equipment in order to meet suppression and prevention needs in Tuolumne County.

Southwest Interface Project – SWIFT

The Southwest Interface project was initiated in March of 1999 as an effort to provide a higher level of wildfire protection in an area with repeated catastrophic wildfire history. The area located in southern Tuolumne and northern Mariposa counties of California has and continues to experience significant losses to property, natural resources and five firefighters have lost their lives over the last few decades fighting wildfires. Twelve concentrated human population areas along with twelve high value watersheds are located within the 132,000 acre project area.

The collaborative partnership that makes up the Southwest Interface Team known as SWIFT, continues after 18 years of work on its primary objectives of protecting communities at risk and the valuable watersheds from wildfires. There are two key elements utilized by SWIFT; Strategic Fire Defense System and Pre-Fire Planning. All actions are based on team identification and prioritization of the best way to protect communities and watersheds under today's environmental, economic, political and social constraints and regulations.

Nine fire and land management agencies and two Fire Safe councils that are affiliated with the collaborative partnership have developed the strategic fire protection plan and approved a coordinated program of work to insure implementation accountability. Resolutions from County Boards of Supervisor's , Memorandums of Understanding, formal Communication Plan, a multi-year coordinated Program of Work, and the Strategic Fire Protection Plan for the project area are all in place.

The communities covered under this plan are identified as the Highway 120 Community Protection Area in Tuolumne County. This area covers Groveland, Moccasin, Big Oak Flat, Second Garrotte, Big Creek Shaft, Yosemite Vista Estates, Hells Hollow, Smith Station, Buck Meadows, and Pine Mountain Lake. The other areas in Mariposa County as identified in the J132 Community Protection area cover Greeley Hill and Coulterville.

Climate Change

OEHHA (2022) reports that the number of large fires (10,000 acres or more) has similarly increased in the past two decades. All but two of the 20 largest wildfires between 1950 and 2021 occurred since 2000; ten of those burned in 2020 and 2021. According to OEHHA (2022):

Why is this indicator important?

- Wildfires threaten public health and safety, property, infrastructure, and ecosystems. Wildfire smoke contains hazardous constituents that can severely impact air quality and human health, both locally and downwind.

- Wildfires lead to, and often accelerate, changes in the state's forests and alter wildlife habitat. For example, after a wildfire, shrubs, grasses, or hardwood trees regrow and replace conifers. The loss of forests means a loss of carbon storage capacity.

- Burn areas become vulnerable to runoff and erosion. The deposition of ash, sediment, debris, heavy metals from soils, and chemical contaminants into streams and rivers threatens aquatic organisms and drinking water sources.

What factors influence this indicator?

- California's unprecedented drought and drought-related tree deaths increased the risk for extreme, high severity wildfires that spread rapidly. By late autumn, very dry vegetation conditions now overlap with seasonal fire-promoting winds.

- More than a century of fire suppression has led to the accumulation of fuels in California's forests. Before Euro-American settlement, large areas of land were burned annually, ignited naturally by lightning and intentionally by Native Americans to manage the landscape.

- Land use and population changes affect ignition sources and fuel availability. For example, new housing in or near wildland vegetation has led to increased fire losses at the wildland-urban interface. The expansion of the electrical distribution system, much of it vulnerable to strong winds, increases risk of wildfires

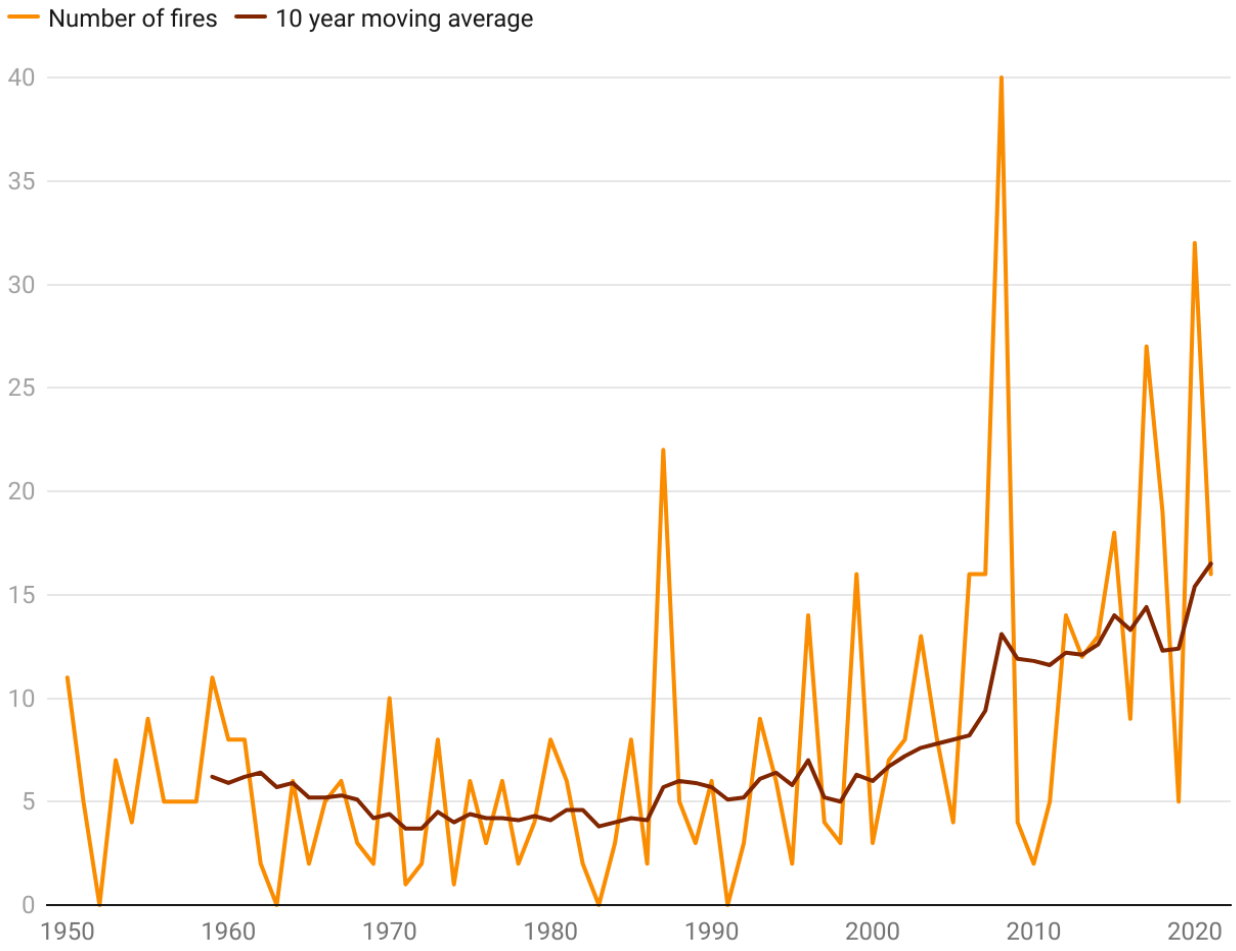


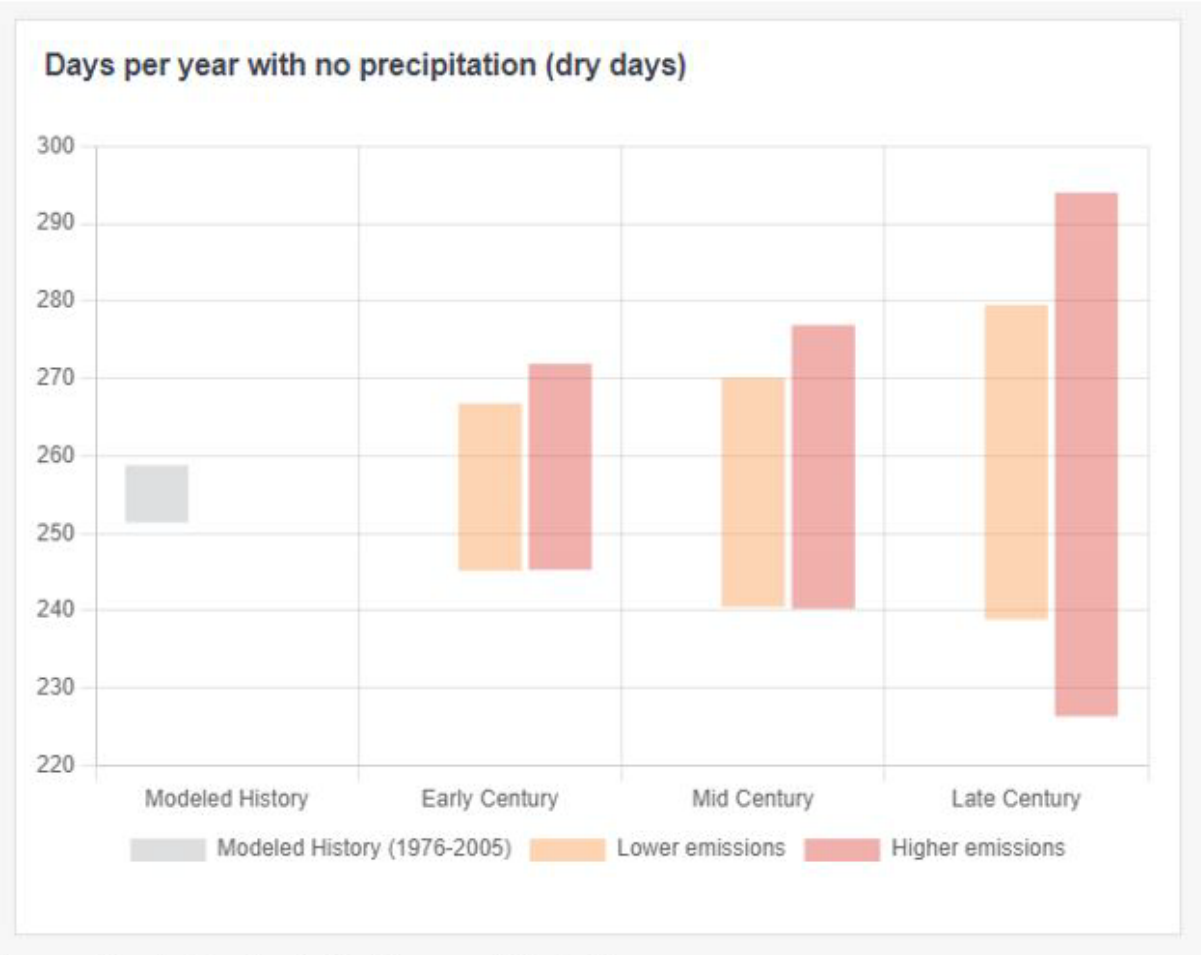
Chart: OEHHA Climate Change Indicators 2022 • Source: CAL FIRE • Created with Datawrapper

Wildfire Climate Projections for Tuolumne County

Early Century (2015-2044)	Lower Emissions	Higher Emissions
Days per year with no precipitation (dry days)	257.4 days +2.7 since 1976-2005	257.1 days +2.4 since 1976-2005
Maximum number of consecutive dry days	55.1 days +0.1 since 1976-2005	57.3 days +2.4 since 1976-2005
Days per year with precipitation (wet days)	107.8 days -2.7 since 1976-2005	108.0 days -2.4 since 1976-2005
Annual days with maximum temperature >90°	31.5 days +8.9 since 1976-2005	32.6 days +10.0 since 1976-2005
Annual days with maximum temperature >100°	6.9 days +3.8 since 1976-2005	7.5 days +4.4 since 1976-2005
Mid Century (2035-2064)	**Lower Emissions**	**Higher Emissions**
Days per year with no precipitation (dry days)	259.5 days +4.8 since 1976-2005	260.0 days +5.3 since 1976-2005
Maximum number of consecutive dry days	55.6 days +0.6 since 1976-2005	57.3 days +2.3 since 1976-2005
Days per year with precipitation (wet days)	105.6 days -4.8 since 1976-2005	105.1 days -5.4 since 1976-2005
Annual days with maximum temperature >90°	36.1 days +13.5 since 1976-2005	40.5 days +17.9 since 1976-2005
Annual days with maximum temperature >100°	9.2 days +6.1 since 1976-2005	11.5 days +8.4 since 1976-2005

Late Century (2070-2099)	Lower Emissions	Higher Emissions
Days per year with no precipitation (dry days)	259.9 days +5.3 since 1976-2005	263.9 days +9.2 since 1976-2005
Maximum number of consecutive dry days	56.0 days +1.1 since 1976-2005	59.6 days +4.6 since 1976-2005
Days per year with precipitation (wet days)	105.2 days -5.3 since 1976-2005	101.2 days -9.3 since 1976-2005
Annual days with maximum temperature >90°	41.5 days +18.9 since 1976-2005	57.5 days +34.9 since 1976-2005
Annual days with maximum temperature >100°	12.2 days +9.1 since 1976-2005	21.1 days +18.0 since 1976-2005

Source: Climate Mapping for Resilience and Adaptation v1.3.1



Source: Climate Mapping for Resilience and Adaptation

Impact of Climate Change

According to California's Fourth Climate Change Assessment, climate change is leading to larger and more severe wildfires in the Western United States. Climate change has increased the area burned and severity of wildfires and impacts on the environment, human health, and society. Climate change has produced warmer and drier conditions with prolonged droughts that stress forest vegetation, facilitating pest outbreaks and tree death, leading to the accumulation of surface fuel. Climate change has also increased vapor pressure deficit that dries fuels, altering fire behavior that results in large, hotter, and more severe fires. Climate change is increasing the probability of wildfires.

Relationship to Other Hazards – Cascading Effects

Major wildfires can completely destroy ground cover. If heavy rains follow a major fire, flash floods, heavy erosion, landslides and debris flows can occur. After a wildfire passes through an

area, the land is laid bare of its protective vegetation cover and is susceptible to excessive run-off and erosion from winter storms. The intense heat from the fire can also cause a chemical reaction in the soil that makes it less porous, and the fire can destroy the root systems of shrubs and grasses that aid in stabilizing slope material. These cascading effects can have ruinous impacts on people, structures, infrastructure, and agriculture.

Vulnerability

Wildland fires can wreak havoc not only on homes, recreational and commercial values, but also on nature in general by destroying fragile habitat, threatening rare and endangered species, causing damage to scenic and aesthetic values, and often producing health hazards due to poor air quality. Water, telephone and power utility companies have lost millions of dollars through both the direct and indirect effects of forest fires. Almost every community in the County has been threatened by wildfire. The greatest hazard, based on the fuels, weather, and topography, exists on the east side of the Highway 49 corridor.

Given the past fire history of the County the probability of significant wildfire occurring in the future is rated as **High**.

The combinations of fuels, weather, topography, and the high risk for personal injury and loss of life, the potential losses of structures and personal property the severity is rated as **High.**

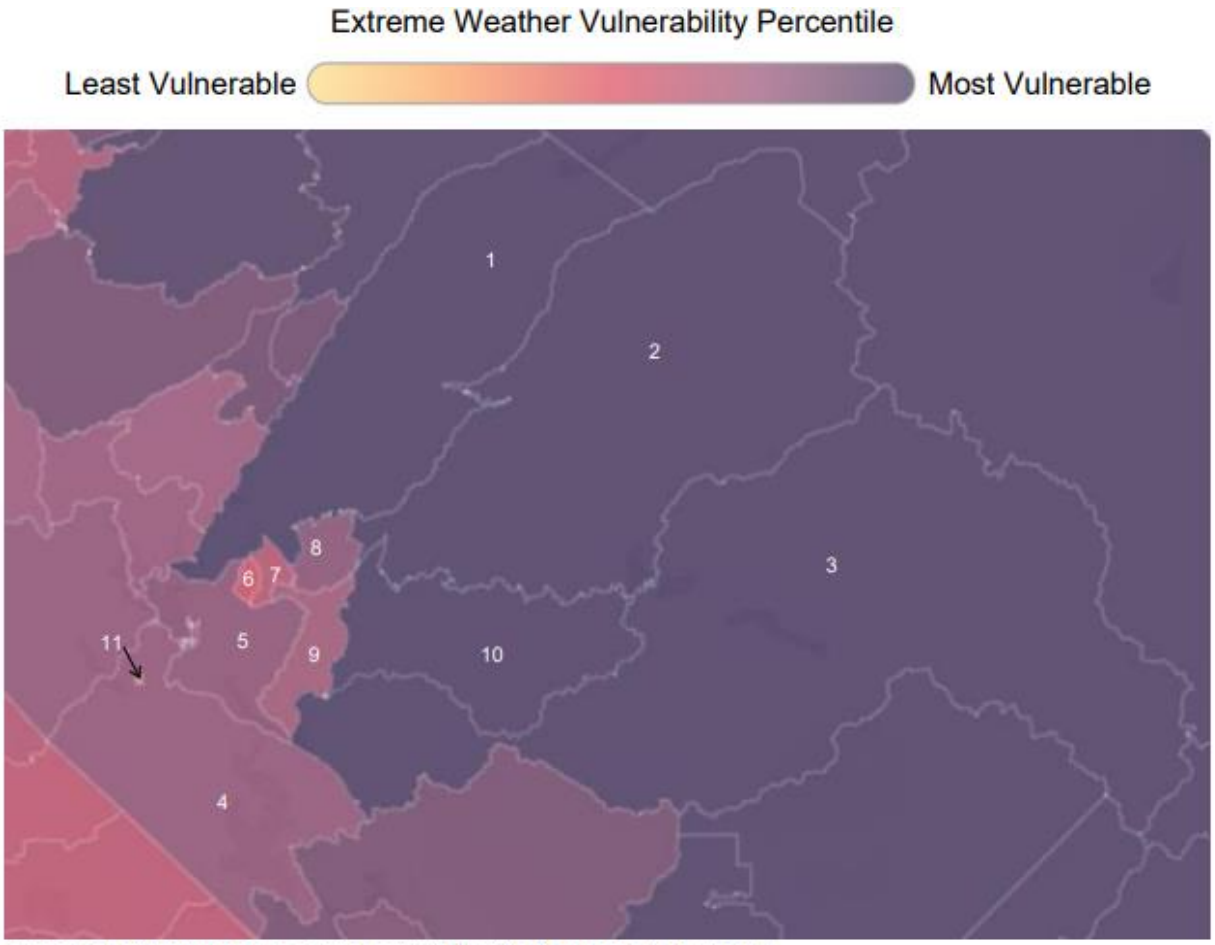
Impact to Vulnerable Populations

All populations in the County are at risk of severe impacts from this hazard. Residents with access and functional needs may have difficulty with not only the process of evacuation but with accessing the sheltering location. The very young and elderly population in the County may have difficulty with timely evacuations due to transportation issues. Populations in the county with existing health issues may experience greater difficulty with smoke and ash in the air.

6. HAZARD: EXTREME WEATHER

Hazard Definition

Extreme weather is defined as any unusual, unseasonable, or severe weather event. It is generally considered to include weather that occurs less than 5% of the time; weather at the extremes of the historical distribution. Events include drought, freeze, ice and hail storms, heavy snow falls, high wind, extreme heat, and thunderstorms. The following conditions can potentially occur at any location within Tuolumne County. The following sub-hazards are all considered to occur at a medium probability.



Source: https://www.sfchronicle.com/projects/2023/california-extreme-weather-map/

Overall Vulnerability by Tract

1	2	3	4	5	6	7	8	9	10	11
80%	85%	82%	61%	62%	45%	50%	57%	63%	82%	79%

The above percentile map was calculated based on the U.S Climate Vulnerability index which combines environmental, social, economic, and infrastructure effects on neighborhood-level stability.

Drought

A drought, or an extreme dry period, is an extended timeframe where water availability falls below the statistical requirements for a region. Droughts are not a purely physical phenomenon, but rather interplay between the natural water availability and human demands for water supply.

The precise definition of drought is made complex owing to political considerations, but there are generally three types of conditions that are referred to as drought:

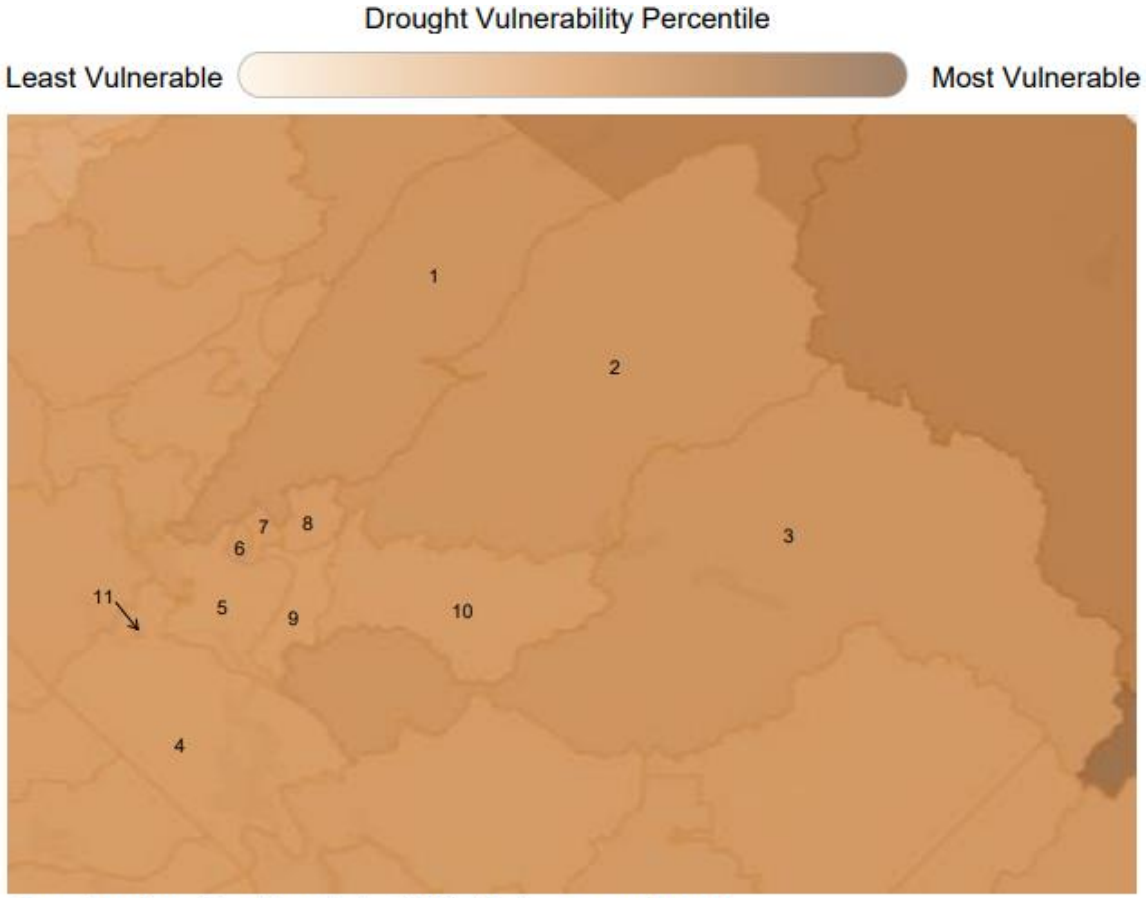
- **Meteorological drought** is brought about when there is a prolonged period with less than average precipitation.

- **Agricultural drought** occurs when there is insufficient moisture for average crop or range production. This condition can arise, even in times of average precipitation, owing to soil conditions or agricultural techniques.

- **Hydrologic drought** is brought about when the water reserves available in sources such as aquifers, lakes, and reservoirs falls below the statistical average. This condition can arise, even in times of average (or above average) precipitation, when increased usage of water diminishes the reserves.

When the word "drought" is used by the general public, the most frequent definition intended is meteorological drought. However, when the word is used by urban planners, it is more frequently in the sense of hydrologic drought.

Tuolumne County has not been included in any Hazard Declarations for Drought since the last Hazard Mitigation Plan Update.



Source: https://www.sfchronicle.com/projects/2023/california-extreme-weather-map/

Drought Vulnerability by Tract

1	2	3	4	5	6	7	8	9	10	11
53%	53%	53%	48%	48%	49%	49%	48%	49%	53%	49%

The above percentile map was calculated based on the U.S Climate Vulnerability index which combines environmental, social, economic, and infrastructure effects on neighborhood-level stability.

California Palmer Drought Severity Index (monthly, January 1895-October 2021)

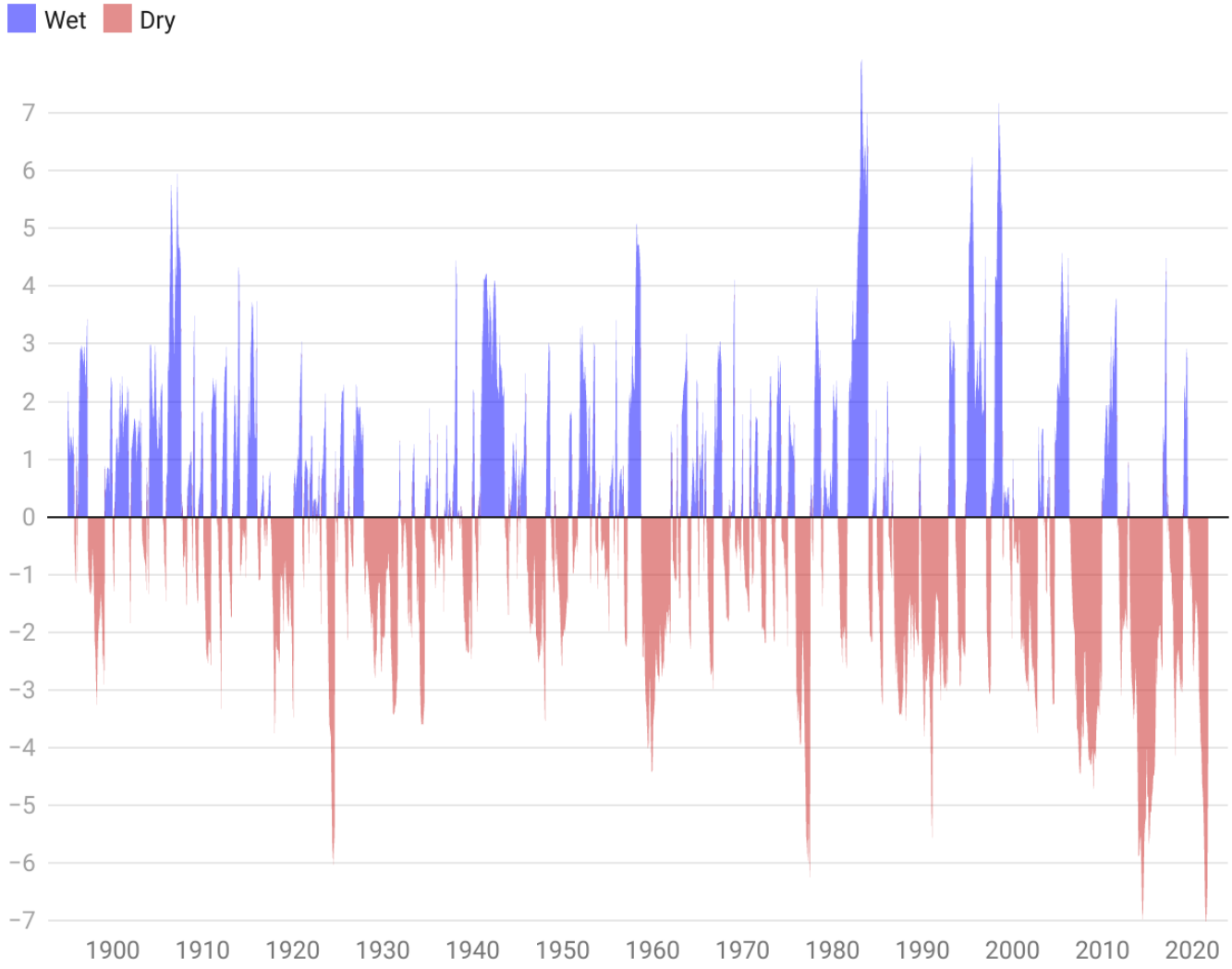


Chart: OEHHA Climate Change Indicators 2022 • Source: Source: (NOAA, 2021) • Created with Datawrapper

The above graph interpretation is taken directly from OEHHA's 2022 Report: Indicators of Climate Change in California (https://oehha.ca.gov/climate-change/epic-2022/changes-climate/drought)

This graph tracks drought using the Palmer Drought Severity Index (PDSI), which measures the relative dryness of a region by incorporating readily available temperature, precipitation, and soil moisture data. Positive values (blue bars) indicate "wet" months; negative values (red bars) are "dry" months. PDSI values below -3 denote severe drought, and below -6 very extreme drought.

- California has become increasingly dry since 1895. From 2012 to 2016, California experienced the most severe drought on record: thirteen of the 30 driest months occurred during this period.
- Except for brief wet periods in the 2017 and 2019 water years, drought conditions have largely persisted through 2021.

Why is this indicator important?

- Droughts create conditions that threaten human health. Examples include degraded drinking water quality, air pollution from wildfires and dust storms, and increased exposures to the fungus that causes Valley Fever and to toxins produced by harmful algal blooms.
- Droughts lead to a wide range of ecological impacts, such as widespread tree deaths, larger wildfires, threatened fish populations.
- Many of the impacts of drought on California's ecosystems disproportionately affect people who depend on these diverse natural resources.

As illustrated below in the tables, the average annual total precipitation is expected to increase due to climate change and thus worsen the impacts of future drought events. The tables below are indicative of the potential risks faced by the County based on levels of greenhouse gas emissions. According to the Environmental Protection Agency, these gasses from human activities are the most significant driver of observed climate change since the mid-20th century (https://www.epa.gov/climate-indicators/greenhouse-gases).

Drought Climate Projections for Tuolumne County

Early Century (2015-2044)	Lower Emissions	Higher Emissions
Average annual total precipitation	43.6 inches 0.1 since 1976.2005	44.7 inches +1.2 since 1976-2005
Days per year with precipitation (wet days)	107.8 days -2.7 since 1976-2005	108.0 days -2.4 since 1976-2005
Days per year with no precipitation (dry days)	257.4 days +2.7 since 1976-2005	257.1 days +2.4 since 1976-2005
Maximum number of consecutive dry days	55.1 days +0.1 since 1976-2005	57.3 days +2.4 since 1976-2005
Annual days with maximum temperature >90°	31.5 days +8.9 since 1976-2005	32.6 days +10.0 since 1976-2005
Annual days with maximum temperature >100°	6.9 days +3.8 since 1976-2005	7.5 days +4.4 since 1976-2005

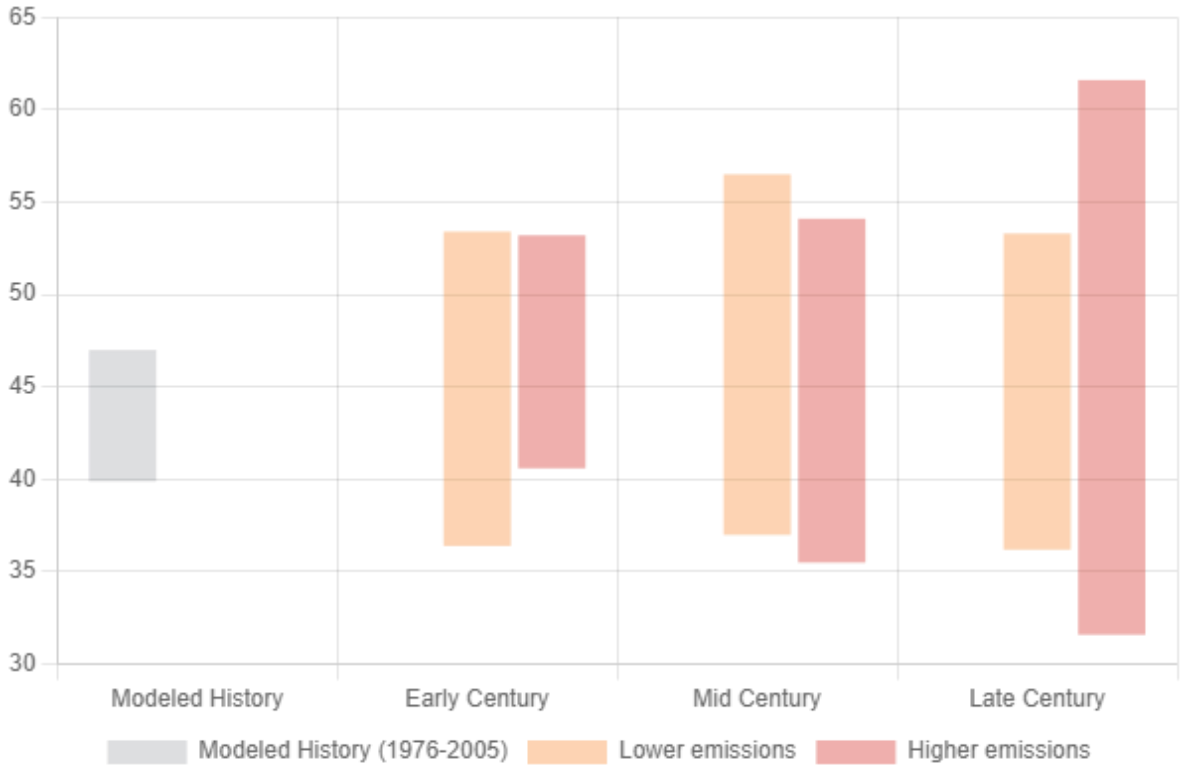
Mid Century (2035-2064)	Lower Emissions	Higher Emissions
Average annual total precipitation	43.2 inches -0.3 since 1976.2005	44.7 inches +1.1 since 1976-2005
Days per year with precipitation (wet days)	105.6 days -4.8 since 1976-2005	105.1 days -5.4 since 1976-2005
Days per year with no precipitation (dry days)	259.5 days +4.8 since 1976-2005	260.0 days +5.3 since 1976-2005
Maximum number of consecutive dry days	55.6 days +0.6 since 1976-2005	57.3 days +2.3 since 1976-2005
Annual days with maximum temperature >90°	36.1 days +13.5 since 1976-2005	40.5 days +17.9 since 1976-2005
Annual days with maximum temperature >100°	9.2 days +6.1 since 1976-2005	11.5 days +8.4 since 1976-2005

Late Century (2070-2099)	Lower Emissions	Higher Emissions
Average annual total precipitation	44.0 inches +0.5 since 1976.2005	45.3 inches +1.8 since 1976-2005
Days per year with precipitation (wet days)	105.2 days -5.3 since 1976-2005	101.2 days -9.3 since 1976-2005
Days per year with no precipitation (dry days)	259.9 days +5.3 since 1976-2005	263.9 days +9.2 since 1976-2005
Maximum number of consecutive dry days	56.0 days +1.1 since 1976-2005	59.6 days +4.6 since 1976-2005
Annual days with maximum temperature >90°	41.5 days +18.9 since 1976-2005	57.5 days +34.9 since 1976-2005

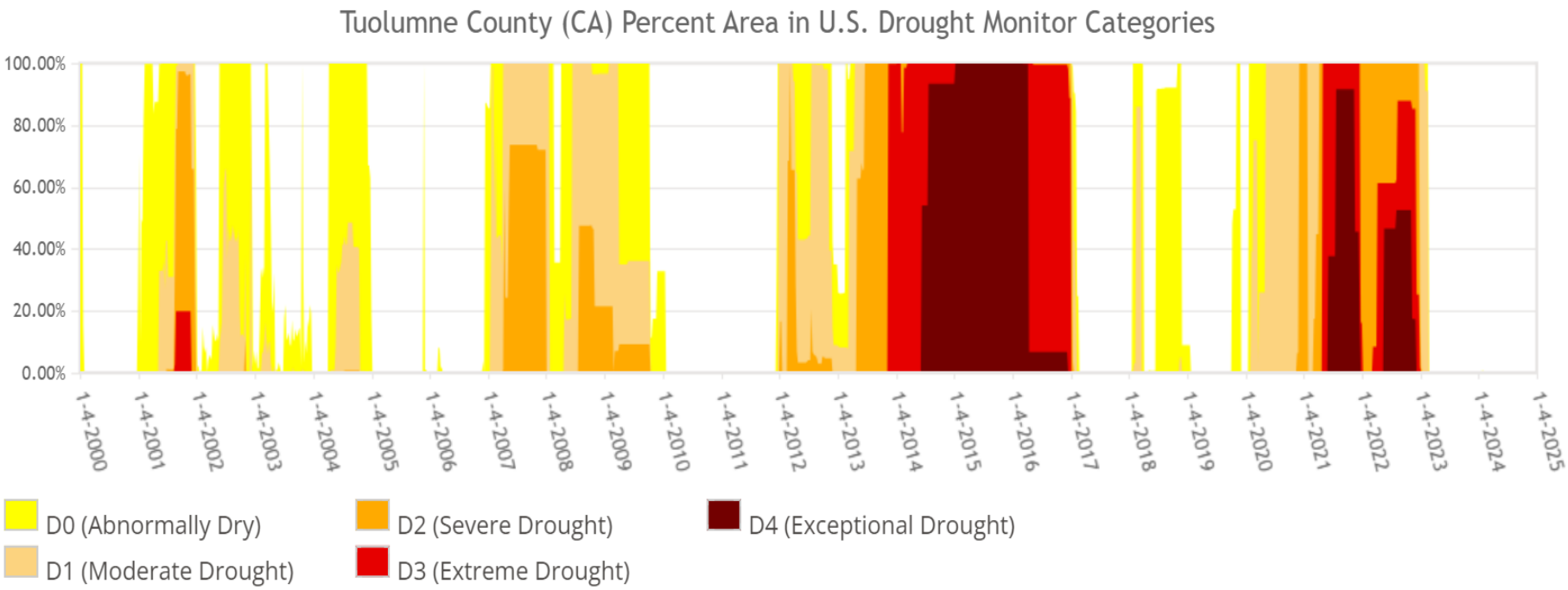
Annual days with maximum temperature >100°	12.2 days +9.1 since 1976-2005	21.1 days +18.0 since 1976-2005

Source: Climate Mapping for Resilience and Adaptation v1.3.1

Average annual total precipitation



Source: Climate Mapping for Resilience and Adaptation v1.3.1



From the U.S. Drought Monitor website, https://droughtmonitor.unl.edu/DmData/TimeSeries.aspx, 2-15-2024

Explanation of Drought Categories – Drought Impacts

Category	Description	Possible Impacts
D4	Exceptional Dry	• Exceptional and widespread crop/pasture losses • Shortages of water in reservoirs, streams, and wells creating water emergencies
D3	Extreme Drought	• Major crop/pasture losses • Widespread water shortages or restrictions
D2	Severe Drought	• Crop or pasture losses likely • Water shortages common • Water restrictions imposed
D1	Moderate Drought	• Some damage to crops, pastures • Streams, reservoirs, or wells low, some water shortages developing or imminent • Voluntary water-use restrictions requested
D0	Abnormally Dry	**Going into drought:** • short-term dryness slowing planting, growth of crops or pastures **Coming out of drought:** • some lingering water deficits • pastures or crops not fully recovered

Source: https://www.drought.gov/explaining-drought-category-maps

Cascading Effects of Drought

Limited water, dry conditions, and forest overpopulation has resulted in a pervasive propagation of bark beetles in California, particularly targeting the Ponderosa Pine specie. Due to lack of sufficient water, the tree is unable to produce pitch as a defense mechanism, reduces its ability to fight off beetles attacks. In 2016, there was an estimated 102 million trees in California that were dead or dying due to these conditions. Tuolumne County has removed a large number of dead and dying trees that can damage County maintained infrastructure, as well as using CAL FIRE State Responsibility Area grant funding to remove trees that can strike a private residence and or fall over non-county maintained roads.

As a result of the previous five years of drought and dealing with the cascading effects on groundwater and tree mortality, the County of Tuolumne is developing a Drought Contingency Plan that demonstrates: preparation, planning, and response to potential water shortages, assessing current drought vulnerability to all citizens, taking proactive actions to reduce drought vulnerability where appropriate, improving availability and readiness of appropriate responses for when drought impacts do occur, and communicating with citizens and the state, regional, and local entities regarding vulnerability, preparedness, current water supply conditions, triggering mechanisms, and responses.

Impact of Climate Change

California's Fourth Climate Change Assessment projects that droughts will become more frequent and severe throughout the year 2100 due to climate change. This is because warmer temperatures cause more moisture to evaporate from soil and plants, which can lead to drier conditions even if precipitation is average. California's snowpack, which is a key source of groundwater and surface water, is also expected to decline by more than a third by 2050 and more than half by 2100 (https://climateresilience.ca.gov/overview/impacts.html)

Exposure & Vulnerability

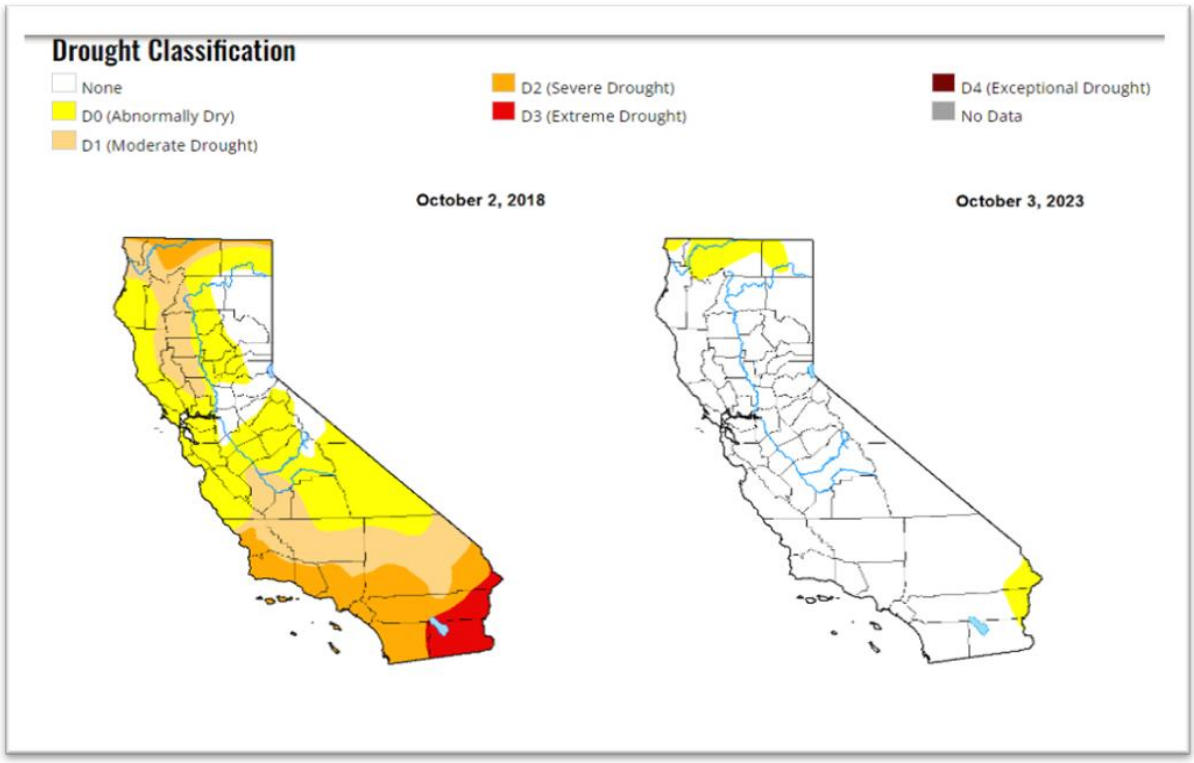
All people and property within the County would have some exposure to the impacts of moderate to sever drought conditions. Socially vulnerable populations in the County are made up of children under 18, the elderly and people experiencing economic difficulties. Water supply, and access to fresh, potable water could impact the County's vulnerable populations. Populations that depend on wells may not have the financial ability to purchase bottled water, and the elderly or persons with disabilities may not have the physical ability to

Drought

Periods of drought can have significant environmental, agricultural, health, economic and social consequences. Drought can also reduce water quality, because lower water flows reduce dilution of pollutants and increase contamination of remaining water sources. In a rural area, such as Tuolumne County, these affects are seen on ground water quantity. Tuolumne County

is in the process of creating a Drought Contingency Plan which will be added to this Multi-Jurisdictional Hazard Mitigation Plan when completed. Wildfires are typically larger and more severe in periods of drought due to the lower fuel moisture content.

As seen in the maps below, Tuolumne County was classified as Abnormally Dry in October 2018. 5 years later, Tuolumne County is showing only two areas as abnormally dry.



Source: https://droughtmonitor.unl.edu/Maps/MapArchive.aspx

Windstorms / Strong Wind

Resulting from air movement from areas of high pressure to those of low air pressure, windstorms can occur at any time of the year and can vary in strength and duration. There are general terms that differentiate winds of different average speeds such as a breeze, a gale, a storm, tornado, or a hurricane. Gale-force winds, according to the National Weather Service, lie between 39 miles/hour and 54 miles/hour with preceding adjectives such as moderate, fresh, strong, and whole used to differentiate the wind's strength within the gale category. A windstorm has sustained winds of 55 to 74 miles/hour. Any area of the county can be impacted by windstorms.

Hazard Potential

Wind events can be quite destructive, especially in urban areas where falling trees and branches can result in considerable property damage. During the winter, as soils become more

saturated from rain or snow melt off, wind events can become even more destructive as tree root systems are more likely to fail. Wind also has a dramatic impact on the spread of wildland fires.

Impact on Vulnerable Populations

High winds can cause power outages when debris strikes powerlines, which impacts the very young, the elderly, those experiencing financial hardships, people that require access to electrically powered durable medical equipment, and people with disabilities. Power outages can impact the populations' ability to provide heating or cooling, access to well water, and other power related issues.

Windstorms and debris from windstorms can cause property damage that the County's vulnerable populations may not afford to be able to repair.

Impact of Climate Change

According to a 2023 study done by the University of Chicago and the U.S. National Science Foundation National Center for Atmospheric Research, due to climate change, jet stream winds will accelerate by about 2% for every 1.8° Fahrenheit that the world warms. The jet stream winds will likely increase the potential for server weather. Faster winds may also lead to conditions that are favorable for stronger, more prolonged storms. (https://www.nature.com/articles/s41558-023-01884-1)

Severity

The Beaufort Wind scale is used to estimate wind strengths.

The Beaufort Wind Scale

Force	Speed (mph)	Speed (knots)	Description	Specifications for use at sea Specifications for use on land
0	0-1	0-1	Calm	Sea like a mirror. Calm; smoke rises vertically.
1	1-3	1-3	Light Air	Ripples with the appearance of scales are formed, but without foam crests. Direction of wind shown by smoke drift, but not by wind vanes.
2	4-7	4-6	Light Breeze	Small wavelets, still short, but more pronounced. Crests have a glassy appearance and do not break. Wind felt on face; leaves rustle; ordinary vanes moved by wind.
3	8-12	7-10	Gentle Breeze	Large wavelets. Crests begin to break. Foam of glassy appearance. Perhaps scattered white horses. Leaves and small twigs in constant motion; wind extends light flag.
4	13-18	11-16	Moderate Breeze	Small waves, becoming larger; fairly frequent white horses. Raises dust and loose paper; small branches are moved.
5	19-24	17-21	Fresh Breeze	Moderate waves, taking a more pronounced long form; many white horses are formed. Small trees in leaf begin to sway; crested wavelets form on inland waters.
6	25-31	22-27	Strong Breeze	Large waves begin to form; the white foam crests are more extensive everywhere. Large branches in motion; whistling heard in telegraph wires; umbrellas used with difficulty.
7	32-38	28-33	Near Gale	Sea heaps up and white foam from breaking waves begins to be blown in streaks along the direction of the wind. Whole trees in motion; inconvenience felt when walking against the wind.
8	39-46	34-40	Gale	Moderately high waves of greater length; edges of crests begin to break into spindrift. The foam is blown in well-marked streaks along the direction of the wind. Breaks twigs off trees; generally impedes progress.
9	47-54	41-47	Severe Gale	High waves. Dense streaks of foam along the direction of the wind. Crests of waves begin to topple, tumble and roll over. Spray may affect visibility Slight structural damage occurs (chimney-pots and slates removed)
10	55-63	48-55	Storm	Very high waves with long overhanging crests. The resulting foam, in great patches, is blown in dense white streaks along the direction of the wind. On the whole the surface of the sea takes on a white appearance. The tumbling of the sea becomes heavy and shock-like. Visibility affected. Seldom experienced inland; trees uprooted; considerable structural damage occurs.
11	64-72	56-63	Violent Storm	Exceptionally high waves (small and medium-size ships might be for a time lost to view behind the waves). The sea is completely covered with long white patches of foam lying along the direction of the wind. Everywhere the edges of the wave crests are blown into froth. Visibility affected. Very rarely experienced; accompanied by wide-spread damage.
12	72-83	64-71	Hurricane	The air is filled with foam and spray. Sea completely white with driving spray; visibility very seriously affected. see Saffir-Simpson Hurricane Scale

Source: https://www.weather.gov/mfl/beaufort

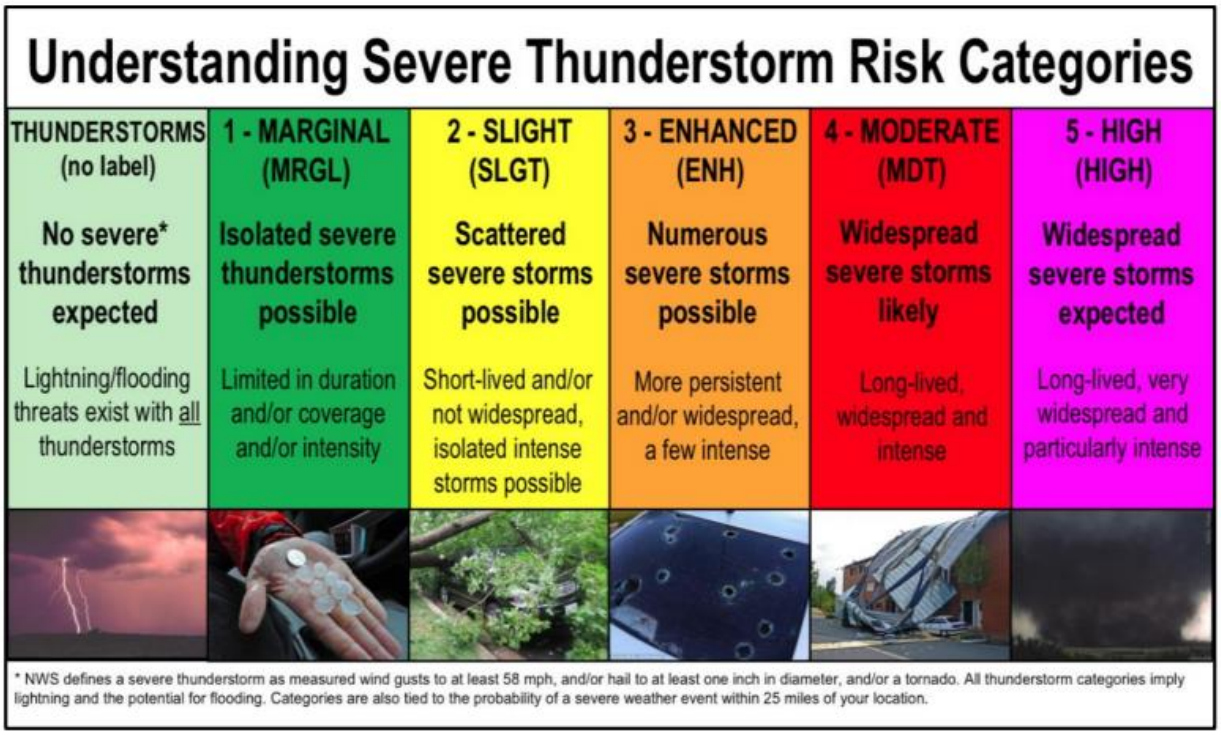
Thunderstorm/Lightning

A thunderstorm, also known as an electrical storm, a lightning storm, thundershower, or simply a storm is a form of weather characterized by the presence of lightning and its acoustic effect on the earth's atmosphere known as thunder. Thunderstorms are usually accompanied by strong winds, heavy rain and sometimes snow, sleet, hail, or no precipitation at all. Those storms which cause hail to fall are known as hailstorms.

Hazard Potential

The lightning associated with thunderstorms may cause considerable damage to communication systems, structures, and may occasionally strike humans causing severe burns or fatalities. Thunderstorms are usually accompanied by strong winds, heavy rain and sometimes snow, sleet, and hail. In the summer months, these storms may produce no precipitation at all and it is quite common during fire season for the County to experience lightning generated wildfires.

Severity



Source: https://www.weather.gov/media/ewx/iwt/SPC_WPC_Differences.pdf

Impact on Vulnerable Populations

Should severe thunderstorms occur in a populated area, the very young, the elderly, those experiencing financial hardships, the unhoused populations and people with disabilities may

have struggle finding safe shelter to weather a storm, and in case of residential damage, encounter difficulty rebuilding and/or repairing damaged structures.

Impact of Climate Change

Climate change may increase the frequency and severity of storms.

Hail Storms

Hail is precipitation in the form of balls or irregular clumps of ice and is always produced by convective clouds, nearly always cumulonimbus. They can vary from pea size all the way up to that of a grapefruit in rare circumstances. Hailstones generally form in thunderstorms between currents of rising air called updrafts and the current of air descending toward the ground, called downdrafts. Large hailstones indicate strong updrafts in the thunderstorm. The larger the hail, the stronger the updraft needed to hold it aloft in the storm.

Hazard Potential

Significant amounts of damage to property notably to automobiles, skylights, and glass-roofed structures can occur from hailstorms. The damage to crops can also be severe. Fortunately, hail very rarely kills anyone, however, each year dozens of people are injured when they are not able to find adequate shelter.

Severity

According to the National Weather Service, to be considered severe, hail stones must be at least 1 inch in diameter.

HAIL DIAMETER SIZE	DESCRIPTION
1/4"	Pea Size
1/2"	Small Marble Size
3/4"	Penny or Large Marble Size
7/8"	Nickel Size
1" (Severe Criteria)	Quarter Size
1 1/4"	Half Dollar Size
1 1/2"	Walnut or Ping Pong Ball Size
1 3/4"	Golf Ball Size
2"	Hen Egg Size
2 1/2"	Tennis Ball Size
2 3/4"	Baseball Size
3"	Teacup Size
4"	Grapefruit Size
4 1/2"	Softball Size

Source: https://www.weather.gov/lwx/skywarn_hail

Graphical Hazardous Weather Outlook
Severe Hail Threat

The "Severe Hail Hazard Map" depicts the local threat of severe hail for specified areas. It is based on the likelihood that severe hail will occur combined with the anticipated size (diameter) of the biggest stones.

Severe Hail Threat Level	Threat Level Descriptions
Extreme	**"An Extreme Threat to Life and Property from Severe Hail."** Within 12 miles of a location, a moderate likelihood or greater (16% probability or greater) of severe hail, with storms capable of baseball to softball sized stones. *See diameter description below.* AND/OR...a high likelihood or greater (26% probability or greater) of severe hail, with storms capable of golf ball to baseball sized hail stones. *See diameter description below.* AND/OR...a very high likelihood (36% or greater) of severe hail, with storms capable of quarter to golf ball sized hail stones. *See diameter description below.*
High	**"A High Threat to Life and Property from Severe Hail."** Within 12 miles of a location, a low likelihood (6% to 15% probability) of severe hail, with storms capable of baseball to softball sized stones. *See diameter description below.* AND/OR...a moderate likelihood (16% to 25% probability) of very large hail (golf ball to baseball sized hail stones). *See diameter description below.* AND/OR...a high likelihood (26% to 35% probability) of large hail (quarter to golf ball sized hail stones). *See diameter description below.*
Moderate	**"A Moderate Threat to Life and Property from Severe Hail."** Within 12 miles of a location, a very low likelihood (2% to 5% probability) of severe hail, with storms capable of baseball to softball sized stones. *See description below.* AND/OR...a low likelihood (6% to 15% probability) of severe hail, with storms capable of golf ball to baseball sized hail stones. *See description below.* AND/OR...a moderate likelihood (16% to 25% probability) of severe hail, with storms capable of quarter to golf ball sized hail stones. *See diameter description below.*
Low	**"A Low Threat to Life and Property from Severe Hail."** Within 12 miles of a location, a very low likelihood (2% to 5% probability) of severe hail, with storms capable of golf ball to baseball sized hail stones. *See diameter description below.* AND/OR...a low likelihood (6% to 15% probability) of severe hail, with storms capable of quarter to golf ball sized hail stones. *See diameter description below.*
Very Low	**" A Very Low Threat to Life and Property from Severe Hail."** Within 12 miles of a location, a very low likelihood (2% to 5% probability) of severe hail, with storms capable of nickel to golf ball sized hail stones. *See diameter description below.* AND/OR...a low likelihood or greater (6% or greater) of small hail (less than 1 inch). *See diameter description below.*
Non-Threatening	**" No Discernable Threat to Life and Property from Severe Hail."** Within 12 miles of a location, environmental conditions do not support the occurrence of severe hail.

Source: https://www.weather.gov/mlb/hail_threat

Impact on Vulnerable Populations
Should severe hail occur in a populated area, the very young, the elderly, those experiencing financial hardships, the unhoused population, and people with disabilities may have struggle finding safe shelter to weather a severe hail storm, and in case of residential damage, encounter difficulty rebuilding and/or repairing damaged structures.

Impact of Climate Change
As a result of climate change, it is generally anticipated that low-level moisture and convective instability will increase, raising hailstorm likelihood and enabling the formation of larger hailstones; the melting height will rise, enhancing hail melt and increasing the average size of surviving hailstones; and vertical wind shear will decrease overall, with limited influence on the overall hailstorm activity, owing to a predominance of other factors. (Raupach, Timothy H. 2021 "Nature Reviews Earth & Environment," Volume 2 Issue 3. P. 213-226)

Heavy Snow Fall / Extreme Cold or Freeze
Heavy snow fall is common in the higher elevations of the County. Occasionally, unsuspecting travels or visitors may become trapped and require the assistance of rescue personnel. In the lower elevations, heavy snow fall is not common. Should it occur, considerable damage to property and vegetation is likely.

A freeze refers to a particularly cold spell of weather where the temperature drops below 32 degrees. During the fall, winter, and spring in the higher elevations of the Tuolumne County, freeze conditions are the norm. In the lower elevations, severe freezing conditions, especially in the spring, can cause damage to crops and cause considerable discomfort to area residents.

Hazard Potential
The costs to the County for heavy freezes and snow fall, in particular, can endanger plants, have detrimental effects on oak forests and agriculture and can have an impact in the millions of dollars. On rare occasions, snow fall may be heavy enough to cause damage to the naturally occurring vegetation. This may result in an increased fire season threat as the damaged vegetation dries out and increases the normal fuel loading**.**

Impact on Vulnerable Populations
Cold events frequently impact the very young, the elderly, people experiencing financial difficulties, people with disabilities as well as the unhoused population. Warming centers, local libraries and meeting halls can be difficult to get to during periods of unsafe travel conditions.

Impact of Climate Change on Extreme Cold or Freeze
According to the California State Hazard Mitigation Plan, due to climate change, most of California has experienced increased temperatures exceeding 1°, the warming trend has the potential to reduce the occurrence of extreme cold or freeze events in the future. According to the Climate Adaptation Platform, climate change will cause less snow, which will lead to less

snowpack, which will impact communities that depend on snow pack for water – including Tuolumne County.

(https://edition.cnn.com/2023/11/25/weather/snowfall-temperatures-climate-change-water/index.html).

California's snowpack acts as a natural reservoir, storing water in the form of snow during the colder months and gradually releasing it as meltwater during the warmer months. This meltwater feeds into rivers and streams, providing a significant portion of the state's water supply for agricultural, urban, and industrial use. The stored water in the snowpack serves as a buffer against drought conditions. In times of low precipitation or reduced water availability, the gradual melt of the snowpack ensures a relatively steady flow of water downstream, helping to alleviate the impact of drought on water availability. (https://snow.water.ca.gov/why#:~:text=Water%20Supply,meltwater%20during%20the%20warmer%20months.)

A sample of the variety of extreme weather events that have occurred in Tuolumne County are found on the following pages:

Date	Event	Details
February 1938	Heavy Snowfall	A very cold storm delivered 48 inches of snow at Soulsbyville, which has an elevation of 3000 feet
Winter 1969	Heavy Snowfall	A series of cold storms dropped 8 inches of snow on the City of Sonora, elevation 1800 feet. The snow stayed on the ground for a full week as a cold front moved in behind the last storms. The County came to a standstill as the limited number of snowplows was unable to keep the roads open
August 1987	Lightning	After months of dry weather, a dry lightning storm moved through the higher elevations of the County igniting numerous fires in the Stanislaus National Forest. These fires eventually merged into one large fire that caused millions of dollars in damage to timber resources and structures.
December 1988	Freeze	A mild winter storm was immediately followed by a very cold front that caused considerable damage as a result of frozen water pipes. Ice covered streets disrupted traffic flows and resulted in several traffic accidents.
February 1999	Freeze	A large winter storm impacted central California during the afternoon of February 7th. The storm slowly moved southward during the day on the 8th. The storm finally picked up speed and rapidly moved through the region on the 9th, with very cold air in its wake. Snow levels in the Southern Sierra Nevada and Tehachapi Mountains dropped to 1500 feet, even lower near Yosemite. Damage from freezing temperatures was extensive.
July 2006	Extreme Heat	The U.S. Department of Agriculture granted a Secretarial disaster designation for 47 California counties, of which Tuolumne was one, due to agricultural losses caused by a record setting heat wave from July 1-31.
Winter 2007-2009	Drought	Three extremely dry winters resulted in a considerably reduce snowpack throughout the Sierra Nevada range and reduced rainfall in the Central Valley. Agricultural losses were significant statewide. Increase fire activity and more

		severe fire seasons were reed. The drought ended in the winter/spring of 2010 when record amounts of precipitation were recorded.
November 2010	Freeze	Four days of extremely cold weather coupled with an early season snow fall caused extensive damage to the County's apple and olive trees.
March 2011	High Winds	With the season rainfall accumulations of nearly 60 inches, a late season storm, accompanied by extremely high wind caused nearly $750,000 in damages across the County. Damages to the flume systems, roadways, the electrical distribution system, and tree damage to numerous residences results in a request for a Federal Disaster Declaration.
2014-2017	Extreme Drought	For five years, California had received significantly less rainfall and snowpack accumulation causing a decrease in surfaces and ground water levels throughout most of Southern and Central California. The lack of water and subsequent effects on the health and safety CA residents, Governor Brown issued a State of Emergency Due to Extreme Drought Conditions. Tuolumne County declared a Local State of Emergency due to drought and groundwater shortages. Over 200 dry wells were reporter in the County. Using California Disaster Assistance Act funding, Tuolumne County was able to place 140 temporary water tanks with water delivery to residents with confirmed dry wells. The program will cease in June 2018.
2017	Winter Storms	In January and February of 2017, Tuolumne County, and much of California, were hit with a series of winter storms that brought large amounts of precipitation, snow, and high winds, all in a very short amount of time. Due to the severity and rapid onset of the storms, many of the County's culverts, ditches, and older infrastructure began to fail, causing flooding to roads, bridge washouts, and pavement failures on roads. Some dirt roads in the county eroded to the point where they had to be closed completely for the safety of the residents. The Tuolumne County Board of Supervisors declared a Local State of Emergency due to the damage assessments done by our roads and engineering department. The total damages sustained equated to approximately $8 million.
2018-2019	Drought	Tuolumne County experienced 53 consecutive weeks in a drought.
February 2019	Winter Storms	In February 2019 a strong atmospheric river brought heavy precipitation with widespread impacts across interior Northern California. Numerous trees and powerlines were brought down due to strong winds
2020-2022	Drought	Tuolumne County experienced 153 consecutive weeks in drought conditions. Tuolumne County Proclaimed a Local State of Emergency during these times.
2022	Winter Storms	Beginning in December of 2022 winter storms related to an atmospheric river system struck Tuolumne County bringing damaging winds, substantial precipitation, including significant snow at higher elevations,

		as well as flooding.
2023	Winter Storms	Late February and early March storms struck Tuolumne County, residents and businesses in Tuolumne County were included in a presidential major disaster declaration due to severe winter storms, straight-line winds, flooding, landslides and mudslides.
2023	Tornado	According to the National Weather Service, a 100-yard-wide tornado touched down in the County. Numerous hardwood trees snapped or uprooted. A wooden power pole snapped in half. NWS Storm Survey determined it to be rated EF-1 with 90 mph winds. According to the NWS, touchdown was near Old Melones Road, north of Table Mountain.

Extreme Heat

Often referred to as a "heat wave" or "heat storm", it is typically defined as a series of days, 3 or more, where weather conditions combine resulting in daytime temperatures being considerably higher than the norm. When combined with high humidity, living conditions can become quite uncomfortable. As the elevation increases, cooler temperatures typically result. Therefore, the mountains of Tuolumne County will very rarely see extreme heat while in the lower foothill portions, daytime temperatures of greater than 100 degrees is quite common.

History

Climate Change and Extreme Heat

According to the California Office of Environmental Health Hazard Assessment (2022), due to climate change, extreme heat events have become notably hotter in the last decade and are happening more across the state. Periods of extreme heat have significant public health, ecological and economic impacts; long periods of high temperatures particularly dangerous when nights remain warm and humid: warm nights do not allow the body to recover after a hot day, and humidity prevents sweat from evaporating to cool down the body (OEHHA, 2022). Extreme heat affects agriculture, water, power, and transportation systems (OEHHA, 2022). According to The Climate Explorer, extreme temperatures on the hottest days of the year are projected to increase between 1-23° (https://crt-climate-explorer.nemac.org/)

Extreme Heat Climate Projections for Tuolumne County

Early Century (2015-2044)	Lower Emissions	Higher Emissions
Annual days with maximum temperature >90°	31.5 days +8.9 since 1976-2005	32.6 days +10 since 1976-2005
Annual days with maximum temperature >95°	16.8 days +6.5 since 1976-2005	17.7 days +7.4 since 1976-2005

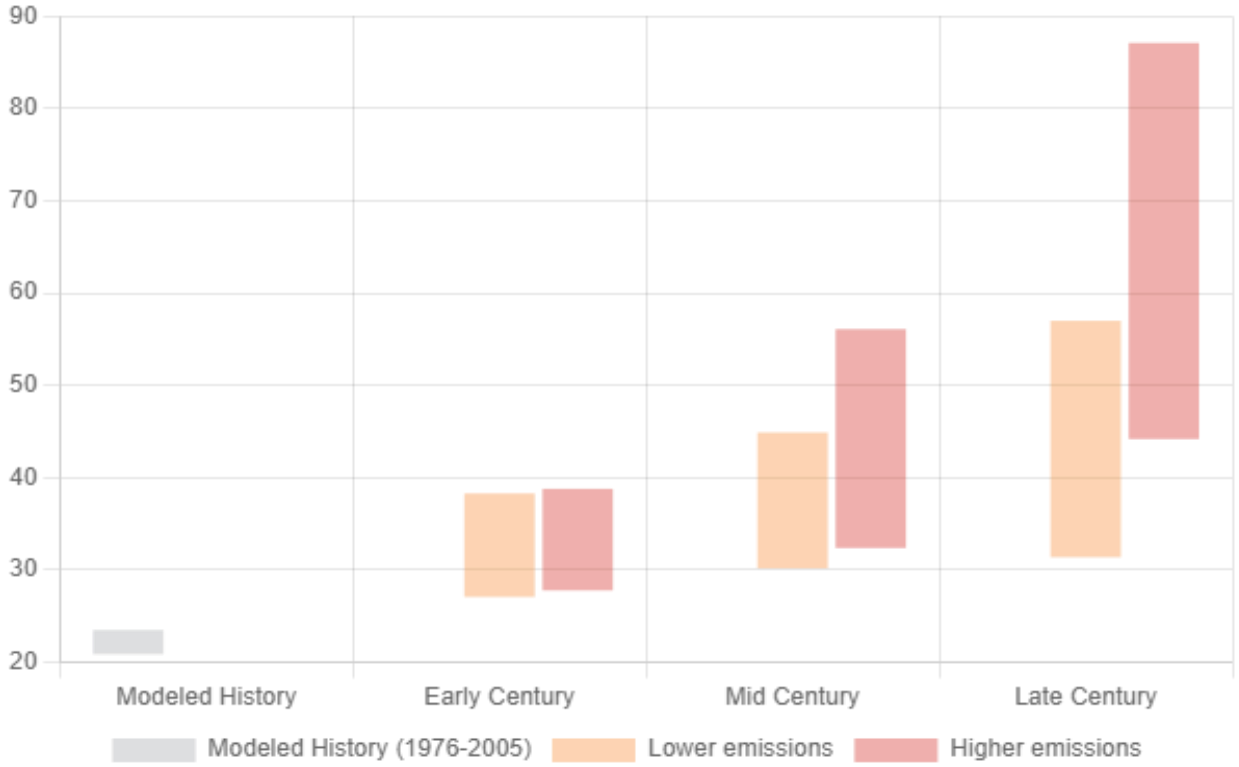
Annual days with maximum temperature >100°	6.9 days +3.8 since 1976-2005	7.5 days +4.4 since 1976-2005
Annual days with maximum temperature >105°	1.8 days +3.3 since 1976-2005	2.0 days +1.6 since 1976-2005

Mid Century (2035-2064)	Lower Emissions	Higher Emissions
Annual days with maximum temperature >90°	36.1 days +13.5 since 1976-2005	40.5 days 17.9 since 1976-2005
Annual days with maximum temperature >95°	20.4 days +10.1 since 1976-2005	23.7 days +13.4 since 1976-2005
Annual days with maximum temperature >100°	9.2 days +6.1 since 1976-2005	11.5 days +8.4 since 1976-2005
Annual days with maximum temperature >105°	2.8 days +2.4 since 1976-2005	4.0 days +3.6 since 1976-2005

Late Century (2070-2099)	Lower Emissions	Higher Emissions
Annual days with maximum temperature >90°	41.5 days +18.9 since 1976-2005	57.5 days +34.9 since 1976-2005
Annual days with maximum temperature >95°	24.6 days +14.3 since 1976-2005	36.9 days +26.6 since 1976-2005
Annual days with maximum temperature >100°	12.2 days +9.1 since 1976-2005	21.1 days +18.0 since 1976-2005
Annual days with maximum temperature >105°	4.3 days +3.9 since 1976-2005	9.6 days +9.9 since 1976-2005

Source: Climate Mapping for Resilience and Adaptation v1.3.1

Annual days with maximum temperature > 90°F

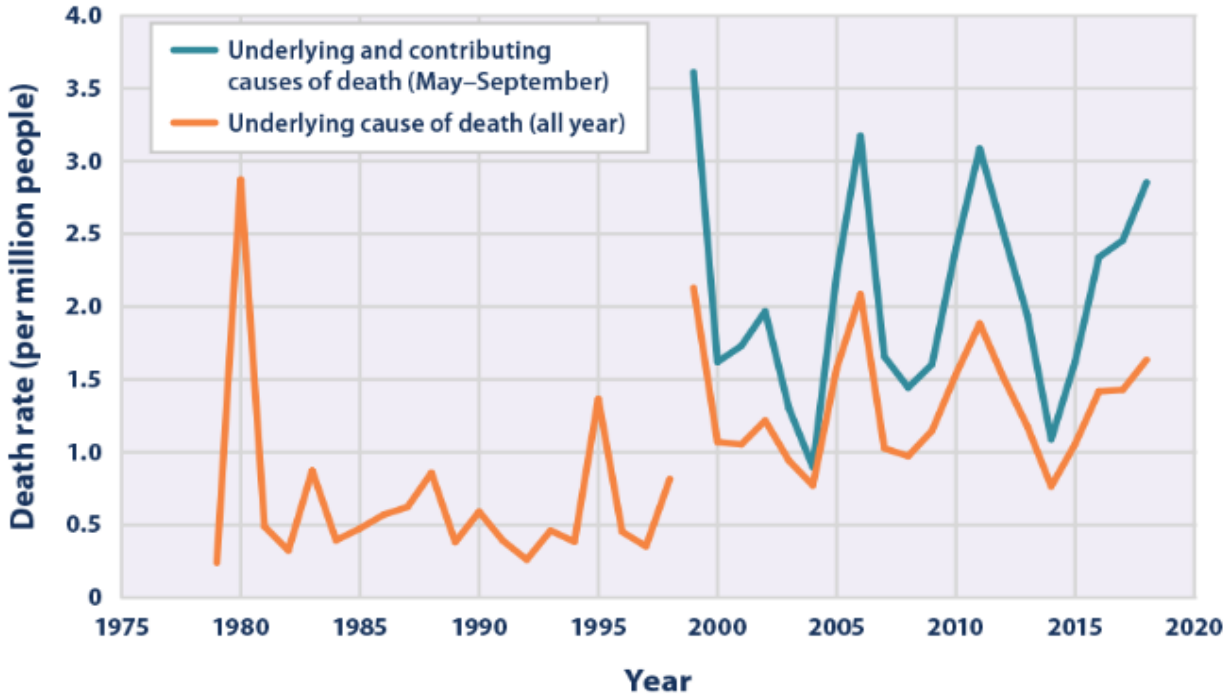


Source: Climate Mapping for Resilience and Adaptation v1.3.1

Hazard Potential

In the United States, heat waves are the most lethal type of weather phenomenon. The public health risks from extended exposure to higher-than-normal temperatures include hyperthermia, rashes, edema, dehydration, and heat cramps, to name a few. Wildland fire danger is also known to increase dramatically as the daily temperatures climb.

Deaths Classified as “Heat-Related” in the United States, 1979-2018



Source: https://www.epa.gov/climate-indicators/climate-change-indicators-heat-related-deaths

Plans and Programs

Working with local, state, and federal emergency response agencies, the Tuolumne County Office of Emergency Services (OES), works regularly to better prepare the County’s residents for the impacts of these types of events.

The National Weather Service (NWS) routinely issues advisories and warnings when unusual periods or life-threatening extreme weather is forecasted. The NWS has created a Tuolumne County weather page to assist with planning for weather events.

First responder agencies, both law enforcement and fire, regularly train on dealing with the cascading effects that can result from events of this nature. The local chapter of the American Red Cross is prepared to assist citizens in shelter welfare issues.

The Tuolumne County Community Development Department – Planning and Building Divisions stipulate and enforce codes and ordinances that ensure that buildings situated in heavy snow fall elevations are properly designed and constructed to meet snow load requirements.

Relationship to Other Hazards – Cascading Effects

The varied topography and wide range of elevation found in the County exaggerates the types of extreme weather. For example, winter storms and freezes in the higher elevations may have little if any impact while at the lower elevations may wreak considerable damage.

Listed below are the primary dangers associated with extreme weather events:

- Threat to life and danger to public health
- Damage/loss of personal property
- Injury/loss of crops/livestock
- Utility failures
- Interruption of the transportation network
- Interruption of communication systems

Impact on Vulnerable Populations

According to the California State Hazard Mitigation Plan, older populations, infants and children, pregnant people and people with chronic illnesses can be especially sensitive to heat exposure. People who are experiencing homelessness or financial insecurity may also be at risk due to limited access to cooling facilities.

According to heat.gov (https://www.heat.gov/pages/who-is-at-risk-to-extreme-heat):

Children are less efficient thermoregulators than adults; they have a smaller cardiovascular output and a higher metabolic rate than adults, which can increase vulnerability

For older adults, health complications such as cardiovascular issues can exacerbate the effects of extreme heat. Adults who require life-sustaining devices may be disproportionately affected during power outages that commonly accompany extreme heat events. Additionally, those who need constant access to oxygen, prescription drugs, or other consumable medical resources may not feel comfortable leaving their homes during a heat wave. Some older adults may also be using prescription drugs that affect their capability to thermoregulate or that block nerve impulses,2 both of which increase vulnerability to thermal extremes. Additionally, certain conditions, such as different types of dementia, can also affect a person's reactions and choices related to taking self-protective actions, increasing risk of harm during a heat event

For pregnant people, extreme heat can be quite uncomfortable. Discomfort occurs not only because pregnant people tend to experience a general increase in their core body temperature regardless of the air temperature, but also because extreme heat events can increase the likelihood of common challenges during pregnancy, such as excessive sweating and heat rash. Importantly, extreme heat also poses health risks for a pregnant people and her developing fetus. There is increasing evidence that extreme heat can increase the risk for preterm birth, low birth weight, fetal death, and infant mortality.

People who work outdoors—in agriculture, fishing, construction, or other service areas—or in situations where they don't have access to air conditioning are at risk for heat-related illnesses and injuries. These workers may have job tasks requiring great physical exertion, and the use of personal protective clothing and equipment may trap heat and prevent cooling. Many of these workers, particularly farm workers, may not have easy and quick access to water and shade. Lack of acclimatization in new workers and during heat waves also puts workers at higher risk. Some outdoor workers may also suffer from increased temperatures in cities due to the urban heat island effect, which can increase temperatures by 18 to 27°F (10 to 15°C) during the day, and 9 to 18°F (5 to 10°C) at night in urban areas compared to rural areas.

Many persons with disabilities are at a higher risk of heat-related illness during periods of high daytime and nighttime temperatures. Approximately one in four adults in the United States has a disability, and extreme heat can cause them significant adverse impacts, and even death. People with disabilities are two to four times more likely to be injured or killed in a natural disaster, and heat waves triple the risk of death for people with preexisting psychosocial disabilities.

During chronic or acute heat events, people with physical, sensory, mental, or cognitive disabilities are disproportionately affected. The increase in heat events across the nation impacts people with disabilities' ability to recover and adapt after an extreme weather event. Additionally, heatwaves can affect many populations over a short period of time, which may overwhelm healthcare and emergency response capacity and disrupt transportation and communications systems.

People with spinal cord injuries are especially at risk during high temperatures because of their inability to control their body temperature. Spinal cord injuries can lead to reduced sweating capacity, the body's natural way to cool itself off. Prolonged periods without water or sustained periods of intense heat could accelerate adverse reactions to extreme temperatures in someone who lacks the ability to naturally thermoregulate.

People with mental health and substance use conditions are especially susceptible to heat. Sleep loss during periods of prolonged, extreme heat may be a contributing stressor for mental health and substance use conditions. Psychotropic medications may increase risk, and use of

alcohol and other substances also can place people at more risk of harm. People with severe mental health conditions, such as schizophrenia, are at risk during hot weather because their medications may interfere with temperature regulation or even directly cause hyperthermia.

Cognitive disabilities, such as intellectual disabilities, Alzheimer's disease and, dementia, can impact a person's ability to comprehend symptoms and/or communicate the effects they are experiencing. Certain cognitive disabilities can also affect a person's ability to take self-protective actions, increasing risk of harm during a heat event.

People experiencing homelessness are disproportionately impacted by heat. Factors that can make this population more at risk from heat include physical conditions such dehydration, disabilities, chronic health issues such as diabetes, cardiovascular issues, and more. Those with mental health conditions including substance misuse, schizophrenia, and dementia are especially at risk of heat-related illnesses. People experiencing homelessness may face significant stress due to their living conditions, insomnia due to poor sleeping arrangements, and lack of food or spoiled food, which also contributes to a higher risk for heat-related illness and death. Additionally, people experiencing homelessness may not seek medical treatment during a heat event due to distance, lack of access to transportation, financial means, and more. Their access to cooling centers or shelters may be limited due to distance and lack of transportation, building hours of access, stigma, and several other factors. People that live in rural areas may have even less access to resources and services.

Vulnerability

The planning area has a history of extreme weather including; extreme cold/freezing, heavy snow fall/winter storms, wind and thunderstorms, heat waves and drought. The duration of these events, with the exception of drought, is most typically short term.

Given the past history of both occurrence and damage and based on the wide range of potential events this section is rated as **Medium** in severity and **Medium** in probability.

Severe Weather's General Impact on Vulnerable Populations

The County's main utility provider for power and electricity, PG&E, has implemented two programs that impact the vulnerable populations in the County as it relates to weather events. PG&E's Enhanced Powerline Safety Settings (EPSS) technology turns off power within one-tenth of a second if a tree branch or other object strikes a power line. PG&E has also implemented Public Safety Power Shutoffs (PSPS), where in conditions of 30% and below humidity, winds forecasted above 19 mph with gusts expected above 30 mph, a Red Flag Warning issued by the National Weather Service and dry material on the ground coupled with low moisture content of vegetation, power is preventatively shut off in identified areas.

While PG&E states this has reduced wildfire ignitions, socially vulnerable, very young children, elderly populations, and people experiencing financial difficulty often experience power outages and do not have access to home generators. These conditions often occur during the hot months of the summer and may impact the identified populations' ability to find relief from hot temperatures, those on wells may have difficulty accessing their water without power and

Power outages, both planned and unplanned (in heat or cold), can cause food spoilage and therefore limit access to fresh food and financial strain replacing spoiled items.

6. HAZARD: HAZARDOUS MATERIALS

After much discussion, the Multijurisdictional Hazard Mitigation Plan Committee elected not to include non-natural hazards in our plan. Therefore, we have determined that we will eliminate the Hazardous Materials section other than in relation to a natural hazard. Hazardous materials are still included as potential cascading effects within other natural hazards

VI. VULNERABILITY ASSESSMENT

A. Code of Federal Regulations Requirements

44 CFR Requirement §201.6(c)(3) [The plan shall include the following:] A mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs, and resources, and its ability to expand on and improve these existing tools. [The hazard mitigation strategy shall include a(n)]

(i) description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

B. Summary of Community's Vulnerability

As outlined above, given the past history, the current conditions, and the overall life and property threat to the County of Tuolumne the Hazard Planning Group has deemed the probability and severity of each hazard as follows:

County of Tuolumne	Earthquake	Wildland Fire	Extreme Weather	Flood	Volcano	Sinkholes
Probability	L	H	M	M	M	L
Severity	H	H	M	L	L	L

H= High Probability M=Moderate Probability L=Low Probability

The vulnerability assessment is a summary of the hazard's impact to the community's vulnerable structures. Community assets and development trends will be identified and assessed with respect to the developed hazard profiles to ascertain the potential amount of damage that could ensue from each identified hazard. This section will include: 1) A description of the critical buildings and infrastructure within the study areas including future building and land use decisions. 2) A general description of the extent of each hazard's impacts to these vulnerable structures, 3) An estimate of the potential dollar losses to vulnerable structures.

C. Critical Facilities and Infrastructure

Critical facilities and infrastructure are those systems within each community whose incapacity or destruction would have a debilitating effect on the community's ability to recover subsequent to a major disaster. The following critical facility and infrastructure are categorized as follows:

1. **Emergency Services** for the health and welfare of the whole population (e.g., hospitals, police, fire stations, emergency operations centers, evacuation shelters, schools).

2. **Lifeline Utility Systems** such as potable water, wastewater, oil, natural gas, electric power and communications systems.

3. **Transportation Systems** including railways, highways, waterways, airways and city streets to enable effective movement of services, goods and people.

4. **High Potential Loss Facilities** such as power plants, dams and levees.

Non-Critical Facilities

For the purpose of this plan, properties such as recreational facilities, parks, libraries, religious facilities, and historical buildings will be classified as non-critical facilities. Although their relevance to the school district, cities, and their residents is undeniably significant, they are not classified as 'critical facilities' per the definition set in Executive Order 13010 (Critical Infrastructure Protection 1996).

Residential Facilities

Although personal residences are not by the above definition considered to be critical facilities, their relevance to these communities and its citizens is unquestionable. For that reason, they have been included in each jurisdiction's vulnerability assessment.

D. Jurisdictional Assets at Risk to Applicable Hazards

Assets at risk include: Buildings, Critical Facilities, Infrastructure, Private Property and Areas (Residential, Environmental, Historical and Economic)

Facility Name	Address	City	Zip Code	Sq. Ft.	Year Built	Total Value	Wildfire	Flood	Earthquake	Sinkholes	Volcano	Weather
Sheriff's Department	28 Lower Sunset Dr	Sonora	95370	31,157	1959	$ 11,772,574	X		X	X	X	X
Tuolumne General Hospital	101 Hospital Rd	Sonora	95370	33,849	1849	$ 12,923,467	X		X	X	X	X
Health & Wellness Bldg	105 Hospital Rd	Sonora	95370	20,700	1967	$ 3,912,794	X		X	X	X	X
CWS Visitation Center, BH MHSA Offices	101 Hospital Rd	Sonora	95370	8,506	1960	$ 1,606,940	X		X	X	X	X
Old County Courthouse	41 W Yaney Ave	Sonora	95370	18,882	1899	$ 5,158,601	X		X	X	X	X
Museum	158 W Bradford St	Sonora	95370	3,966	1857	$ 1,009,233	X				X	X
Museum Annex / Warehouse	158 W Bradford St	Sonora	95370	3,602	1866	$ 367,844	X				X	X
Veteran's Memorial Hall	9 N Washington St	Sonora	95370	10,170	1932	$ 2,369,108	X		X	X	X	X
Sonora Youth Center	732 S Barretta St	Sonora	95370	2,960	1960	$ 591,491	X		X	X	X	X
Youth Center Restrooms	732 S Barretta St	Sonora	95370	198	1983	$ 27,793	X		X	X	X	X
Probation Building	465 S Washington St	Sonora	95370	8,400	1946	$ 1,273,519	X		X	X	X	X
Storage Building	465 S Washington St	Sonora	95370	370	2001	$ 45,568	X		X	X	X	X
Superior Court Bldg	60 N Washington St	Sonora	95370	6,042	1945	$ 1,221,918	X		X	X	X	X
Fire Station #51	19500 Hillsdale Dr	Sonora	95370	4,086	1980	$ 711,244	X				X	X

Fire Station #51 Storage	19500 Hillsdale Dr	Sonora	95370	600	1980	-	X				X	X
County Administration Center	2 S Green St	Sonora	95370	39,864	1980	$ 8,589,149	X		X	X	X	X
Farm Advisor Office	43 N Green St	Sonora	95370	3,630	1965	$ 633,193	X				X	X
Francisco Building	48 W Yaney Ave	Sonora	95370	57,005	1983	$ 11,116,343	X		X	X	X	X
Memorial Hall	18375 Fir St	Tuolumne	95379	11,610	1936	$ 2,739,667	X		X		X	X
Pool Chemical Storage	18625 Main St	Tuolumne	95379	580	1975	$ 148,611	X				X	X
Tuolumne Pool	18625 Main St	Tuolumne	95379	4,129	2016	$ 680,932	X				X	X
Pool Bath House	18625 Main St	Tuolumne	95379	784	1975	$ 102,025	X				X	X
Band Stand / Gazebo	West Side Memorial Park	Tuolumne	95379	400	1975	$ 25,574	X				X	X
County Yard Equipment Shed	18870 Birch St	Tuolumne	95379	4,180	1950	$ 142,628	X		X		X	X
County Yard Office / Library	18870-18880 Birch St	Tuolumne	95379	1,326	1950	$ 142,628	X		X		X	X
Field Restrooms / Snack Shack	Jerry Whitehead Field	Tuolumne	95379	366	1950	$ 48,907	X				X	X
Baseball Bleachers / Storage	Jerry Whitehead Field	Tuolumne	95379	598	1950	$ 78,448	X				X	X
County Yard Vehicle Service Building	10727 N Airport Rd	Columbia	95310	5,521	1960	$ 491,085	X		X		X	X
County Yard Shop Building	10727 N Airport Rd	Columbia	95310	2,758	1960	$ 299,505	X		X	X	X	X
County Yard Warehouse Building	10727 N Airport Rd	Columbia	95310	2,800	1960	$ 223,631	X		X	X	X	X

Fuel Shed	10727 N Airport Rd	Columbia	95310	66	1960	$ 2,166	X		X	X	X	X
Airport Admin Offices	10723 Airport Rd	Columbia	95310	1,739	1980	$ 224,421	X				X	X
Airport Terminal	10723 Airport Rd	Columbia	95310	2,706	1935	$ 400,215	X				X	X
Airport Hangar	10723 Airport Rd	Columbia	95310	960	1955	$ 70,935	X				X	X
Airport / Courtney	10723 Airport Rd	Columbia	95310	4,026	1965	$ 444,478	X		X	X	X	X
Ag Comm Lab	22365 S Airport Rd	Sonora	95370	592	1985	$ 64,741	X		X	X	X	X
Airport Hanger A	10723 Airport Rd	Columbia	95310	26,100	1960	$ 242,007	X		X	X	X	X
Airport Hanger B	10723 Airport Rd	Columbia	95310	4,582	1960	$ 247,769	X				X	X
Airport Hanger C	10723 Airport Rd	Columbia	95310	4,582	1960	$ 247,769	X				X	X
Airport Hanger D	10723 Airport Rd	Columbia	95310	4,582	1960	$ 247,769	X				X	X
Airport Hanger E	10723 Airport Rd	Columbia	95310	4,582	1960	$ 247,769	X				X	X
Airport Hanger F	10723 Airport Rd	Columbia	95310	10,350	1980	$ 512,450	X				X	X
Airport Hanger G	10723 Airport Rd	Columbia	95310	8,250	1980	$ 417,148	X				X	X
Equipment	Bald Mountain Rd	Columbia	95310	160	0	$ 69,167	X		X	X	X	X
Equipment	Elizabeth Peak Rd	Columbia	95310	400		$ 69,167	X				X	X
County Yard	18165 7th Ave	Jamestown	95327	945	1945	$ 30,226	X		X	X	X	X
County Yard	18188 7th Ave	Jamestown	95327	4,387	1950	$ 401,880	X		X	X	X	X
County Yard	18188 7th Ave	Jamestown	95327	216	1950	$ 4,795	X		X	X	X	X
County Yard	18188 7th Ave	Jamestown	95327	96	2000	$ 2,777	X		X	X	X	X
County Yard Office Bldg	18165 7th Ave	Jamestown	95327	504	1950	$ 65,174	X		X	X	X	X
County Yard Storage Shed #3	18165 7th Ave	Jamestown	95327	117	1970	$ 3,176	X		X	X	X	X
Community Hall / Sheriff's Office	18250-18254 Main St	Jamestown	95327	3,312	1910	$ 578,842	X				X	X
Patterson Field Bleachers	10633 Reservoir Rd	Jamestown	95327	904	1955	$ 82,213	X		X	X	X	X
Patterson Field Dugouts	10633 Reservoir Rd	Jamestown	95327	488	1955	$ 109,431	X				X	X
Patterson Field Restroom	10633 Reservoir Rd	Jamestown	95327	300	1955	$ 12,901	X				X	X
Patterson Field Storage	10633 Reservoir Rd	Jamestown	95327	200	1955	$ 45,009	X				X	X

Patterson Field Snack Shack	10633 Reservoir Rd	Jamestown	95327	175	1955	$ 21,032	X				X	X
County Yard	11242 Wards Ferry Rd	Big Oak Flat	95305	3,956	1960	$ 354,635	X		X		X	X
County Yard	11242 Wards Ferry Rd	Big Oak Flat	95305	960	1950	$ 67,409	X		X		X	X
County Yard	11242 Wards Ferry Rd	Big Oak Flat	95305	224	1950	$ 7,557	X		X		X	X
County Yard	11242 Wards Ferry Rd	Big Oak Flat	95305	104	1950	$ 3,008	X		X		X	X
County Yard	11242 Wards Ferry Rd	Big Oak Flat	95305	1,082	1950	$ 78,225	X		X		X	X
County Yard	11242 Wards Ferry Rd	Big Oak Flat	95305	900	1950	$ 26,659	X		X		X	X
Airport Admin Office	20960 Elderberry Way	Groveland	95321	576	1980	$ 74,087	X				X	X
Pine Mountain Firehouse #3	20960 Elderberry Way	Groveland	95321	512	1982	$ 56,754	X				X	X
County Yard	22099 Lava Rd	Twain Harte	95383	1,100	1960	$ 40,708	X		X		X	X
County Yard Garage Building	20740 Hwy 108	Pinecrest	95364	3,747	1955	$ 341,369	X		X		X	X
County Yard	30740 Hwy 108 Pinecrest Dump Rd	Pinecrest	95364	1,400	1955	$ 83,832	X		X		X	X
County Yard	30740 Hwy 108 Pinecrest Dump Rd	Pinecrest	95364	2,130	1955	$ 113,895	X		X		X	X
County Yard	30740 Hwy 108 Pinecrest Dump Rd	Pinecrest	95364	336	1955	$ 10,582	X		X		X	X
Facilities 59-234-02	16319 Stent Cutoff Rd	Sonora	95370	1,288	1857	$ 190,288	X				X	X
Merlo Field Clubhouse	18490 Standard Rd	Sonora	95370	2,470	1982	$ 485,992	X				X	X
Merlo Field Bleachers	18490 Standard Rd	Sonora	95370	800	1982	$ 92,535	X				X	X
Merlo Field Play Structure	18490 Standard Rd	Sonora	95370	200	1982	$ 14,677	X				X	X
Pioneer Park Bleachers	10900 N Airport Rd	Columbia	95310	378	1975	$ 53,705	X				X	X
Storage Building	10900 N Airport Rd	Columbia	95310	110	1975	$ 6,678	X				X	X
Restroom Building	10900 N Airport Rd	Columbia	95310	294	1975	$ 29,556	X				X	X
Park Play Structure	10900 N Airport Rd	Columbia	95310	200	1975	$ 14,415	X				X	X

Vehicles	2 S Green St	Sonora	95370	0		$ 18,843,000	X		X	X	X	X
Behavioral Health & Enrichment Center	101 E Hospital Rd	Sonora	95370	5,242	1987	$ 1,157,475	X		X	X	X	X
Human Services Office	20075 Cedar Rd N	Sonora	95370	21,075	1986	$ 2,930,774	X		X	X	X	X
Main Library	480 Greenley Rd	Sonora	95370	15,992	1987	$ 3,926,720	X		X	X	X	X
Contractor's Equipment	2 S Green St	Sonora	95370	0	0	$ 3,208,163	X		X	X	X	X
Fire Station #55	55 Pinecrest Ave	Pinecrest	95364	2,542	1975	$ 190,403	X		X		X	X
Ag / Air Pollution Office	22365 S Airport Rd	Columbia	95310	1,920	1985	$ 443,113	X				X	X
Senior Center	540 Greenley Rd	Sonora	95370	9,672	1990	$ 1,828,144	X		X	X	X	X
Storage #1 & Storage #2	540 Greenley Rd	Sonora	95370	240	1990	$ 3,082	X		X	X	X	X
Station #58	24190 Kewin Mill Rd	Cedar Ride	95924	1,276	1984	$ 187,913	X		X	X	X	X
Station #56	16925 Mono Vista Rd	Sonora	95370	1,876	1970	$ 255,463	X		X	X	X	X
Station #52	14041 Park Ave	Sonora	95370	2,000	1965	$ 307,388	X		X	X	X	X
Station #61	13875 Hwy 120	Chinese Camp	95309	2,000	1990	$ 314,012	X		X		X	X
Station #63	23260 Elmore Rd	Groveland	95321	1,356	1988	$ 205,503	X		X		X	X
Station #64	2990 Hwy 132	La Grange	95329	2,000	1960	$ 292,623	X		X		X	X
County Coroner / Warehouse	229 W Jackson St	Sonora	95370	4,700	1960	$ 405,790	X		X	X	X	X
Human Services Building	20111 Cedar Rd N	Sonora	95370	15,621	1983	$ 2,159,691	X		X	X	X	X
Public Defenders Office	99 N Washington St	Sonora	95370	5,078	1949	$ 1,116,654	X		X	X	X	X
Telephone Equipment	2 S Green St	Sonora	95370			$ 1,083,277	X		X	X	X	X
Animal Control Facility	10040 Victoria Way	Jamestown	95327	17,250	1997	$ 2,468,628	X		X	X	X	X
Ambulance Medic Residence	20591 N Sunshine Rd	Sonora	95370	2,703	1985	$ 627,123	X		X	X	X	X
Ambulance Garage	20591 N Sunshine Rd	Sonora	95370	800	1985		X				X	X
Sunshine Advocacy Center	20591 N Sunshine Rd	Sonora	95370	3,689	2009	$ 819,964	X		X	X	X	X
Fire Station #57	21720 Phoenix Lake Rd	Sonora	95370	1,728	1998	$ 235,187	X		X	X	X	X

Fire Station #53	20810 Tomira Meadows	Tuolumne	95379	1,764	2002	$ 234,665	X		X	X	X	X
County Airport	10713 Airport Rd	Columbia	95310	950	1950	$ 53,984	X		X	X	X	X
Airport AWOS	10723 Airport Rd	Columbia	95310	407	1960	$ 74,401	X		X	X	X	X
Airport Armory	10800 Airport Rd	Columbia	95310	10,500	1940	$ 890,187	X		X	X	X	X
Airport Shop #2	10723 Airport Rd	Columbia	95310	960	1940	$ 29,396	X		X	X	X	X
Airport Office	10749 Airport Rd	Columbia	95310	289	1973	$ 8,774	X		X	X	X	X
County Airport	10747 Airport Rd	Columbia	95310	159	1975	$ 4,925	X		X	X	X	X
County Airport	10753 Airport Rd	Columbia	95310	228	1975	$ 6,850	X		X	X	X	X
County Airport	10767 Airport Rd	Columbia	95310	196	1960	$ 5,991	X		X	X	X	X
County Airport	10723 Airport Rd	Columbia	95310	171	1966	$ 5,846	X		X	X	X	X
County Airport	10723 Airport Rd	Columbia	95310	16,000	1950	$ 868,489	X				X	X
County Airport	10723 Airport Rd	Columbia	95310	16,371	1980	$ 717,707	X				X	X
County Airport	10723 Airport Rd	Columbia	95310	14,650	1980	$ 642,258	X				X	X
County Airport	10723 Airport Rd	Columbia	95310	14,650	1980	$ 642,258	X				X	X
County Airport	22353B S Airport Rd	Columbia	95310	2,500	1950	$ 110,972	X		X	X	X	X
Ag Comm /Storage Lab	22365 S Airport Rd	Columbia	95310	700	1977	$ 106,882	X		X	X	X	X
Campground Clubhouse	10723 Airport Rd	Columbia	95310	3,920	1967	$ 398,624	X		X	X	X	X
Jamestown Youth Center	10540 7th St	Jamestown	95327	1,440	1950	$ 218,474	X		X	X	X	X
Columbia Pool	22540 Parrotts Ferry Rd	Columbia	95310	0	1950		X				X	X
Archive Building	490 Greenley Rd	Sonora	95370	7,488	1999	$ 1,373,347	X				X	X
Patrol Building	11 Elm St	Sonora	95370	1,450	1999	$ 153,968	X		X	X	X	X
Groveland Library / Museum	18990 Hwy 120	Groveland	95321	4,284	1999	$ 1,206,715	X		X	X	X	X
District Attorneys' Office	423 N Washington St	Sonora	95370	9,625	1960	$ 1,414,567	X		X	X	X	X
Community Meeting Room	24411 Sierra Park Dr	Mi Wuk	95346	1,069	1958	$ 135,044	X		X	X	X	X
Library Branch	18701 Tiffeni Rd Ste 1E & F	Twain Harte	95383	1,713	1985		X		X	X	X	X

Playground Equipment	480 Greenley Rd	Sonora	95370	2,400	2000	$ 402,547	X				X	X
Bath House / Office	23075 Fuller Rd	Twain Harte	95383	850	1998	$ 224,370	X				X	X
Pump House	23075 Fuller Rd	Twain Harte	95383	200	2014	$ 181,527	X				X	X
Pool	23075 Fuller Rd	Twain Harte	95383	6,000	2014	$ 946,026	X				X	X
Rocca Park Restroom	18226 Main St	Jamestown	95327	384	2003	$ 102,430	X		X	X	X	X
Rocca Park Gazebo	18226 Main St	Jamestown	95327	200	1982	$ 59,317	X		X	X	X	X
Rocca Park Restroom	18226 Main St	Jamestown	95327	200	1975	$ 16,627	X				X	X
Tuolumne County Office / Storage	12980 Clements Rd	Pine Mountain Lake	95321	1,164	1988	$ 260,645	X		X		X	X
Boat Patrol / Search & Rescue	10915 N Airport Rd	Columbia	95310	4,500	1980	$ 180,419	X		X		X	X
Sheriff's Sub Station	13769 Unit D Mono Way	Sonora	95370	2,000	1984	$ 190,343	X		X	X	X	X
Sheriff's Sub Station	1274 Mueller Dr	Groveland	95321				X		X		X	X
Sheriff's Sub Station	22698 Meadow Drive	Twain Harte	95364	750	1930	$ 49,665	X		X		X	X
Children's Shelter	20635 N Sunshine Rd	Willow Springs	93560	4,836	2004	$ 799,570	X		X		X	X
Library / Museum Building	18990 Hwy 120	Groveland	95321	10,758	2001	$ 2,232,246	X		X		X	X
Leased Copiers	2 S Green St	Sonora	95370	0		$ 441,203	X		X	X	X	X
Ambulance Groveland	11850 Powder House Rd	Groveland	95321	1,386	2003	$ 453,223	X		X		X	X
Airport Columbia House	10915 N Airport Rd	Columbia	95310	7,184	1966	$ 947,843	X		X		X	X
Fire Station Mi-Wuk #77	1 Pinecrest Ave	Pinecrest	95346	885	1958	$ 201,656	X		X		X	X
Tuolumne Youth Center / Library	18636 Main St	Tuolumne	95379	4,320	2004	$ 1,353,344	X		X		X	X
Computer Equipment	2 S Green St	Sonora	95370			$ 3,490,086	X		X	X	X	X
Information Systems & Services	1015 Morning Star Dr	Sonora	95370	6,510	2004	$ 1,359,448	X		X	X	X	X
Facilities Mgmt Storage Building	229 W Jackson St	Sonora	95370	1,500	1930	$ 203,719	X		X	X	X	X
Fire Station 54 / School	25910 Long Barn Rd	Long Barn	95335	7,194	1958	$ 1,092,899	X		X		X	X

Fire Administration / Ambulance	18440 Striker Ct	Sonora	95370	11,360	2006	$ 3,266,718	X		X	X	X	X
Rocca Park Jail	18226 Main St	Jamestown	95327	400	1852	$ 105,953	X		X	X	X	X
Historic "Ball" Mill	21250 Hwy 120	Groveland	95321				X		X		X	X
Jamestown Mine HazMat Locker	17855 High School Rd	Sonora	95370	440	2010	$ 87,966	X		X	X	X	X
Facilities Office	9 Calaveras St	Sonora	95370	6,400	1991	$ 20,396	X		X	X	X	X
Office Building	17857 High School Rd	Sonora	95370	3,200	1950	$ 515,781	X				X	X
Vacant House	17600 Field Stone Rd	Jamestown	95327	2,750	1965	$ 283,144	X				X	X
Hazardous Waste Locker / Cargo Cont	17855 High School Rd	Jamestown	95327	3,200	2010	$ 40,071	X		X	X	X	X
Reconditioned Cargo Cont	10700 Merrel Rd	Groveland	95321	3,200	2006	$ 38,481	X				X	X
Behavioral Health House	1180 S Washington St	Sonora	95370	2,568	2008	$ 414,233	X				X	X
Inmate Housing	12915 Justice Center Dr	Sonora	95370	69,000			X				X	X
Reconditioned Cargo Cont	20740 Pinecrest Rd	Pinecrest	95364	320	2006	$ 4,101	X				X	X
County Airport	22353B S Airport Rd	Columbia	95310	6,300	1955	$ 260,139	X				X	X
County Airport	22353B S Airport Rd	Columbia	95310	3,600	1970	$ 148,651	X				X	X
Juvenile Detention Center	12785 Justice Center Dr	Sonora	95370	22,114	2017	$ 16,000,000	X				X	X
Pinecrest School	2 Pinecrest School Rd	Pinecrest	95364				X				X	X
Sheriff	19890 Cedar Road	Sonora	95370				X				X	X
Sheriff	19890 Cedar Road	Sonora	95370				X				X	X
Community Resource Center	18241 Bay St	Tuolumne	95379	9,770	2022	$ 10,000,000	X				X	X
Community Resource Center	18986 Ferretti Rd	Groveland	95321		2022	$ 10,000,000	X				X	X
Kennedy Meadows	42421 CA-108	Pinecrest	95346				X				X	X
Tuolumne County Transit Center	Justice Center Drive	Sonora	95370			$ 2,562,855	X				X	X

Transportation System Replacement Cost Breakdown

Tuolumne County Roads Division is responsible for maintenance of 610.33 miles of roads:

1)	miles of arterials (16 miles @ $3,000,000 per mile)	$48 million
2)	86.33 miles of major collectors (86 miles @ $1,500,000 per mile)	$129 million
3)	104.59 miles of minor collectors) (104@ $1,000,000 per mile	$104 million
4)	403.65 miles of local roads (404 miles @ $500,000 per mile)	$202 million

Tuolumne County Community Service Areas (CSA):

1)	31 miles of CSA roads (31 miles @ $500,000 per mile)	$15.5 million

Tuolumne County Bridges:

54 bridges at an average cost of $4 million per bridge structure	$216 million

Road Yards:

1)	West Division Yard and burn dump	$1 million
2)	East Division Yard and Quonset hut	$1 million
3)	South Division Yard	$1 million
4)	Columbia shops	$5 million

Vehicle & Equipment Fleet:	$34 million
Roads, bridges, and support structures total cost:	***$756 million***

E. Methodology Used

To determine the number of critical structures and infrastructure at risk, a combination of field surveys, aerial photos and GIS maps, and Google Earth software was used. The methodology used in preparing the Vulnerability Estimate consisted of determining the value of critical buildings and facilities from insurance property schedules. Critical infrastructure values were

established by using actual replacement costs which were determined by recent comparable replacement projects.

F. Loss Estimations

Dollar losses to buildings and infrastructure vary depending upon the natural hazard occurring and the severity of the hazard. In general, earthquakes can extensively damage a wide area therefore critical structure and infrastructure losses should be estimated at a 100% value. Destruction from flooding takes place in specific areas and the damage is historically less severe than that of an earthquake. Thus, the estimated loss as a result of flooding should be calculated at the 50% level. Damage resulting from Wildfires should be calculated at 25% of structural value for those structures located within 300 feet of the wildfire areas. Extreme weather could impact any portion of the jurisdiction. Historical data indicates that these events are extremely localized and a 10% loss should be anticipated.

G. Development Trend Analysis

While the population of Tuolumne County has not grown significantly in the past five years, there are Land Use policies and elements within the County General Plan to help assure orderly development when it does occur. There has been no significant development within the County since the approval of the 2013 Multi-Jurisdictional Hazard Mitigation Plan. Because of the expected stasis in population of the County, all hazards are expected to keep the same impacts to the County.

In addition, the Local Agency Formation Commission (LAFCO) of Tuolumne County is tasked with the mission to provide an orderly pattern of growth that reconciles the varied needs of the County. One of the fundamental principles of LAFCO is to ensure the establishment of an appropriate and logical municipal government structure for the distribution of efficient ad appropriate public services. LAFCO Land Use Objectives include:

- The discouragement of urban sprawl
- Preservation of the physical and economic integrity of agricultural lands
- Preservation of open space within urban development patterns
- Orderly formation and development of agencies by shaping local agency boundaries
- The minimization of agencies providing services to a given area
- Utilization of Spheres of Influence to guide future development of agency boundaries.

VII. CAPABILITY ASSESSMENT

A. Code of Federal Regulations Requirements

44 CFR Requirement §201.6(c)(3) [The plan shall include the following:] A mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs, and resources, and its ability to expand on and improve these existing tools.

B. Overview

An important component of the Mitigation Strategy is an understanding of the resources available to the County in order to mitigate the effects of each of the identified hazards. The Capability Assessment begins with a review of legal and regulatory capabilities, including ordinances, codes, and plans needed to address hazard mitigation activities. This assessment also describes the administrative and technical capability available to each jurisdiction. The third component of the Capability Assessment is each jurisdiction's fiscal capability to ensure the availability of financial resources to implement proposed mitigation strategies. Next, is a discussion of the community's general willingness to implement mitigation measures. The final part of the Capability Assessment is a review of the physical assets available to respond to the emergency needs of the community.

B. Legal and Regulatory

The County has applicable Building Codes, Zoning Ordinances, Subdivision Regulations, Capital Improvement Plan, and other regulatory development guidelines which enable it to provide specific support and expand upon and improve hazard mitigation activities within the County and in each of the un-incorporated communities. The County of Tuolumne and the City of Sonora have participated in the National Flood Insurance Program (NFIP) since April of 1978 and October of 1975 respectively. Additionally, the County General Plans, Multi-hazard Emergency Response Plans, and Disaster Recovery Plans provide additional authority. Further, participation in the County's Hazardous Waste Management Plan (HWMP) ensures compliance with hazardous materials regulations.

Tuolumne County Emergency Operations Plan (EOP)

The County's EOP establishes the overarching roles, responsibilities, and coordination between various Tuolumne County government agencies (especially first responder agencies), jurisdictional and federal partners, private-sector partners, community groups, and the public before, during and after an emergency or disaster situation. This plan was updated and formally adopted in March 2024 and can be found here.

Tuolumne County General Plan

California state law requires each city and county to adopt a general plan "for the physical development of the county or city, and any land outside its boundaries which bears relation to its planning" (Section 65300 of the California Government Code).

General plans in California are required to have seven mandatory elements, and the Tuolumne County General Plan includes those seven plus several other optional elements for a total of thirteen including: Land Use; Circulation; Housing; Conservation and Open Space; Noise; Safety; Public Facilities and Services; Recreation; Cultural Resources; Economic Development; Agricultural; Air Quality; and Community Identity. Natural hazards and mitigation are addressed directly or indirectly in at least four of these elements: Land Use; Conservation and Open Space; Safety; and Public Facilities and Services. The General Plan establishes the overall vision for growth and development in the County. The Safety Element within that plan identifies hazards that could impact the County and can establish policy for the MJHMP.

2020 Urban Water Plan for Tuolumne Utilities District (UWMP)

This document is a long-term, general planning document for water supply and demand management. It is part of Tuolumne Utility District's (TUD) long-range resource planning to ensure water service reliability for TUD's customers, especially during multiple-year drought periods or other natural or ma made supply interruptions. The document provides a plan of action to be followed during the various stages of a water shortage.

Legal Authority

Local governments in California have a wide range of tools available to them for implementing mitigation programs, policies and actions. A hazard mitigation program can utilize any or all of the government powers granted by the State of California, which include:

- **General Police Power** The general police power of Tuolumne County is typically enacted and enforced with ordinances, which define, prohibit, regulate or abate acts, omissions, or conditions detrimental to the health, safety, and welfare of the people, and to define and abate nuisances, including public health nuisances.

  Since hazard mitigation can be included under the police power as protection of public health, safety and welfare, towns, cities and counties may include requirements for hazard mitigation in local ordinances. Local governments may also use their ordinance making power to abate "nuisances," which could include any activity or condition making people or property more vulnerable to a hazard.

- **Building Codes, Permitting and Inspection** Construction within the County must meet the standards of the California Building Code. The County's Community Resource Agency - Building and Safety Division, reviews proposed subdivisions and building

plans, and conducts site inspections to ensure applicable codes are followed. Additionally, the County Fire Department reviews proposed projects for enforcement of the California Fire Code.

- **Zoning Ordinances** are based on the County's General Plan for the Count and are enacted to promote the public health, safety, comfort and general welfare through the County. Zoning ordinances can restrict where and how development can occur within the County and can be used to restrict building and development in known risk areas.

- **Land Use Regulations** Land use regulatory powers include planning, enacting and enforcing zoning ordinances, floodplain ordinances, and land division controls. Local government can control the amount, timing, density, quality and location of new development in order to reduce a community's vulnerability to naturally occurring hazards. In conclusion, unsafe development in hazard prone areas can be prevented through local planning, zoning and development review by Tuolumne County Community Resource Agency – Planning Division.

- **Acquisition/Eminent Domain** California legislation empowers cities, towns and counties to acquire property for public purpose by gift, grant, devise, bequest, exchange, purchase, lease or eminent domain. Tuolumne County can and has used acquisition as a tool for pursuing local mitigation goals. This reduces or eliminates the possibility of unsafe development occurring.

- **Taxation** California law gives local government the power to levy taxes and special assessments. The power of taxation extends beyond merely the collection of revenue and can have a profound impact on the pattern of development in the community. Communities in some states have the power to set preferential tax rates for areas which are more suitable for development in order to discourage development in otherwise hazardous areas. California does not allow cities or counties to increase tax rates beyond the base rate, except with voter approval. A community can pursue voter approval of a bond or similar mechanism to increase the property tax to be used for a specific purpose. Often used for schools, the increase could be used for a fuel break program or other hazard reduction program. While voter approval of such measures is difficult to obtain it is not impossible; the Mi-Wuk Sugar Pine Fire Protection District passed a ballot measured in 2010 that allowed for increased revenue for the district.

- **Spending/Budget** Local governments have the power to make expenditures in the public interest. Hazard mitigation principles can be made a routine part of all spending decisions made by the local government, including the adoption of budgets and a Capital Improvement Plan (CIP).

A CIP is a schedule for the provision of municipal or county services over a specified period of time. Capital programming, by itself, can be used as a growth management technique, with a view to hazard mitigation. By tentatively committing itself to a timetable for the provision of capital to extend services, a community can control growth to some extent especially in areas where the provision of on-site sewage disposal and water supply are unusually expensive.

In addition to formulating a timetable for the provision of services, a local community can regulate the extension of and access to services. A CIP that is coordinated with extension and access policies can provide a significant degree of control over the location and timing of growth. These tools can also influence the cost of growth. If the CIP is effective in directing growth away from environmentally sensitive or high hazard areas, for example, it can reduce environmental costs.

C. Administrative and Technical

The County of Tuolumne has experienced and competent administrative and technical staff in place to expedite the mitigation actions identified. They possess technical expertise in the areas of planning, engineering, floodplain management, Geographic Information Systems (GIS), and both emergency and general management authority. Additionally, professional contractors with technical and administrative resources are available to assist the staff in implementing the hazard mitigation goals.

Tuolumne County Board of Supervisors

The Board oversees the management of the County government and special districts. The Board adopts ordinances, resolutions, and minute orders within the limits prescribed by State Law. As an executive body, the Board establishes policy, approves the annual budget, conducts public hearings on land use, committees, commissions, and certain special districts. The Board also serves as the Joint Powers Authority Board for the Tuolumne Public Power Agency, the Air Pollution Control Board, and the Board of Equalization. All of these entities drive safe and sane expansion and mitigation within the County.

Tuolumne County Community Development Department

The Community Development Department (CDD) oversees and provides guidance on the development processes for Tuolumne County, including zoning, land use and natural resources, housing, environmental health, and building and safety as well as oversite of the code compliance ordinance to the public. In addition to development services, CDD also provides regulatory oversite of the consumer protection programs and CUPA programs for Tuolumne County including operations as the Local Enforcement Agency for solid waste and recycling related matters. CDD provides staff support to multiple committees and commissions, including the Airport Land Use Commission, Tuolumne County Planning Commission, the Local Agency Formation Commission, the Board of Supervisors Planning Committee, the Board of

Supervisors Housing Loan Review Committee, the Board of Supervisors Housing Policy Committee, the Board of Supervisors Transportation Committee and the Historic Preservation Review and Demolition Review Committee.

Tuolumne County Public Works Department

Public Works provides road maintenance, engineering, solid waste, surveying, and airport services to the public. This department conducts a variety of activities including road, bridge, sidewalk, storm drain and traffic signal construction and maintenance, capital projects engineering, surveying, GIS, airport operations, fleet services, solid waste system oversight and support, conditioning of development projects, and permitting for grading/encroachments/special events.

D. Financial

To achieve the goals and objectives of the Mitigation Strategy, one or more of the following funding sources could be utilized: federal and state entitlements and grants, general fund, sales and property taxes, infrastructure user fees, impact fees, and new development impact fees and grant funding (FEMA, Cal OES). All of the agencies studied have the necessary budgetary tools and practices in place to facilitate handling appropriate funds; however, funding sources are currently very limited.

E. Political Will of Community

Tuolumne County's active fire history has enabled residents to become knowledgeable about the natural hazards potentially impacting their community and has increased their familiarity with the concept of mitigation. For this reason, the community fully supports hazard mitigation strategies and is open to implementing changes that will make their County and its residents safer.

F. Physical Assets

Law Enforcement

The Tuolumne County Sheriff's Department has primary responsibility for law enforcement within the County. The Department relies on paid staff, a small reserve staff, and a number of volunteer groups to provide law enforcement services in the County.

The Department is composed of an elected Sheriff, an appointed Undersheriff, 2 Captains, 2 Lieutenants, 11 Sergeants, and 52 deputies, 1 Jail Commander, 6 Jail Sergeants, 32 Jail Deputies, a Communications Supervisor, 12 full time Dispatchers, 2 part time Dispatcher and 9 administrative/clerical support personnel.

In addition to the paid professional personnel the department is supported by volunteer groups. These include the following:

The Community Assistance Patrol (CAP) performs a multitude of duties which may include serving subpoenas, vacation checks, handicap parking enforcement, motorist assists, victim witness transport, crime scene security, property bookings, etc.

The Marine Enforcement Unit - Boat Patrol volunteers assist the uniformed deputies in patrolling the four main lakes in Tuolumne County. Boat Patrol volunteers may assist uniformed deputies in the following activities; boat patrol, accident investigations, vessel assistance, boating safety presentations and vessel inspections.

Tuolumne County Search and Rescue (TCSAR) is one of the oldest teams in continuous service in the state of California. This team ranks among the five busiest, with an average of 60 missions per year. Composed of 6 uniformed Deputies, 30 volunteers, TCSAR has saved hundreds of lives. Tuolumne County is a central location for numerous tourist attractions including all seasonal mountain and water recreational sports, therefore TCSAR maintains a steady mission-call volume throughout the year. TCSAR disciplines include medical extrication, search and mountain rescue using ground, mounted, and air, swift-water rescue, dive recovery, Nordic patrol, OHV rescue, and technical rope rescue, specializing in both high and low angle operations.

Fire Service

The Tuolumne County Fire Department (TCFD), through a cooperative fire protection agreement with the California Department of Forestry and Fire Protection (CAL FIRE) provides fire protection within the County's jurisdictional responsibility. Within the County, TCFD/CAL FIRE along with three Fire Districts, one Tribal Fire Department, and one City Fire Department, provide life and property emergency response. In addition to services traditionally provided by most fire protection agencies nationwide, the County has the responsibility of addressing a significant wildland fire problem. Wildland fires constitute the most significant major disaster threat in the County.

The fire protective services in Tuolumne County responded to 8,829 emergency calls during the 2023 calendar year, and currently serve approximately 54,000 residents in an area of more than 2,200 square miles.

These fire protective services rely on paid staff, part-time staff and volunteer firefighters who provide fire suppression, emergency medical services, public education, fire prevention and investigation, and other related services to the citizens and visitors of Tuolumne County. The departments also participate in automatic and mutual aid agreements throughout the County and provide fire apparatus to the State-wide mutual aid system as requested.

The TCFD/CAL FIRE is equipped with 18 Engines (5 career-staffed), 6 Water Tenders, 1 Rescue Squad, 1 Breathing Support Unit, 1 Fleet Service Unit, 1 Fire Boat, 4 snowmobiles, and 12 utility vehicles.

The other fire agencies have a variety of fire engines, water tenders, rescue units, and utility vehicles available for emergency response.

G. Education and Outreach

The following table identifies the methods used for education and outreach to the citizens of Tuolumne County to mitigate hazards.

Program/ Organization	Yes/No	Describe Program/Organization and how it relates to disaster resilience and mitigation.
Local Citizen Groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Y	Community Emergency Response Team/ Community Assistance Patrol/ Tuolumne County Search and Rescue/ American Red Cross
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Y	OES is committed to fostering resilient communities through proactive wildfire preparedness. Our outreach and education initiatives at community events aim to equip individuals with the knowledge and tools needed to safeguard themselves and their loved ones in the face of potential wildfires and other natural disasters. Some of our key messages are as follows: We emphasize the importance of having a ”Go Bag” ready at all times. This bag should contain the essentials that can sustain you for at least 72 hours. Recognizing the critical nature of a timely evacuation. We guide attendees on creating a plan tailored to their needs. We advocate for families to develop a communications plan ensuring everyone can reach each other in case of separation. Staying informed is key to making informed decision, we encourage individuals to sign up for emergency alerts provided by the county. We also encourage personal accountability and ask the community to participate in efforts to mitigate wildfire risks.

Natural disaster or safety related school programs	Y	Great Shake Out/ Fire Drills
Storm Ready Certification	N	
Firewise Communities certification	N	We have 20 Firewise Communities within Tuolumne County
Public-private partnership initiatives addressing disaster-related issues	N	
Other	Y	County Fire personnel stress defensible space and provide handouts and press releases to ensure the community is aware of the fire hazard. Additional mitigation efforts include the use of emergency alert systems, such as Everbridge and IPAWS in the event of an imminent threat.

H. Current Capability Limitations and Opportunities for Expansion

Limitations

The County's most limiting factors for expanding capabilities are limited time and financial prospects. While grants are available, the application and management required for grants are time consuming and costly.

Opportunity for Expansion

Planning/Regulatory
Obtain funding to update the County's Capital Improvement Plan, which was last updated in 2012.

Admin/Technical
Hire a full-time County grant writer to research and apply for available grant opportunities.

Financial
Pursue FEMA Homeland Security Funding grant money in order to acquire FM Alter and NOAA Weather Radio Weather Receivers for the County.

Education/Outreach
Expand the number of Firewise communities into more areas within the County, with a particular focus on communities with limited ingress/egress options.

VIII. Plan Update

A. Code of Federal Regulations Requirements

44 CFR Requirement §201.6(d)(3) A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit it for approval within 5 years in order to continue to be eligible for mitigation project grant funding.

B. Population Change

The County's population has remained relatively stable in size, and distribution, only increasing by 1,541 residents since the plan update in 2019. One notable change is the number of residents in the County aged 65 and over, which increased by 3,338 individuals. This growth has made us more susceptible to the impact of natural hazards. There are more people that may have increased needs for evacuation assistance and less ability to address hazards on their property, which increases the County's overall vulnerability.

C. Changes in Development

Since 2019, there have been 1,082 Development Type Building permits finalized since 2019. The County has several large projects in various stages of development. Some of these include:

Terra Vi Lodge Yosemite – A 154,098 square foot mixed use lodge, at completion will have 240 hotel and cabins

Yonder Yosemite – A visitor serving development with 175 new free-standing guest suites

Firefall Ranch – A new resort under construction with more than 50 standalone cottages and villas on 300 acres

Under Canvas – A luxury tent camping resort project that will have 99 rental units over 80 acres

These new developments bring with them more tourists to our small county, and a new challenge for our existing alert and warning systems, which increase our County's overall vulnerability. However, as these developments were built to existing code, informed by land use

policies and in consideration of the Wildland Urban Interface, this has lowered the County's overall vulnerability.

D. Adoption of Local Policies

The County has adopted the 2022 California Building Code for enforcement as of January 1, 2023. The County is also updating our Title 17, Zoning Code within the County Code of Ordinances to align with the 2018 General Plan update. The Zoning Code Update aims to achieve additional County goals, including consistency with state and federal law; development processes that are transparent, predictable, and consistent; better response to community concerns; and promotion infill, mixed-use developments in Identified Communities. Newer, more stringent local policies reduce our overall risk exposure.

E. Mitigation Success Stories

Tuolumne County is covered by multiple jurisdictions. Approximately 75% of lands are Federally managed; the Stanislaus National Forest accounts for over half of that area, covering more than 600,000 acres in the County. Another approximately 360,000 acres fall under the State Responsibility Area. Like the rest of California, the County is increasingly threated by wildfire. A catastrophic wildfire has not occurred in the County has not occurs since the Rim Fire in 2013 but as fuel load in the forest and on property throughout the county continues to accumulate, the risk increases. To that end the County developed a Fuels Reduction Storyboard. This storyboard provides a single resource for displaying recently completed fuels reduction projects from multiple sources. This project can receive regularly updated information on fuels treatment projects from federal, tribal, local, state and non-profit agencies. Information gathered and stored will allow all entities within Tuolumne County who do regular fuels reduction work to collaborate and coordinate efforts such as grant applications.

F. Completed Mitigation Actions

#	2019 Mitigation Action Status	Completed	Continue in 2024 Plan
1A	Through newsletters, advertisements, speaking engagements and other public contacts, educate the general public and key stakeholders on the issues, responsibilities, and current efforts and successes in the area of disaster preparedness as they impact each agency.	Yes	Yes
1B	Conduct periodic workshops and exercise on the Emergency Notification Systems available to the public to ensure familiarity of the public to warning applications.	Yes	Yes

2A	Educate the County and City planning staffs, administrative staffs and elected officials on the importance of keeping current on trends and developments in disaster preparedness	Yes	Yes
2B	Encourage planning staffs to attend seminars and lectures on naturally occurring hazards so that they may better assist the appropriate governing bodies as the process future developments	Yes	Yes
2C	In order to better protect life and property, continue to develop a more accurate and comprehensive series of countywide GIS geology, fire and flood map data sets.	Yes	Yes
3.1A	To ensure that employees are available to assist during a major emergency, develop and adopt a family support plan for all jurisdictions and County Agencies .	No	Yes
3.1B	Review and when necessary, update the jurisdiction's Emergency Operations Plans and supporting documents	Yes	Completed
3.1C	Assist with Public Health Emergency Preparedness to plan and prepare for medical and healthcare impacts which would result from all hazards within the County	Yes	Yes
3.2A	Support the Tuolumne Water Agency to better protect public health by initiating a Watershed Sanitary Survey	No	Yes
3.2B	Assist in identifying opportunities for funding of additional egress routes within single-access areas in the event of evacuations.	Yes	Yes
3.2C	Support a study and seek funding to increase the raw water storage or establish a secure conveyance from Lyons Reservoir to ensure service for both domestic consumption and urban fire protection.	No	Yes
3.2D	Support development of improvements to wastewater systems by replacing or relining collection pipes to reduce sewer overflows and limit inflow and infiltration subsequently reducing the public health threat	No	Yes
3.2E	Support development of a program that would, in emergency situations, enable water districts and water companies to share water resources through interconnections	Yes	Yes
3.2F	Support development of a program to secure water rights for all of Tuolumne County	No	Yes

3.2G	Promote a county-wide sewer connection plan to reduce septic failure impacts and improve water quality.	Yes	Yes
3.2H	Promote land use recommendations that new developments occur adjacent to public water and wastewater facilities	Yes	Yes
3.3	Build and maintain communications throughout Tuolumne County all jurisdictions to assist in the response to emergencies.	Yes	Yes
4A	Work to improve localized flood prone areas through a combination of vegetation management and storm drain improvements (i.e. Sonora, Curtis, Sullivan, and Woods Creeks)	Yes	Yes
4B	Maintain compliance with the National Flood Insurance Program (NFIP) requirements	Yes	Yes
4C	Restrict construction of essential service facilities in the 100-year flood plain	Yes	Yes
4D	In order to better protect life and property, record a notice on properties located in flood zones utilizing FIRM maps and notify property owners of said action.	Yes	Yes
4E	Continue to work cooperatively with the state and federal flood related agencies for funding improvements through grant and agency programs.	No	Yes
4F	Seek funding sources for and initiate watershed improvement projects for the County.	No	Yes
5.1A	In order to assist fire prevention efforts and to better manage large fires when they occur, continue to improve GIS mapping and tracking efforts by gathering and maintaining relevant GIS data layers and imagery and utilizing the best available mapping applications and software.	Yes	Yes
5.1B	Continue to work with all jurisdictions to initiate fuel thinning and chipping projects in high priority areas. Collaborate with property owners and regulatory agencies in order to utilize prescribed fire on private and public-owned lands in the county	Yes	Yes

5.1C	Work with all jurisdictions to update as needed the Community Wildfire Protection Plans for the County so that they will continue to: Assess the fire hazard in the County, Prioritize treatment areas, enhance collaboration amongst all fire agencies and stakeholders, streamline environmental review processes	Yes	Yes
5.1D	Assist in the development of evacuation plans which includes possible sheltering in place at county schools	Yes	Yes
5.1E	Work with utilities districts to improve fire flow, system reliability and redundancy, and increased water supply in their responsibility areas.	Yes	Yes
5.1F	Protect water conveyance system by reducing fuels adjacent to wooden flumes.	Yes	Yes
5.1G	Work with the water districts to improve system reliability and redundancy, and increased water supply in their responsibility areas.	Yes	Yes
5.1H	Work with the utilities to improve the reliability of the electrical grid in and provide for emergency backup power supply to be used during power outages at critical water system facilities.	Yes	Yes
5.2A	Encourage participation of all Fire Agencies in the monthly Fire Chief Association meetings and support, when possible, efforts by the Association to improve fire protection and preventions efforts in the County.	Yes	Yes
5.2B	Encourage participation in cooperative automatic and mutual aid agreements between the County, the City of Sonora, Tribes and Districts	Yes	Yes
6A	Working with Cal OES, increase participation in earthquake preparedness activities such as the annual Great California Shake-Out drill.	Yes	Yes
6B	Continue to support the work of utility districts in replacing sewer and water lines and portions of the flume that are the most vulnerable to an earthquake or landslide.	Yes	Yes
7.1A	Analyze and remove hazards that threaten public safety due to the cascading effects of drought such as dry wells and tree mortality.	Yes	Yes
7.1B	Encourage water agencies to conduct water supply evaluations public water system to determine the effect of drought on community water supply.	Yes	Yes

7.1C	Work with the Water Agency and districts to increase groundwater supply and/or identify other alternate water sources to be used when drought and related reservoir operational requirements diminish the water supply available.	Yes	Yes

G. New Technology

Tuolumne County has recently gone live with outdoor audible alerts (sirens) within communities that may have limited connectivity and communication. These sirens can be used to notify the public in the case that evacuations were required.

Since the County's last plan update, we have also added the Everbridge system as a notification layer within the community. This technology can send messages via telephone, text message, and email to the public when there is a need for mass targeted, geo-targeted, evacuation or other emergency notifications in several languages. This technology can also alert via audio message and in multiple languages to alert populations with access and functional needs or limited-English Proficiency. This technology contributes to reducing our overall vulnerability.

H. New Community Assets and Capabilities

Since the last plan update in 2019, the Tuolumne County Fire Department has experienced some expansion.

Fire Service Asset	**2019**	**2024**
Engines	28	18
Water Tenders	5	6
Rescue Squad	1	1
Fast Attack Unit	1	0
Breathing Support Units	1	1
Fleet Services Unit	0	1
Fire Boat	0	1
Snowmobiles	0	4
Utility Vehicles	0	12
Law Enforcement Asset	**2019**	**2024**
Sheriff	1	1
Undersheriff	1	1
Captain	0	1
Lieutenants	3	2
Sergeants	11	8
Corporal	0	1
Deputy Sheriffs	52	48
Communications Supervisor	1	1
Dispatchers (full time)	12	5
Dispatcher Supervisor	0	1
Boat Patrol Deputy	0	1
Boat Patrol Sergeant	0	1

Administrative/Clerical	9	21

I. Previous Plan Integration

The 2019 plan has been integrated into several County plans, most notably the Community Wildfire Protection Plan (CWPP) and the Emergency Operations Plan (EOP), both adopted in March 2024. Both the CWPP and the EOP integrated the 2019 plan and aligns with the goals and mitigation actions identified in that plan.

IX. MITIGATION STRATEGY

A. Code of Federal Regulations Requirements

44 CFR Requirement §201.6(c)(3) [The plan shall include the following:] A mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs, and resources, and its ability to expand on and improve these existing tools. [The hazard mitigation strategy shall include a(n)]

(i) description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

(ii) section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure. All plans approved by FEMA after October 1, 2008, must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.

B. 2019 Goals Progress Report

	2019 Tuolumne County Goals	Notes
1	**Promote understanding and support for hazard mitigation by key stakeholders and the public within Tuolumne County.**	Ongoing: Education of key stakeholders and the public to increase awareness of hazards and opportunities of mitigating hazards.
2	**Ensure that future development is protected from natural disasters**	Ongoing: Increase awareness for businesses of natural hazards of that may occur in their community and what they can do to mitigate exposure and damages.
3	**Build and support local capacity and commitment to minimize the jurisdictions within Tuolumne County's vulnerability to potential hazards.**	Ongoing: Improved existing capabilities to manage emergency situations.

4	**Minimize the level of damage and losses to people, existing and future critical facilities, and infrastructure due to flooding**	Ongoing: enhanced the ability of community assets, particularly critical facilities, located in the 100 year floodplain to handle existing and projected flood levels.
5	**Minimize the level of damage and losses tor people, existing and future critical facilities, and infrastructure due to wildland fire**	Ongoing: enhanced collaboration amongst all fire agencies and stakeholders through regularly scheduled meetings.
6	**Minimize the level of damage and losses to people, existing and future critical facilities, and infrastructure due to geological events (earthquakes, volcanoes, landslides and sinkholes)**	Ongoing: continue public education and outreach to better prepare against a significant geological event including the Great Shake Out activities.
7	**Limit risk to, and impacts from hazardous materials spills, intentional discharges, illegal disposals, transportation accidents or system failures**	Completed: This has been addressed in the Emergency Operation Plan.
8	**Minimize the level of damage and losses to people, existing and future infrastructure, and critical facilities due to extreme weather.**	Ongoing: continue the comprehensive approach to reducing the level of damage and losses due to extreme weather and drought.

C. Goals

Tuolumne County MJHMP Goals and Action Updates – 2024

Goal 1:	**Promote and increase hazard education and risk awareness within Tuolumne County.**
Applies to:	All jurisdictions
Objective 1:	Educate key stakeholders and the public to increase awareness of hazards and opportunities for mitigating hazards.
Mitigation Action 1A:	Through newsletters, advertisements, speaking engagements and other public contacts, educate the general public and key stakeholders on the issues, responsibilities, and current efforts and successes in the area of disaster preparedness as they impact each agency.
Mitigation Action 1B:	Establish an interactive website for educating the public on hazard mitigation and preparedness measures.
Goal 2:	**Ensure that future development is protected from natural disasters.**

Applies to:	All jurisdictions
Objective 2:	Limit new development in hazardous areas, and as permissible, build to standards that will prevent or reduce damage.
Mitigation Action 2A:	Educate the County and City planning staffs, administrative staffs, and elected officials on the importance of keeping current on trends and developments in disaster preparedness.
Mitigation Action 2B:	Encourage planning staffs to attend seminars and lectures on naturally occurring hazards so that they may better assist the appropriate governing bodies as they process future developments.
Mitigation Action 2C:	In order to better protect life and property, continue to develop a more accurate and comprehensive series of countywide GIS geology, fire, and flood maps and data sets.

Goal 3:	**Build and support local capacity and commitment to minimize the jurisdictions within Tuolumne County's vulnerability to potential hazards.**
Applies to:	All jurisdictions
Objective 3.1:	Improve existing capabilities to manage emergency situations.
Objective 3.2:	Enhance the safety of residents, students, and staff within the community and jurisdictions.
Objective 3.3:	Enhance the communications between agencies to support emergency response.
Mitigation Action 3.1A:	To ensure that employees are available to assist during a major emergency, develop and adopt a family support plan for all jurisdictions and County Agencies.
Mitigation Action 3.1B:	Review and when necessary, update the jurisdiction's Emergency Operations Plans and supporting documents.
Mitigation Action 3.1C:	Assist with Public Health Emergency Preparedness to plan and prepare for medical and healthcare impacts which would result from all hazards within the County.
Mitigation Action 3.2A:	Support the Tuolumne Water Agency to better protect public health by initiating a Watershed Sanitary Survey.
Mitigation Action 3.2B:	Assist the County in identifying opportunities for funding of additional egress routes within single-access areas in the event of evacuations.
Mitigation Action 3.2C:	Support a study and seek funding to increase the raw water storage or establish a secure conveyance from Lyons Reservoir to ensure service for both domestic consumption and urban fire protection.
Mitigation Action 3.2D:	Make improvements to wastewater systems by replacing or relining collection pipes to reduce sewer overflows and limit inflow and infiltration subsequently reducing the public health threat.

Mitigation Action 3.2E:	Develop a program that would, in emergency situations, enable water districts and water companies to share water resources through interconnections.
Mitigation Action 3.2F:	Develop and support a program to secure water rights for all of Tuolumne County.
Mitigation Action 3.2G:	Promote a county-wide sewer connection plan to reduce septic failure impacts and improve water quality.
Mitigation Action 3.2H:	Promote land use recommendations that new developments occur adjacent to public water and wastewater facilities.
Mitigation Action 3.3:	Build and maintain communications throughout Tuolumne County all jurisdictions to assist in the response to emergencies.

Goal 4:	**Minimize the level of damage and losses to people, existing and future critical facilities, and infrastructure due to flooding.**
Applies to:	All jurisdictions
Objective 4:	Enhance the ability of community assets, particularly critical facilities, located in the 100-year floodplain to handle existing and projected flood levels.
Mitigation Action 4A:	Work to improve localized flood prone areas through a combination of vegetation management and storm drain improvements. (i.e., Sonora, Curtis, Sullivan, and Woods Creeks).
Mitigation Action 4B:	Maintain compliance with the National Flood Insurance Program (NFIP) requirements.
Mitigation Action 4C:	Restrict construction of essential service facilities in the 100-year flood plain.
Mitigation Action 4D:	In order to better protect life and property, record a notice on properties located in flood zones utilizing FIRM maps and notify property owners of said action.
Mitigation Action 4E:	Continue to work cooperatively with the state and federal flood related agencies for funding improvements through grant and agency programs.
Mitigation Action 4F:	Seek funding sources for and initiate watershed improvement projects for the County.
Mitigation Action 4G:	Study ways to improve drainage to prevent erosion on the steep slopes of the Curtis Creek campus and seek funding sources for mitigation.
Mitigation Action 4H:	Study ways to improve drainage to prevent erosion on the steep slopes of the Belleview School campus and seek funding sources for mitigation.
Mitigation Action 4I:	Work with Belleview School to identify and evaluate opportunities to create additional evacuation routes within the single-access areas in the district.

Goal 5:	**Minimize the level of damage and losses to people, existing and future critical facilities, and infrastructure due to wildland fires.**
Applies to:	All Jurisdictions
Objective 5.1:	Continue the comprehensive approach to reducing the level of damage and losses due to wildland fires through vegetation management, code enforcement, GIS mapping, and planning process.
Objective 5.2:	Enhance collaboration amongst all fire agencies and stakeholders.
Mitigation Action 5.1A:	To assist fire prevention efforts and to better manage large fires when they occur, continue to improve GIS mapping and tracking efforts by gathering and maintaining relevant GIS data layers and imagery and utilizing the best available mapping applications and software.
Mitigation Action 5.1B:	Continue to work with all jurisdictions to initiate fuel thinning and chipping projects in high priority areas. Collaborate with property owners and regulatory agencies in order to utilize prescribed fire on private and public-owned lands in the county.
Mitigation Action 5.1C:	Work with all jurisdictions to update as needed the Community Wildfire Protection Plans for the County so that they will continue to: Assess the fire hazard in the County Prioritize treatment areas Enhance collaboration amongst all fire agencies and stakeholders Streamline environmental review processes
Mitigation Action 5.1D:	Assist in the development of evacuation plans which includes possible sheltering in place at county schools
Mitigation Action 5.1E:	Work with utilities districts to improve fire flow, system reliability and redundancy, and increased water supply in their responsibility areas.
Mitigation Action 5.1F:	Protect water conveyance system by reducing fuels adjacent to wooden flumes.
Mitigation Action 5.1A	Work with the water districts to improve system reliability and redundancy, and increased water supply in their responsibility areas.
Mitigation Action 5.1H:	Work with the utilities to improve the reliability of the electrical grid in and provide for emergency backup power supply to be used during power outages at critical water system facilities.
Mitigation Action 5.2A:	Encourage participation of all Fire Agencies in the monthly Fire Chief Association meetings and support, when possible, efforts by the Association to improve fire protection and preventions efforts in the County.
Mitigation Action 5.2B:	Encourage participation in cooperative automatic and mutual aid agreements between the County, the City of Sonora, Tribes and Districts.

Goal 6:	**Minimize the level of damage and losses to people, existing and future critical facilities, and infrastructure due to geological events (earthquakes, volcanoes, landslides, and sinkholes).**
Applies to:	All jurisdictions
Objective 6:	Continue public education efforts to better prepare the citizens of Tuolumne County from the effects of a significant geological event.
Mitigation Action 6A:	Working with Cal OES, increase participation in earthquake preparedness activities such as the annual Great California Shake-Out drill.
Mitigation Action 6B:	Continue to support the work of utility districts in replacing sewer and water lines and portions of the flume that are the most vulnerable to an earthquake or landslide.

Goal 7:	**Minimize the level of damage and losses to people, existing and future infrastructure, and critical facilities due to extreme weather.**
Applies to:	All Jurisdictions
Objective 7.1	Continue the comprehensive approach to reducing the level of damage and losses due to extreme weather and drought through GIS mapping, planning process, and the removal of dead and dying trees.
Mitigation Action 7.1A:	Analyze and remove hazards that threaten public safety due to the cascading effects of drought such as dry wells and tree mortality.
Mitigation Action 7.1B:	Encourage water agencies to conduct water supply evaluations public water system to determine the effect of drought on community water supply.
Mitigation Action 7.1C:	Work with the Water Agency and districts to increase groundwater supply and/or identify other alternate water sources to be used when drought and related reservoir operational requirements diminish the water supply available.

D. How Mitigation Goals Address Existing and New Buildings and Infrastructure

The following tables demonstrate how the proposed mitigation actions take into account both existing and new buildings and infrastructure.

Goals	Mitigation Actions	Existing Buildings and Infrastructure						
		Electrical and Power Infrastructure	Dams and Water Management	Communication Facilities	Critical Roads and Bridges	Essential Services Facilities (Fire, Law, Hospitals)	Agricultural Infrastructure	Public Structures
Goal 1	**General Mitigation** Promote understanding and support for hazard mitigation by key stakeholders and the public within the County of Tuolumne	X	X	X	X	X	X	X
Goal 2	**General Mitigation** Ensure that future development is protected from natural disasters	X	X	X	X	X	X	X
Goal 3	**General Mitigation** Build and support local capacity and commitment to minimize the County of Tuolumne's vulnerability to potential hazards		X		X	X	X	X
Goal 4	**Flood** Minimize the level of damage and losses to people, existing and future critical facilities, and infrastructure due to flooding	X	X	X	X	X	X	X
Goal 5	**Wildfire** Minimize the level of damage and losses to people, existing and future critical facilities, and infrastructure due to wildfire	X	X	X	X	X	X	X

Goal 6	**Earthquake** Minimize the level of damage and losses to people, existing and future critical facilities, and infrastructure due to earthquake, landslides and sinkholes	X	X	X	X	X	X	X
Goal 7	**Extreme Weather** Minimize the level of damage and losses to people, existing and future critical facilities, and infrastructure due to extreme weather	X	X		X	X		X

Goals	**Mitigation Actions**	**New Projects / Buildings and Infrastructure**					
		Residential Subdivisions	Various Mixed-Use Projects (Residential and Commercial)	Ag Clusters (Residential, Open Space, Ag Uses)	Commercial and Industrial Projects	Essential Service Facilities	Public Structures
Goal 1	**General Mitigation** Promote understanding and support for hazard mitigation by key stakeholders and the public within the County of Tuolumne	X	X	X	X	X	X
Goal 2	**General Mitigation** Ensure that future development is protected from natural disasters	X	X	X	X	X	X
Goal 3	**General Mitigation** Build and support local capacity and commitment to minimize the County of Tuolumne's vulnerability to potential hazards	X	X	X	X	X	X

Goal 4	**Flood** Minimize the level of damage and losses to people, existing and future critical facilities, and infrastructure due to flooding	X	X	X	X	X	X
Goal 5	**Wildfire** Minimize the level of damage and losses to people, existing and future critical facilities, and infrastructure due to wildfire	X	X	X	X	X	X
Goal 6	**Earthquake** Minimize the level of damage and losses to people, existing and future critical facilities, and infrastructure due to earthquake, landslides and sinkholes	X	X	X	X	X	X
Goal 7	**Extreme Weather** Minimize the level of damage and losses to people, existing and future critical facilities, and infrastructure due to extreme weather	X	X			X	X

X. MITIGATION ACTION IMPLEMENTATION

A. Code of Federal Regulations Requirements

44 CFR Requirement §201.6(c)(3) [The plan shall include the following:] A mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs, and resources, and its ability to expand on and improve these existing tools. [The hazard mitigation strategy shall include a(n)]

(i) description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

(ii) section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure. All plans approved by FEMA after October 1, 2008, must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.

(iii) action plan, describing how the action identified in paragraph (c)(3)(ii) of this section will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

(iv) For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.

B. Prioritization of Mitigation Actions

The Mitigation actions were prioritized using a system which is outlined below. This system factored in the following components: 1) Probability of Occurrence 2) Effectiveness of Mitigation Actions, 3) Practicality of mitigation action for the jurisdiction based on the STAPLE+E criteria of Social, Technical, Administrative, Political, Legal, Economic and Environmental components. This gave rise to the development of an overall relative risk value that resulted in ratings of HIGH, MEDIUM and LOW for each of the mitigation actions. The resultant prioritization was presented to key stakeholders and lengthy discussions were held to ensure that the results were indeed applicable to the priorities and capabilities of the jurisdictions' served. There has been no change in priorities since the approval of the 2013 Multi-Jurisdictional Hazard Mitigation Plan.

Sample Mitigation Action Prioritization Worksheet

Mitigation Action	Probability of Associated Threat Occurrence Low=1 Med.=2 High=3	Effectiveness of Mitigation Action Minimal=1 Moderate=2 High=3	Practicality (based on STAPLE+E criteria) Low=1 Medium=2 High=3	Relative Risk (Product of Risk Components)
1.A	3	2	3	18

In assessing and evaluating each strategy, Tuolumne County considered the following factors:

- The benefit justified the cost
- The availability of financial resources
- The availability of staff resources
- Impact on County department functions
- Strategies reflect the goals and objectives

C. Action Plan

Once the MJHMP has received formal adoption by the Board of Supervisors and each of the various governing bodies the following action plan, agreed upon by Hazard Mitigation Planning Group, will be utilized to ensure the Plan is implemented and remains an active and relevant document. Actual implementation may be dependent upon funding availability.

ACTION PLAN FOR TUOLUMNE COUNTY
MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

The table below lists all mitigation actions considered by the planning team. None were rejected and all were determined to be necessary and in the best interest of the County.

#	Mitigation Action	Hazard(s) Assessed	Responsible Department	Funding Sources	Priority	Timeline
1A	Through newsletters, advertisements, speaking engagements and other public contacts, educate the general public and key stakeholders on the issues, responsibilities, and current efforts and successes in the area of disaster preparedness as they impact each agency.	All Hazards	Tuolumne County OES	EMPG/HSGP/CaFire Safe Council/HMGP	Medium	Ongoing
1B	Conduct periodic workshops and exercise on the Emergency Notification Systems available to the public to ensure familiarity of the public to warning applications.	All Hazards	Tuolumne County OES/Sheriff	HSGP/CaFireSafe Council/HMGP	Medium	Ongoing
2A	Educate the County and City planning staffs, administrative staffs and elected officials on the importance of keeping current on trends and developments in disaster preparedness	All Hazards	Tuolumne County OES	HSGP/CaFireSafe Council/HMGP	Medium	Ongoing
2B	Encourage planning staffs to attend seminars and lectures on naturally offering hazards so that they may better assist the appropriate governing bodies as the process future developments	All Hazards	Tuolumne County Community Development Department	HMGP/BRIC	Low	Ongoing

2C	In order to better protect life and property, continue to develop a more accurate and comprehensive series of countywide GIS geology, fire and flood map data sets.	All Hazards	Tuolumne County Public Works/GIS	HMGP/BRIC/FMA	Medium	Ongoing
3.1 A	To ensure that employees are available to assist during a major emergency, develop and adopt a family support plan for all jurisdictions and County Agencies .	All Hazards	Tuolumne County CAO/HR/OES	General Funds/ HSGP/EMPG/HMGP	Medium	Ongoing
3.1 B	Review and when necessary, update the jurisdiction's Emergency Operations Plans and supporting documents	All Hazards	Tuolumne County OES	General Funds/EMPG/HSGP/HMGP/BRIC	Medium	Ongoing
3.1 C	Assist with Public Health Emergency Preparedness to plan and prepare for medical and healthcare impacts which would result from all hazards within the County	All Hazards	Tuolumne County Public Health	BRIC/Public Health EPREP	Medium	Ongoing
3.2 A	Support the Tuolumne Water Agency to better protect public health by initiating a Watershed Sanitary Survey	All Hazards	Tuolumne County CAO/TUD	HMGP/BRIC	Medium	Ongoing
3.2 B	Assist in identifying opportunities for funding of additional egress routes within single-access areas in the event of evacuations.	All Hazards	Tuolumne County OES	EMPG/HSGP/CaFire Safe Council/HMGP	Medium	24 months
3.2 C	Support a study and seek funding to increase the raw water storage or establish a secure conveyance from Lyons Reservoir to ensure service for both domestic consumption and urban fire protection.	All Hazards	Tuolumne County CAO/TUD	HMGP/BRIC	Medium	24 months

3.2 D	Support development of improvements to wastewater systems by replacing or relining collection pipes to reduce sewer overflows and limit inflow and infiltration subsequently reducing the public health threat	All Hazards	Tuolumne County CAO/TUD	HMGP/BRIC	Medium	24 months
3.2 E	Support development of a program that would, in emergency situations, enable water districts and water companies to share water resources through interconnections	All Hazards	Tuolumne County CAO/Water Districts	HMGP/BRIC	Medium	36 months
3.2 F	Support development of a program to secure water rights for all of Tuolumne County	Drought	Tuolumne County CAO	HMGP/BRIC	High	24 months
3.2 G	Promote a county-wide sewer connection plan to reduce septic failure impacts and improve water quality.	Drought	Tuolumne County CAO	HMGP/BRIC	Medium	36 months
3.2 H	Promote land use recommendations that new developments occur adjacent to public water and wastewater facilities	Drought	Tuolumne County Community Development Department	HMGP/BRIC	Medium	ongoing
3.3	Build and maintain communications throughout Tuolumne County all jurisdictions to assist in the response to emergencies.	All Hazards	Tuolumne County OES	EMPG/HSGP/CaFire Safe Council/HMGP	High	24 months
4A	Work to improve localized flood prone areas through a combination of vegetation management and storm drain improvements (i.e. Sonora, Curtis, Sullivan, and Woods Creeks)	Flood	Tuolumne County Floodplain Manager	HMGP/BRIC/FMA	Medium	36 months
4B	Maintain compliance with the National Flood Insurance Program (NFIP) requirements	Flood	Tuolumne County Floodplain Manager	HMGP/BRIC/FMA	Medium	need to renew

4C	Restrict construction of essential service facilities in the 100-year flood plain	Flood	Tuolumne County Floodplain Manager	HMGP/BRIC/FMA	Medium	Ongoing
4D	In order to better protect life and property, record a notice on properties located in flood zones utilizing FIRM maps and notify property owners of said action.	Flood	Tuolumne County Floodplain Manager Department	HMGP/BRIC/FMA	Medium	Ongoing
4E	Continue to work cooperatively with the state and federal flood related agencies for funding improvements through grant and agency programs.	Flood	Tuolumne County Floodplain Manager	HMGP/BRIC/FMA	Medium	Ongoing
4F	Seek funding sources for and initiate watershed improvement projects for the County.	Flood	Tuolumne County CAO	HMGP/BRIC/FMA	Medium	24 months
5.1 A	In order to assist fire prevention efforts and to better manage large fires when they occur, continue to improve GIS mapping and tracking efforts by gathering and maintaining relevant GIS data layers and imagery and utilizing the best available mapping applications and software.	Wildfire	Tuolumne County Public Works/GIS	EMPG/HSGP/CaFire Safe Council/HMGP/BRIC	High	Ongoing
5.1 B	Continue to work with all jurisdictions to initiate fuel thinning and chipping projects in high priority areas. Collaborate with property owners and regulatory agencies in order to utilize prescribed fire on private and public-owned lands in the county	Wildfire	Tuolumne County CAO/OES	CalFIre/CaFire Safe Council/HMGP/BRIC	High	Ongoing

5.1 C	Work with all jurisdictions to update as needed the Community Wildfire Protection Plans for the County so that they will continue to: Assess the fire hazard in the County, Prioritize treatment areas, enhance collaboration amongst all fire agencies and stakeholders, streamline environmental review processes	Wildfire	Tuolumne County CAO/OES/Tuolumne Firesafe Council	CalFire/CaFire Safe Council/HMGP/BRIC	High	Ongoing
5.1 D	Assist in the development of evacuation plans which includes possible sheltering in place at county schools	Wildfire	Tuolumne County OES/Sheriff/Superintende nt of School	EMPG/HSGP/CaFire Safe Council/HMGP/BRIC	Medium	Ongoing
5.1 E	Work with utilities districts to improve fire flow, system reliability and redundancy, and increased water supply in their responsibility areas.	Wildfire	Tuolumne County CAO/OES/Fire	CalFire/CaFire Safe Council/HMGP/BRIC	Medium	Ongoing
5.1 F	Protect water conveyance system by reducing fuels adjacent to wooden flumes.	Wildfire, Drought	Tuolumne County CAO/OES/Fire/TUD	HMGP/BRIC	Medium	Ongoing
5.1 G	Work with the water districts to improve system reliability and redundancy, and increased water supply in their responsibility areas.	Wildfire, Drought	Tuolumne County CAO/OES/Water Districts	HMGP/BRIC	Medium	36 months
5.1 H	Work with the utilities to improve the reliability of the electrical grid in and provide for emergency backup power supply to be used during power outages at critical water system facilities.	Wildfire, Drought	Tuolumne County CAO/OES	HMGP/BRIC	Medium	24 months

5.2 A	Encourage participation of all Fire Agencies in the monthly Fire Chief Association meetings and support, when possible, efforts by the Association to improve fire protection and preventions efforts in the County.	All Hazards	Tuolumne County CAO/OES	HMGP/BRIC	Medium	Ongoing
5.2 B	Encourage participation in cooperative automatic and mutual aid agreements between the County, the City of Sonora, Tribes and Districts	All Hazards	Tuolumne County CAO/Fire	HMGP/BRIC	Medium	Ongoing
6A	Working with Cal OES, increase participation in earthquake preparedness activities such as the annual Great California Shake-Out drill.	Earthquake	Tuolumne County OES	EMPG/HSGP/CaFire Safe Council/HMGP	Medium	Fall of each year
6B	Continue to support the work of utility districts in replacing sewer and water lines and portions of the flume that are the most vulnerable to an earthquake or landslide.	Earthquake, Landslides/sink holes	Tuolumne County CAO/TUD	HMGP/BRIC	Medium	24 months
7.1 A	Analyze and remove hazards that threaten public safety due to the cascading effects of drought such as dry wells and tree mortality.	Drought	Tuolumne County CAO/OES	HMGP/BRIC	High	36 months
7.1 B	Encourage water agencies to conduct water supply evaluations public water system to determine the effect of drought on community water supply.	Drought	Tuolumne County CAO/OES	HMGP/BRIC	Medium	24 months
7.1 C	Work with the Water Agency and districts to increase groundwater supply and/or identify other alternate water sources to be used when drought and related reservoir operational requirements diminish the water supply available.	Drought	Tuolumne County CAO/OES/Water Districts	HMGP/BRIC	Medium	36 months

D. Implementation through Existing Plans and Programs

Tuolumne County currently uses comprehensive land use planning, capital improvements planning, and building codes to guide and control development within the County. This MJHMP will be provided to those responsible for the County's General Plan development mechanisms to ensure that consistency is maintained. The same holds true whenever substantive changes are made. Many of the special districts within the County have opted to join in the MJHMP, it is a seamless integration between existing and future special district plans. In addition to adhering to the Tuolumne County General Plan, Local Land Use Development in Tuolumne County is comprised of various stakeholders, including internal subject matter experts, the Tuolumne County Planning Commission, the Tuolumne County Board of Supervisors, as well as direct coordination with external stakeholders including the Local Association of Realtors, the Tuolumne County Business Council and the Local Building Industry Association.

This 2024 MJHMP plan update will be adopted into the County's General Plan Safety Element at the next General Plan update. Both the County's Emergency Operations Plan and the Community Wildfire Protection Plan have both gone through plan updates and adoption in March 2024, so this plan was unable to be integrated into those plans. When these plans are updated, the 2024 MJHMP will be integrated into both. The County's Climate Adaptation Plan was adopted recently in 2022, so the MJHMP will be incorporated in to the 2027 update. The County does not have a current Capital Improvement Plan (CIP), the last one was completed in 2012 and the funding does not currently exist to create an updated plan. When funding becomes available to update the CIP, the mitigation goals and principals from the MJHMP will be integrated into it.

*Mitigation Actions have been assigned to the County and to specific jurisdictions. These individual actions will fall under the general administrative oversight of the local governing body. Should technical expertise not be available in these agencies, the County Office of Emergency Services is committed to, when possible, coordinating the resources of the County to assist with implementation of the mitigation actions.

The general administrative oversight of this MJHMP rests with the Tuolumne County Office of Emergency Services.

E. Plan Monitoring, Evaluating and Updating

44 CFR Requirement §201.6(c)(4) [The plan shall include a] plan maintenance process that includes

(i) A section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

(ii) A process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.

(iii) Discussion on how the community will continue public participation in the plan maintenance process.

In order to continue to be an effective representation of each jurisdiction's overall strategy for reducing its risks from natural hazards, the mitigation plan must reflect current conditions. Monitoring and evaluating the plan will occur annually to make certain that the goals and objectives for the County and participating jurisdictions are current and mitigation activities are being carried out. The plan will be evaluated by how successfully the implementation of identified actions has helped to achieve the plan goals and objectives. The plan will be updated every 5 years to reflect progress in mitigation efforts, changes in priorities, and ensure all requirements are met for mitigation project funding. The County will begin the next update process two and a half years before this plan's expiration date. At that time, the MHMP planning team will convene and initiate the update process.

To ensure that regular review and update of this Multi-Jurisdictional Hazard Mitigation Plan takes place, the County Office of Emergency Services will take the lead to communicate and coordinate planning sessions with the MJHMP Planning Group members annually. This will keep the plan components up-to-date and meet current realities. The MJHMP will convene at least annually to review progress on mitigation actions and any difficulties encountered.

The MJHMP Planning Group will review each goal and objective to evaluate its:

- Relevance to current and evolving situations in Tuolumne County.
- Consistency with changes in local, state and federal policy.

The planning group will review the risk assessment component of the plan to ascertain if the information needs to be updated or modified. Each jurisdiction will report on:

- Current status of their mitigation actions

- How coordination efforts are proceeding
- Implementation processes that worked well
- Any difficulties encountered
- Any strategies in need of revision

If the plan review leads the Hazard Mitigation Planning Group to determine that modifications are necessary, then the County or the applicable jurisdiction can initiate a plan amendment.

F. Continued Public Involvement

Tuolumne County understands the importance of involving the public in the ongoing Hazard Mitigation Plan review and updating process. In the County's last update, it was suggested that the County budget more time for greater community outreach and public participation. To that end, we held several public meetings to discuss this plan, and will continue to do so over the next five-year plan period. The following actions will be taken:

- A copy of the MJHMP will be posted on the County website
- Hard copies of the updated Plan will be available at the County Office of Emergency Services and the County Library to make this plan accessible to all members of the community
- The Public Survey will remain open indefinitely and monitored regularly for new input
- During public outreach events, the MJHMP will be made available to the public that do not have access to the internet
- During public outreach events, Office of Emergency Services staff will solicit input from the public regarding mitigation issues and future opportunities for projects
- Members of the Public wishing to submit feedback for the plan may contact the Tuolumne County Office of Emergency Services at (209) 533-6395, by email at oes@co.tuolumne.ca.us, or may send correspondence to the following address:

  Office of Emergency Services
  2 South Green Street
  Sonora, CA 95370

DEFINITION OF TERMS

Asset
Any natural or human-caused feature that has value, including, but not limited to people; buildings; infrastructure like bridges, roads, and sewer and water systems; lifelines like electricity and communication resources; or environmental, cultural, or recreational features like parks, dunes, wetlands, or landmarks.

Critical Facilities
Facilities that are critical to the health and welfare of the population and that are especially important following hazard events. Critical facilities include, but are not limited to, shelters, police and fire stations, and hospitals.

Disaster Mitigation Act of 2000
A law signed by the President on October 30, 2000 that encourages and rewards local and state pre-disaster planning, promotes sustainability as a strategy for disaster resistance, and is intended to integrate state and local planning with the aim of strengthening statewide mitigation planning.

Emergency Response Plan
This is the document that contains information on the actions that may be taken by a governmental jurisdiction to protect people and property before, during, and after a disaster.

Federal Emergency Management Agency (FEMA)
Part of the Department of Homeland Security's Emergency and Response Directorate, FEMA was created to provide a single point of accountability for all Federal activities related to disaster mitigation and emergency preparedness, response and recovery.

Flood Insurance Rate Map (FIRM)
Map of a community, prepared by FEMA that shows the special flood hazard areas and the risk premium zones applicable to the community.

Frequency
A measure of how often events of a particular magnitude are expected to occur. Frequency describes how often a hazard of a specific magnitude, duration, and/or extent typically occurs, on average.

Geographic Information Systems (GIS)
A computer software application that relates physical features on the earth to a database to be used for mapping and analysis.

Hazard Event
A specific occurrence of a particular type of hazard.

Hazard Mitigation
Cost effective measures taken to reduce or eliminate long-term risk associated with hazards and their effects.

Hazard Profile
A description of the physical characteristics of hazards and a determination of various descriptors including magnitude, duration, frequency, probability, and extent.

HAZUS
A GIS-based nationally standardized earthquake loss estimation tool developed by FEMA.

Mitigate
To cause to become less harsh or hostile; to make less severe or painful. Mitigation activities are actions taken to eliminate or reduce the probability of the event, or reduce its severity of consequences, either prior to or following a disaster/emergency.

100-Hundred Year Floodplain
Also referred to as the Base Flood Elevation (BFE) and Special Flood Hazard Area (SFHA). An area within a floodplain having a 1 percent or greater chance of flood occurrence in any given year.

Q3 Data
The Q3 Flood Data product is a digital representation of certain features of FEMA's Flood Insurance Rate Map (FIRM) product, intended for use with desktop mapping and Geographic Information Systems technology.

Repetitive Loss Property
A property that is currently insured for which two or more National Flood Insurance Program losses (occurring more than ten days apart) of at least $1000 each have been paid within any 10-year period since 1978.

Richter Magnitude Scale
A logarithmic scale devised by seismologist C.F. Richter in 1935 to express the total amount of energy released by an earthquake. While the scale has no upper limit, values are typically between 1 and 9, and each increase of 1 represents a 32-fold increase in released energy.

Risk
The estimated impact that a hazard would have on people, services, facilities, and structures in a community; the likelihood of a hazard event resulting in an adverse condition that causes injury or damage. Risk is often expressed in relative terms such as a high, moderate, or low likelihood of sustaining damage beyond a particular threshold due to a specific type of hazard event. It also can be expressed in terms of potential monetary losses associated with the intensity of the hazard.

Vulnerability
Describes how exposed or susceptible to damage an asset is. Vulnerability depends on an asset's construction, contents, and the economic value of its functions. Like indirect damages, the vulnerability of one element of the community is often related to the vulnerability of another. For example, many businesses depend on uninterrupted electrical power–if an electric substation is flooded, it will affect not only the substation itself, but a number of businesses as well. Often, indirect effects can be much more widespread and damaging than direct effects.

Vulnerability Analysis
The extent of injury and damage that may result from a hazard event of a given intensity in a given area. The vulnerability analysis should address impacts of hazard events on the existing and future built environment.

Vulnerable Populations
Any segment of the population that is more vulnerable to the effects of hazards because of things such as lack of mobility, sensitivity to environmental factors, or physical abilities. These populations can include, but are not limited to, senior citizens and school children.

ACRONYM

Acronym	Definition
CGS	California Geological Survey
Cal EPA	California Environmental Protection Agency
Caltrans	California Department of Transportation
CAL Fire	California Department of Forestry and Fire Protection
CDF	California Department of Forestry and Fire Protection
CDHS	California Department of Health Services
CFR	Code of Federal Regulations

CGS	California Geological Survey
CISN	California Integrated Seismic Network
CSSC	California Seismic Safety Commission
DFG	State Department of Fish and Game
DHS	Department of Homeland Security
DWR	Department of Water Resources
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FMA	Flood Mitigation Assistance
FMP	Floodplain Management Plan
FRAP	Fire and Resource Assessment Program
GIS	Geographic Information System
HMGP	Hazard Mitigation Grant Program
MJHMP	Multi-Jurisdictional Hazard Mitigation Plan
NFIP	National Flood Insurance Program
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Services
OES	Governor's Office of Emergency Services
SEMS	Standardized Emergency Management System
SFHA	Special Flood Hazard Area
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey