



Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan

Volume 1: Countywide Elements

2018 Update





TABLE OF CONTENTS

I.	ADOPTION RESOLUTIONS.....	4
A.	2013 Adoption Resolution	4
B.	2018 Adoption Resolution	6
II.	EXECUTIVE SUMMARY	8
A.	Plan Description	8
B.	Plan Purpose and Authority	9
III.	PLANNING PROCESS	10
A.	DMA 2000 Requirements	10
B.	Plan Development and Public Input Process	10
C.	Incorporation of Existing Plans and Other Information	13
IV.	TUOLUMNE COUNTY PROFILE	14
A.	County History	14
B.	Geography	15
C.	Cities and Communities	16
D.	Population and Housing	18
E.	Economy	23
F.	Climate	26
G.	Climate Change-Global Warming	26
H.	Transportation Systems	27
I.	Governing Body	30
J.	Land Use	30
K.	Development Trends	31
V.	RISK ASSESSMENT	32
A.	DMA 2000 Requirement	32
B.	Hazard Identification	32
C.	Hazard Profiles	33
i.	Earthquake	33
ii.	Flooding	50
iii.	Landslides and Sinkholes	60
iv.	Volcano	64
v.	Wildfire	67
vi.	Extreme Weather	74
vii.	Hazardous Materials	81



VI. VULNERABILITY ASSESSMENT	84
A. DMA 2000 Requirements	84
B. Summary of Community's Vulnerability	84
C. Critical Facilities and Infrastructure	85
D. Jurisdictional Assets at Risk to Applicable Hazards	86
E. Methodology Used	95
F. Loss Estimations	95
G. Development Trend Analysis	95
VII. CAPABILITY ASSESSMENT	96
A. Overview	96
B. Legal and Regulatory	96
C. Administrative and Technical	98
D. Financial	98
E. Political Will of Community	98
F. Physical Assets	98
G. Education and Outreach	98
VIII. MITIGATION STRATEGY	101
A. DMA 2000 Requirements	102
B. 2013 Mitigation Action Progress Report	102
C. Goals, Objectives and Mitigation Actions 2018	102
D. How Mitigation Goals Address Buildings and Infrastructure	103
IX. MITIGATION ACTION IMPLEMENTATION	110
A. DMA 2000 Requirements	114
B. Prioritization of Mitigation Actions	114
C. Action Plan	116
D. Implementation Through Existing Plans and Programs	119
E. Plan Monitoring, Evaluating and Updating	120
F. Continued Public Involvement	121
DEFINITIONS/ACRONYMS	122
APPENDIX A- Additional Documents	

Volume II contains all Jurisdiction Specific Hazard Annex

NOW THEREFORE, BE IT RESOLVED that the Tuolumne County Board of Supervisors adopts the Multi-Jurisdictional Hazard Mitigation Plan for the County and participating jurisdictions. It supersedes all previous county hazard mitigation plans;

BE IT FURTHER RESOLVED that the Tuolumne County Board of Supervisors authorizes the County Administrator to make any minor, non-substantive changes and sign off on the final plan; and

BE IT FURTHER RESOLVED that a copy of this Resolution and a copy of the Multi-Jurisdictional Hazard Mitigation Plan will be forwarded to the Governor's Office of Emergency Services and the Federal Emergency Management Agency.

No. 74a-12

Filed December 4, 2012

By [Signature]
Clerk of the Board of Supervisors



RESOLUTION
OF THE BOARD OF SUPERVISORS OF THE COUNTY OF TUOLUMNE

WHEREAS, the Tuolumne County Office of Emergency Services (OES) is committed to protecting the people of Tuolumne County from the potential harm caused from natural or man-made disasters or emergencies;

WHEREAS, mounting costs of disaster recovery in the nation over the past decade has promoted interest in providing effective ways to minimize our county's hazard vulnerability;

WHEREAS, the Disaster Mitigation Act (DMA) of 2000, also commonly known as the "2000 Stafford Act Amendments", constitutes an effort by the Federal government to reduce the rising cost of disasters;

WHEREAS, the Disaster Mitigation Act of 2000 requires local governments to develop and submit mitigation plans in order to qualify for the Hazard Mitigation Grant Program project funds;

WHEREAS, the purpose of the Disaster Mitigation Act of 2000 was to establish a national program for pre-disaster mitigation, streamline administration of disaster relief at both the federal and state levels, and control federal costs of disaster assistance; and

WHEREAS, the County in conjunction with the other participating jurisdictions concluded a planning process which allowed participation by the local community, and have developed a multi-jurisdictional Hazard Mitigation Plan that meets the needs established by the Disaster Mitigation Act of 2000;

NOW THEREFORE, BE IT RESOLVED that the Tuolumne County Board of Supervisors adopts the Multi-Jurisdictional Hazard Mitigation Plan for the County and participating jurisdictions. It supersedes all previous county hazard mitigation plans;

BE IT FURTHER RESOLVED that the Tuolumne County Board of Supervisors authorizes the County Administrator to make any minor, non-substantive changes and sign off on the final plan; and

BE IT FURTHER RESOLVED that a copy of this Resolution and a copy of the Multi-Jurisdictional Hazard Mitigation Plan will be forwarded to the Governor's Office of Emergency Services and the Federal Emergency Management Agency.

ADOPTED BY THE BOARD OF SUPERVISORS OF THE COUNTY OF TUOLUMNE ON
8/4, 2012.

AYES:	1st Dist. <u>[Signature]</u>	NOES:	_____	Dist. _____
	2nd Dist. <u>Harvett</u>		_____	Dist. _____
	3rd Dist. <u>Poye</u>	ABSENT:	<u>1st</u>	Dist. <u>Bass</u>
	4th Dist. <u>Gray</u>		_____	Dist. _____
	5th Dist. <u>Pond</u>	ABSTAIN:	_____	Dist. _____

[Signature]

CHAIR OF THE BOARD OF SUPERVISORS

ATTEST: [Signature]
 Clerk of the Board of Supervisors

No. 74a-12

I hereby certify that according to the provisions of Government Code Section 25103, delivery of this document has been made.

By: [Signature]
 ACTIA L. JAMAR
 Clerk of the Board

Tuolumne County Multi-Jurisdictional Hazard Mitigation plan



B. Tuolumne County Board of Supervisors 2017 adoption resolution

No. 118-17

Filed: December 19, 2017
By: [Signature]
Clerk of the Board of Supervisors



**RESOLUTION
OF THE BOARD OF SUPERVISORS OF THE COUNTY OF TUOLUMNE**

WHEREAS, the Tuolumne County Office of Emergency Services (OES) is committed to protecting the people of Tuolumne County from the potential harm caused from natural or man-made disasters or emergencies; and

WHEREAS, mounting costs of disaster recovery in the nation over the past decade has promoted interest in providing effective ways to minimize our county's hazard vulnerability; and

WHEREAS, the Disaster Mitigation Act (DMA) of 2000, also known as the "2000 Stafford Act Amendments", constitutes an effort by the Federal government to reduce the rising costs of disasters; and

WHEREAS, the Disaster Mitigation Act of 2000 requires local governments to develop and submit mitigation plans in order to qualify for the Hazard Mitigation Grant Program project funds; and

WHEREAS, the purpose of the Disaster Mitigation Act of 2000 was to establish a national program for pre-disaster mitigation, streamline administration of disaster relief at both the federal and state levels, and control federal costs of disaster assistance; and

WHEREAS, the County in conjunction with the other participating jurisdictions concluded a planning process which allowed participation by the local community, and have developed a 2018 Multi-Jurisdictional Hazard Mitigation Plan that meets the needs established by the Disaster Mitigation Act of 2000; and

NOW THEREFORE BE IT RESOLVED that the Tuolumne County Board of Supervisors do hereby adopt the updated 2018 Multi-Jurisdictional Hazard Mitigation Plan for the County and participating jurisdictions. The plan supersedes all previous County hazard mitigation plans; and

BE IT FURTHER RESOLVED that the Tuolumne County Board of Supervisors approves the County Administrator as the authorized signatory and to make any minor, non-substantive changes on the final plan; and

BE IT FURTHER RESOLVED, that a copy of this Resolution and a copy of the updated 2018 Multi-Jurisdictional Hazard Mitigation Plan will be forwarded to the Governor's Office of Emergency Services (Cal OES) and the Federal Emergency Management Agency (FEMA).



Tuolumne County Multi-Jurisdictional Hazard Mitigation plan

ADOPTED BY THE BOARD OF SUPERVISORS OF THE COUNTY OF TUOLUMNE ON
12/19/17

AYES: 1st Dist. Obert NOES: _____ Dist. _____
2nd Dist. Hankelt _____ Dist. _____
3rd Dist. Royce ABSENT: 1st Dist. Burnan
4th Dist. Hay _____ Dist. _____
5th Dist. Rodgers ABSTAIN: _____ Dist. _____

Sherri Brennan
Sherri Brennan
CHAIRPERSON OF THE BOARD OF SUPERVISORS

ATTEST: [Signature] No. 118-17
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.

Alicia L. Jamar
Clerk of the Board
By: [Signature]

THE FOREGOING INSTRUMENT IS A CORRECT COPY OF
THE ORIGINAL ON FILE IN THIS OFFICE



ATTEST:

[Signature] 12/19/17
Clerk of the Board of Supervisors
County of Tuolumne



II. EXECUTIVE SUMMARY

A. Plan Description

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. The goal of this multi-jurisdictional plan 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 subsequent to a disaster.

Development of this Multi-Jurisdictional Hazard Mitigation Plan entailed reviewing existing applicable plans and assessing the planning capabilities, securing political support and soliciting input and approval from each of the involved communities.

Risk assessments were then performed which identified and evaluated each natural and man-made hazard that could impact these areas. Historical hazard events are described. The future probability of these identified hazards and their impact on each of these communities is described.

Vulnerability assessments were performed which summarized the identified hazards' impact to each of the community's critical structures, infrastructure, and future development. An estimate of the potential dollar losses to vulnerable structures was determined.

The risk and vulnerability assessments were used to determine mitigation goals and objectives to minimize long-term vulnerabilities to the identified hazards. These goals and objectives were the foundation behind the development of a comprehensive range of specific attainable mitigation actions created for each jurisdiction.

An action plan was developed in 2004, updated in 2013 and updated again in 2017 which 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.



Tuolumne County Multi-Jurisdictional Hazard Mitigation plan

B. Plan Purpose and Authority

The Disaster Mitigation Act (DMA) of 2000, also commonly known as “The 2000 Stafford Act Amendments” (the Act), constitutes an effort by the Federal government to reduce the rising cost of disasters. The Act stresses the importance of mitigation planning and disaster preparedness prior to an event.

Mitigation Planning Section 322 of the Act requires local governments to develop and submit mitigation plans in order to qualify for the Hazard Mitigation Grant Program (HMGP) project funds. It also increases the amount of HMGP funds available to states meeting the enhanced planning criteria, and enables these funds to be used for planning activities.

For disasters declared after November 1, 2004, Tuolumne County must have an LHMP approved pursuant to §201.6 in order to receive FEMA Pre-Disaster Mitigation (PDM) project grants or to receive post-disaster Hazard Mitigation Grant Program (HMGP) project funding. The LHMP is written to meet the statutory requirements of DMA 2000 (P.L. 106-390), enacted October 30, 2000 and 44 CFR Part 201 – Mitigation Planning, Interim Final Rule, published February 26, 2002.

To facilitate implementation of the DMA 2000, the Federal Emergency Management Agency (FEMA) created an Interim Final Rule (the Rule), published in the Federal Register in February of 2002 at section 201 of 44 CFR. The Rule spells out the mitigation planning criteria for States and local communities. Specific requirements for local mitigation planning efforts are outlined in section §201.6 of the Rule. Local jurisdictions must demonstrate that proposed mitigation actions are based upon a sound planning process that accounts for the inherent risk and capabilities of the individual communities as stated in section §201.5 of the Rule.

In developing this comprehensive Hazard Mitigation Plan, FEMA’s Multi-Hazard Mitigation Planning Guidance (March 2013) was strictly adhered to for the purpose of ensuring thoroughness, diligence, and compliance with the new DMA 2000 planning requirements.



III. PLANNING PROCESS

A. DMA 2000 Requirements

DMA Requirements §201.6(b) and §201.6(c)(1):

An open public involvement process is essential to the development of an effective plan. 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.
- 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

A full review and revision of the original 2013 Hazard Mitigation Plan has occurred and four additional jurisdictions have been added to the 2017 plan update. The new jurisdictions have all participated fully in the mitigation plan update along with the original jurisdictions.

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 construct the new 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.

After the MJHMP Planning Group Members and Tuolumne County Office of Emergency Services were both satisfied with the newly constructed draft plan and its mitigation goals, objectives, and actions, a noticed public hearing occurred at the



Tuolumne County Multi-Jurisdictional Hazard Mitigation plan

County Board of Supervisors Chambers. This meeting was widely advertised both locally and in neighboring counties to provide an opportunity for the general public, bordering communities and regional agencies involved in hazard mitigation activities to participate in the planning process. Notice of the public hearing was posted, two weeks in advance, on the County website, community bulletin boards and through a press release. Informative letters were sent to Office of Emergency Services managers in all neighboring Counties.

Several weeks prior to the hearing, the newly constructed Plan was posted on the County website to enable the public and stakeholders ample time to read and evaluate it. At this hearing, the planning process was reviewed and discussed. Additionally, a detailed explanation was provided of the risks and vulnerabilities the community faced. The mitigation goals, objectives and actions were explained in detail as were the resources that would be used to help mitigate these hazards. Five members of the public attended this meeting in addition to OES representatives from Calaveras and Mariposa Counties.

The general public had an opportunity to ask questions and comment on the proposed plan. Members of the community expressed concern towards the wildfire and hazardous material threats within the County. While suggestions were response-oriented and not tied to mitigation, staff took note of the priorities expressed in this public meeting.

Participating Jurisdictions

The following table contains those jurisdictions that have fully participated in the hazard mitigation planning and approval process. Each entity has fulfilled their obligations towards the preparation and adoption of this hazard mitigation plan.

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



Tuolumne County Multi-Jurisdictional Hazard Mitigation plan

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^
Twain Harte Union School District^
Tuolumne Band of Me-Wuk Indians^
Tuolumne County Superintendent of Schools*
Soulsbyville Union School District*
Lake Don Pedro Community Services District*

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

Name	Agency	Job Title
Tracie Riggs	Tuolumne County Office of Emergency Services	OES Coordinator
Dore Bietz	Tuolumne Band of Me-Wuk Indians	Assistant Planner
Aimee New	City of Sonora Fire Department	Fire Chief
Tim Miller	City of Sonora	City Administrator
Turu Vanderwiel	City of Sonora-Police Department	Sonora Police Chief
Eric Erhardt	Tuolumne County Sheriff's Office	Sheriff's Lieutenant
Paul Avilla	CAL FIRE TCU Unit	County Fire Warden
Todd McNeal	Twain Harte Fire/Rescue	Fire Chief
Larry Crabtree	Mi-Wuk/Sugar Pine Fire Protection District	Fire Chief
Mark Ferriera	Columbia Fire Protection District	Fire Chief
Jon Sterling	Groveland Fire Department	General Manager
Tom Trott	Twain Harte Community Services District	General Manager
Patti Ingalls	Jamestown Sanitary District	District Manager
Brenda Bonillo Ben Kikugawa	Tuolumne City Sanitary District	District Manager
Lisa Westbrook Abby Parcon	Tuolumne Utilities District	Public Relations Coord. Safety Compliance Coord
Quincy Yaley Madeline Amlin	Tuolumne County Community Resources Agency	Asst Deputy Director GIS Technician
Margie Bulkin	Tuolumne County Superintendent of Schools	County Superintendent
Joe Aldridge Nickie Lamm	Columbia Union School District	Superintendent
Patrick Chabot	Sonora Union High School District	Superintendent

Tuolumne County Multi-Jurisdictional Hazard Mitigation plan



Contessa Pelfrey	Jamestown Elementary School District	Superintendent
Sharon Johnson	Curtis Creek School District	Superintendent
Rick Hennes	Twain Harte Union School District	Superintendent
Steve Sweitzer	Summerville Union High School District	Superintendent
Leigh Shampain	Summerville Elementary School District and Sonora Elementary School District	Superintendent
Jeff Winfield	Soulsbyville School District	Superintendent
Dave Urquhart	Big Oak Flat School District	Superintendent
Trevor Stewart Greg Elam	Columbia College	Vice President
Michelle Jachetta	Tuolumne County Public Health	Emergency Preparedness Coordinator

C. 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:

- Tuolumne General Plan including
 - Land Use Element
 - Open Space Element
 - Safety Element
- CAL FIRE/Tuolumne County Fire Management Plan
- California State Hazard Mitigation Plan
- Local and State land use regulations
- Flood ordinances
- Past disaster declarations
- Flood Insurance Rate Maps (FIRM's)
- Tuolumne County Community Wildfire Protection Plan
- Tuolumne County Emergency Services Plan

This plan will be utilized to inform the following plans:

- Tuolumne General Plan including
 - Land Use Element
 - Open Space Element
 - Safety Element
- CAL FIRE/Tuolumne County Fire Management Plan
- Local land use regulations



Tuolumne County Multi-Jurisdictional Hazard Mitigation plan

- Flood ordinances
- Tuolumne County Community Wildfire Protection Plan
- Tuolumne County Emergency Operations Plan
- Capital Improvement Plan

D. Plan Adoption

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.

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 Mi Wuk 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 similar to 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, bed, bath, and sustenance to the miners. The bare bones of civilization in the form of government, law, newspapers, and social lodges developed, and violence



Tuolumne County Multi-Jurisdictional Hazard Mitigation plan

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" as a result of the Compromise of 1850. Prior to 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

According to the U.S. Census Bureau (2010), Tuolumne County has a total area of 2,274 square miles (5,891 km²), of which, 2,220.88 square miles (5,790 km²) 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) include 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 Multi-Jurisdictional Hazard Mitigation plan

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. The majority of the County's population resides in the unincorporated area, which interfaces with the National Forest and National Park lands. In 2010, there was an average of 24.90 persons per square mile in the County compared with 239.00 persons per square mile in the State of California.

C. Cities and Communities

Incorporated City and County Seat:

- Sonora

Census-Designated Places (CDPs):

- Cedar Ridge
- Chinese Camp
- Cold Springs
- Columbia
- East Sonora
- Groveland
- Jamestown
- Long Barn
- Mi-Wuk Village

Other Unincorporated Communities:

- Blanchard
- Buchanan
- Bumblebee
- Confidence
- Dardanelle
- Deadwood
- Groveland-Big Oak Flat
- Mono Vista
- Phoenix Lake
- Pine Mountain Lake
- Sierra Village
- Soulsbyville
- Strawberry
- Tuolumne City
- Tuttletown
- Twain Harte
- Mather
- Moccasin
- Phoenix Lake-Cedar Ridge
- Pinecrest
- Standard
- Squabbletown

Special Districts in Tuolumne County include:

- Bellevue Elementary School District
- Big Oak Flat-Groveland Unified School District
- Chinese Camp Elementary School District
- Columbia Fire District
- Columbia Union Elementary School District
- Curtis Creek Elementary School District
- Groveland Community Services District
- Jamestown Elementary School District

Tuolumne County Multi-Jurisdictional Hazard Mitigation plan



- Jamestown Fire District
- Mi-Wuk Fire District
- Sonora Elementary School District
- Sonora Union High School District
- Soulsbyville Elementary School District
- Strawberry Fire District
- Summerville Union High School District
- Summerville Elementary School District
- Tuolumne County Air Pollution Control District
- Tuolumne County Water Dist. No. 1
- Tuolumne Fire District
- Tuolumne City Sanitary District
- Tuolumne Regional Water District
- Tuolumne Utilities District
- Twain Harte Fire District
- Twain Harte Elementary School District
- Yosemite Community College District





D. Population and Housing Profile

Tuolumne Residents:

Population: 54,079

53% urban, 47% rural (2010) 43rd Largest County
population in California.

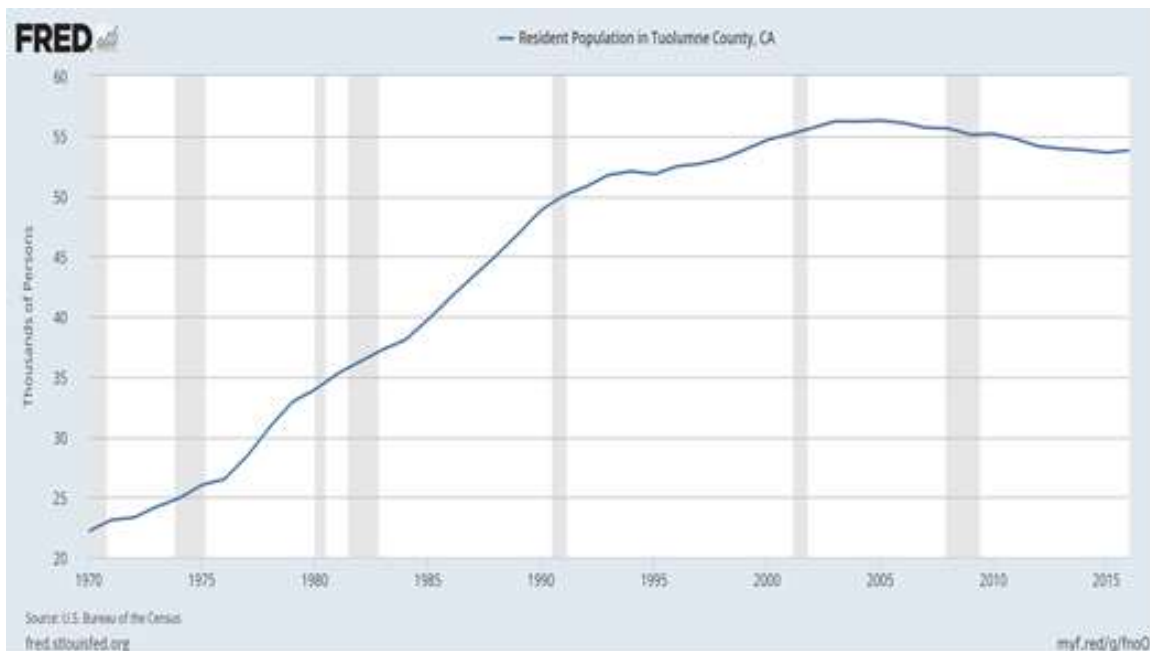
The population fluctuates from the winter to the busy summer season based both on tourist impacts and second home use.

Median resident age: 48.6 years

California median age: 35.8 years

Persons 65 years and over: 12,291

Source: 2015 U.S. Census; American Community Survey



Demographics

The 2015 United States Census; American Fact Finder reported that Tuolumne County had a population of 54,079. The racial makeup of Tuolumne County was 47,620 (88.1%) White, 991 (1.8%) African American, 924 (1.7%) Native American, 745 (1.4%) Asian, 113 (0.2%) Pacific Islander, 1,668 (3.1%) from other races, and 2,018 (3.7%) from two or more races. Hispanic or Latino of any race were 6,139 persons (11.4%).

Tuolumne County Multi-Jurisdictional Hazard Mitigation plan



Population Reported at 2015 U.S. Census; American Community Survey

The County	Total Population	White	African American	Native American	Asian	Pacific Islander	Other Races	Two or More Races	Hispanic or Latino (of any race)
Tuolumne County	54,079	47,620	991	924	745	113	1,668	2,018	6,139
Incorporated City	Total Population	White	African American	Native American	Asian	Pacific Islander	Other Races	Two or More Races	Hispanic or Latino (of any race)
Sonora	4,827	3,907	176	20	314	13	140	257	560
Census-Designated Places (CDPs)	Total Population	White	African American	Native American	Asian	Pacific Islander	Other Races	Two or More Races	Hispanic or Latino (of any race)
Cedar Ridge	1,250	1,155	6	7	10	0	12	60	76
Chinese Camp	170	103	0	0	0	0	0	67	85
Cold Springs	163	114	0	49	0	0	0	1	23
Columbia	2,597	2,265	2	65	4	36	62	163	387
East Sonora	2,368	2,069	0	61	0	0	118	120	200
Groveland	653	617	0	0	0	0	0	36	27
Jamestown	2,687	2,593	0	68	0	0	181	25	282
Long Barn	143	143	0	0	0	0	0	0	0
Mi-Wuk Village	1,191	964	0	85	8	0	75	59	326
Mono Vista	2,334	2,217	4	6	31	0	29	47	155
Phoenix Lake	4,741	4,551	49	39	28	13	0	61	418
Pine Mountain Lake	2,471	2,326	0	8	31	0	6	100	187
Sierra Village	521	427	0	0	74	0	0	20	24
Soulsbyville	2,071	1,877	0	43	0	0	24	127	176
Strawberry	246	245	0	0	1	0	0	0	0
Tuolumne City	1,763	1,620	2	11	2	0	36	92	212

Tuolumne County Multi-Jurisdictional Hazard Mitigation plan



Tuttletown	1,068	1,025	0	0	0	0	34	9	81
Twain Harte	2,297	2,240	0	18	0	0	0	39	169
Un-incorporated Communities	Total Population	White	African American	Native American	Asian	Pacific Islander	Other Races	Two or More Races	Hispanic or Latino (of any race)
All others not CDPs (combined)	21,708	17,735	985	459	211	28	1,616	674	2,847

Tuolumne County School Enrollment by Ethnicity 2016-17 School Year

Level	Hispanic or Latino of Any Race	American Indian or Alaska Native, Not Hispanic	Asian, Not Hispanic	Pacific Islander, Not Hispanic	Filipino, Not Hispanic	African American, Not Hispanic	White, not Hispanic	Two or More Races, Not Hispanic	Not Reported	Total
Tuolumne	1,046	143	52	20	39	66	4,423	217	94	6,100
State Total	3,378,344	33,369	559,159	29,384	153,670	350,338	1,470,499	207,170	46,302	6,228,235

Source: California Department of Education, Educational Demographics Unit ~2017

Age Breakdown:

Persons under the age of 18: 16.7%

Persons over the age of 65: 20.4%

Source: U.S. Census Quick Facts



Language:

Tuolumne County Top Languages Spoken At Home

Rank	Language	Population	Percent Of Reported Languages
1.	Only English	98,236	94.21%
2.	Spanish Or Spanish Creole	3,680	3.53%
3.	German	790	0.76%
4.	French	240	0.23%
5.	Italian	234	0.22%
6.	Tagalog	218	0.21%
7.	Japanese	154	0.15%
8.	Other West Germanic	120	0.12%
9.	Scandinavian	116	0.11%
10.	Portuguese / Portuguese Creole	92	0.09%

Source: Justia.com 2011

Education Analysis:

Education Level of Population 25 Years and Over in Tuolumne County, California

Male

- No Schooling Completed: 0.66%
- Nursery To 4th Grade: 0.39%
- 5th And 6th Grade: 0.39%
- 7th And 8th Grade: 2.78%
- 9th Grade: 1.76%
- 10th Grade: 1.5%
- 11th Grade: 3.18%
- 12th Grade, No Diploma: 3.93%
- High School Graduate (includes Equivalency): 28.99%
- Some College, Less Than 1 Year: 9.39%
- Some College, 1 Or More Years, No Degree: 20.02%
- Associate Degree: 6.88%
- Bachelor's Degree: 12.73%
- Master's Degree: 3.93%
- Professional School Degree: 2.88%
- Doctorate Degree: 0.79%

Tuolumne County Multi-Jurisdictional Hazard Mitigation plan



Female

- No Schooling Completed: 0.4%
- Nursery To 4th Grade: 0.34%
- 5th And 6th Grade: 0.26%
- 7th And 8th Grade: 2.3%
- 9th Grade: 1.26%
- 10th Grade: 1.92%
- 11th Grade: 2.94%
- 12th Grade, No Diploma: 2.99%
- High School Graduate (includes Equivalency): 29.42%
- Some College, Less Than 1 Year: 10.42%
- Some College, 1 Or More Years, No Degree: 21.03%
- Associate Degree: 9.55%
- Bachelor's Degree: 10.63%
- Master's Degree: 4.45%
- Professional School Degree: 1.81%
- Doctorate Degree: 0.29%

Source: City Melt.Com, Tuolumne County Complete Analysis 2010



E. Economy

Income

In 2015, the median household income of Tuolumne County residents was \$50,306. Tuolumne County households made slightly more than Kern County households (\$49,026) and Yuba County households (\$46,829). However, 13.9% of Tuolumne County residents live in poverty.

Source: US Census American Fact Finder 2015

Employment by Industry

Male, with Percent of Employed Male Population			
1.	Construction	3,376	15.63%
2.	Public Administration	1,648	7.63%
3.	Accommodation and Food Services	1,598	7.40%
4.	Health Care	1,096	5.07%
5.	Admin, Support, and Waste Management	924	4.28%
6.	Educational Services	918	4.25%
7.	Agriculture / Forestry / Fishing / Hunting	844	3.91%
8.	Professional / Scientific / Tech Services	798	3.69%
9.	Arts / Entertainment / Recreation	722	3.34%
10.	Motor Vehicle and Parts Dealers	640	2.96%
11.	Food and Beverage Stores	636	2.94%
12.	Repair and Maintenance	636	2.94%
13.	Utilities	548	2.54%
14.	Truck Transportation	456	2.11%
15.	Wood Manufacturing	436	2.02%
16.	Real Estate and Rental and Leasing	412	1.91%
17.	Religious / Grant making / Civic / Similar Organizations	406	1.88%
18.	Building Materials / Hardware / Lawn and Garden Supplies	360	1.67%
19.	Metal Manufacturing	356	1.65%
20.	Other Transportation	336	1.56%



Female, with Percent of Employed Female Population			
1.	Health Care	3,566	18.54%
2.	Educational Services	2,664	13.85%
3.	Accommodation and Food Services	2,024	10.52%
4.	Public Administration	1,430	7.43%
5.	Social Assistance	910	4.73%
6.	Professional / Scientific / Tech Services	734	3.82%
7.	Admin, Support, and Waste Management	642	3.34%
8.	Food and Beverage Stores	564	2.93%
9.	Arts / Entertainment / Recreation	556	2.89%
10.	Finance and Insurance	536	2.79%
11.	Department and Other General Stores	498	2.59%
12.	Real Estate and Rental and Leasing	458	2.38%
13.	Personal and Laundry Services	436	2.27%
14.	Agriculture / Forestry / Fishing / Hunting	320	1.66%
15.	Used Merchandise / Gift / Misc. Stores	312	1.62%
16.	Private Household Services	302	1.57%
17.	Building Materials / Hardware / Lawn and Garden Supplies	272	1.41%
18.	Publishing / Movie / Sound Recording Industries	210	1.09%
19.	Pharmacies and Drug Stores	198	1.03%
20.	Construction	196	1.02%

Source: Justia.com 2008

Tuolumne County Multi-Jurisdictional Hazard Mitigation plan



MAJOR EMPLOYERS IN TUOLUMNE COUNTY (2012)

(Listed alphabetically by company name)

Employer Name	Location	Industry
Black Oak Casino	Tuolumne	Resorts
Chicken Ranch Bingo & Casino	Jamestown	Casinos
Columbia College	Sonora	Schools-Universities & Colleges
Corrections Department	Jamestown	State Government-Correctional Institutions
Diestel Turkey Ranch	Chinese Camp	Food Processing Consultants
Diestel Family Turkey Ranch	Sonora	Game Birds Venison Etc.
Dodge Ridge Ski Resort	Pinecrest	Skiing Centers & Resorts
Hetch Hetchy Project	Groveland	Government Offices-City, Village & Twp
Hetch Hetchy Water & Power	Moccasin	Government Offices-County
Lair of the Golden Bear	Pinecrest	Camps
Lowe's Home Improvement	Sonora	Home Centers
Pine Mountain Lake Association	Groveland	Associations
Safeway	Sonora	Grocers-Retail
Sierra Pacific Industries	Chinese Camp	Sawmills-Manufacturers
Sierra Pacific Industries	Sonora	Lumber-Manufacturers
Adventist Health Sonora	Sonora	Hospitals
Sonora Union High School	Sonora	Schools
Tuolumne County Sheriff	Sonora	Sheriff
Walmart	Sonora	Department Stores

Source: America's Labor Market Information System (ALMIS) Employer Database 2017



F. Climate

Climate in Tuolumne County, California

Climate	Tuolumne, CA	United States
Rainfall (in.)	36.7	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.

G. 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 1.4°F 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.



H. 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. The majority 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 en route to Modesto Reservoir, Turlock Reservoir, Don Pedro Reservoir and the Sierra Nevada foothills.

PUBLIC AIRPORTS

Columbia Airport

Columbia Airport is located near the town of Columbia, California, in the Sierra Nevada foothills at an elevation of 2,120'. 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 2,100 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 2015, there were 45,657 annual aircraft operations at Columbia Airport. There is a projection of a 1.57% increase annually to aircraft operations over the 20 year horizon.



94% of aircraft operations come from general aviation and emergency response aircraft; air taxi and military operations makeup 6% of operations.

There are 148 aircraft based at Columbia Airport:

- Single engine aircraft: 133
- Multi engine aircraft: 7
- Jet Aircraft: 0
- Turboprop: 4
- Helicopter: 4

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 through contracts with the US Forest Service.
- Aero Resources: Provides full service aircraft maintenance including major airframe service.
- 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 Super Huey 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 22 based aircraft at Pine Mountain Lake Airport with an estimated 14,965 operations annually:

- Single engine aircraft: 20
- Multi Engine: 2

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.



I. 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.

J. 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



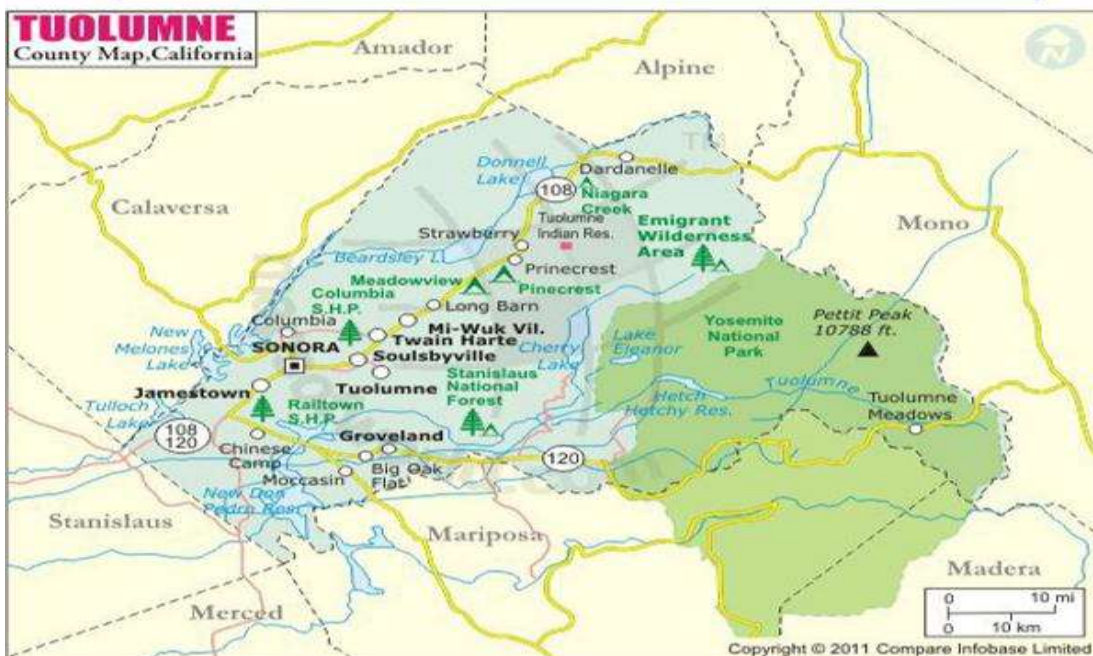
K. Development Trends

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.

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. DMA 2000 Requirements

DMA Requirement §201.6(c)(2)(i) :	The risk assessment shall include a description of the type of all natural hazards that can affect the jurisdiction.
DMA Requirement §201.6(c)(2)(i) :	The risk assessment shall include a description of the location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.
DMA Requirement §201.6(c)(2)(iii):	For multi-jurisdictional plans, the risk assessment must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.

B. Hazard Identification

The following natural and manmade, Hazardous Materials, hazards can affect the jurisdiction:

- Earthquake:
 - Building/Structure Collapse
 - Faulting
- Extreme Weather:
 - Drought
 - Heat
 - Ice, Hail and Snow Storms
 - Thunder/Lightning Storms
 - Windstorms
- Volcano
- Flood:
 - Dam/Levee Failure
- Wildland Fire
- Landslides/Sinkholes
- Hazardous Materials:
 - Accidental Spills and Releases
 - Clandestine Dumping



C. Hazard Profiles

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.

HAZARD: EARTHQUAKE

Severity: High	Probability: Low
-----------------------	-------------------------

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.

Tuolumne County Multi-Jurisdictional Hazard Mitigation plan



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
Epicerter 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:** Earthquake magnitude, as generally measured by either the Richter or Moment Magnitude scale, is a measurement of energy released by the movement of a fault. As the amount of energy released by an earthquake increases, the potential for ground shaking impacts also increases.
- **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: 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.

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.

Tuolumne County Multi-Jurisdictional Hazard Mitigation plan



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.

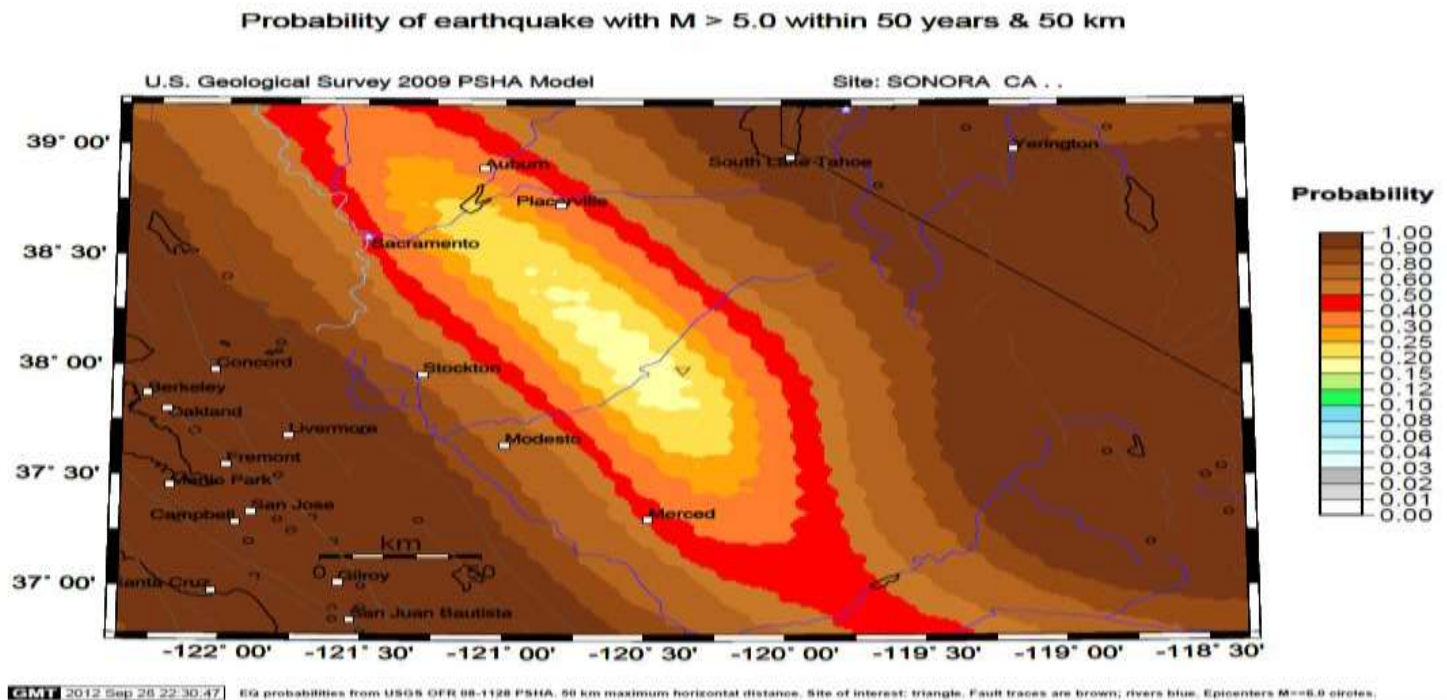
The planning and building divisions of both the City of Sonora and the County of Tuolumne ensure that all new construction complies with current codes and ordinances regarding earthquake safety.

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 USGS database shows that there is a 28.264% chance of a 7.0 + (Major) earthquake within 50 kilometers of Tuolumne, California within the next 50 years. The largest earthquake within 100 miles of Tuolumne, California was a 6.2 (Strong) Magnitude in 1984.

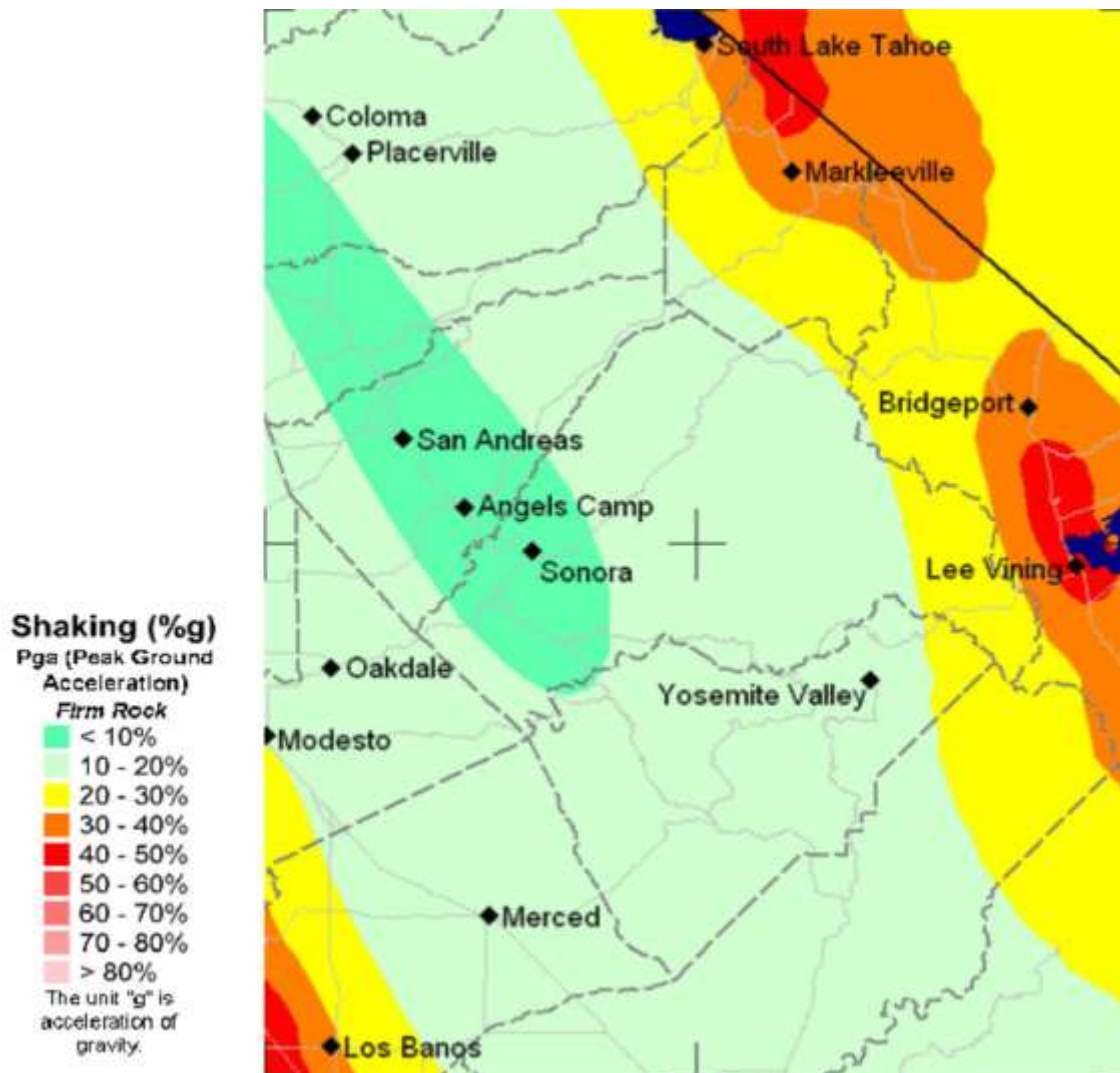
As noted by the map below, the probability of a 5.0 (Moderate) earthquake occurring in the next 30 years is low, somewhere in the range of 1 -15%.



Probability of Earthquake with Magnitude 5.0 or Greater Occurring in the City of Sonora, California (and 50km) Within 50 Years-Source: USGS 2012



Tuolumne County and Neighboring Areas Peak Ground Acceleration



The graphic above shows that the predicted peak acceleration for Tuolumne County does not exceed 10% of gravity in the majority of the developed portions of the County (Jamestown and the City of Sonora). The remainder of the County is less than 20% peak ground acceleration.



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”

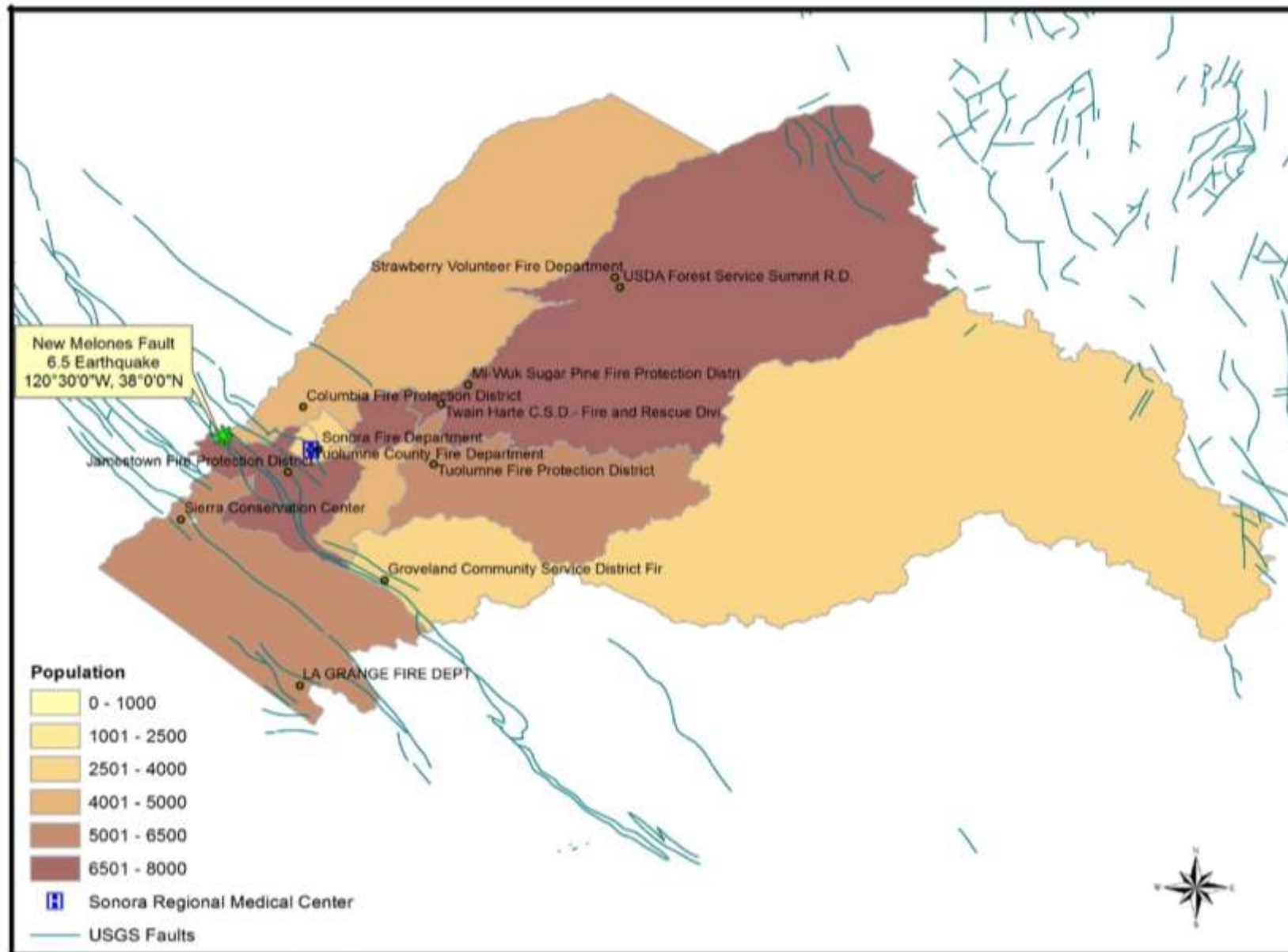
FEMA HAZUS - Natural Loss Analysis

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.



Tuolumne County Multi-Jurisdictional Hazard Mitigation plan





Tuolumne County Multi-Jurisdictional Hazard Mitigation plan

Utility System Dollar Exposure

November 06, 2012

All values are in thousands of dollars

	Potable Water	Waste Water	Oil Systems	Natural Gas	Electric Power	Communication	Total
California							
Tuolumne							
Facilities	18,339	29,737	0	0	259,600	826	308,502
Pipelines	112,424	67,454	0				179,878
Total	130,763	96,913	0	0	259,600	826	488,380
Total	130,763	96,913	0	0	259,600	826	488,380
Region Total	130,763	96,913	0	0	259,600	826	488,380



Tuolumne County Multi-Jurisdictional Hazard Mitigation plan

Building Stock Exposure By General Occupancy

November 06, 2012

All values are in thousands of dollars

	Residential	Commercial	Industrial	Agriculture	Religion	Government	Education	Total
California								
Tuolumne	4,290,537	531,108	105,239	13,541	56,749	34,106	45,481	5,076,761
Total	4,290,537	531,108	105,239	13,541	56,749	34,106	45,481	5,076,761
Region Total	4,290,537	531,108	105,239	13,541	56,749	34,106	45,481	5,076,761



Tuolumne County Multi-Jurisdictional Hazard Mitigation plan

Building Damage by Count by General Occupancy

November 06, 2012

	# of Buildings					Total
	None	Slight	Moderate	Extensive	Complete	
California						
Tuolumne						
Single Family	22,424	0	0	0	0	22,424
Industrial	370	0	0	0	0	370
Commercial	1,075	0	0	0	0	1,075
Other Residential	5,823	0	0	0	0	5,823
Religion	79	0	0	0	0	79
Agriculture	84	0	0	0	0	84
Education	44	0	0	0	0	44
Government	47	0	0	0	0	47
Total	29,946	0	0	0	0	29,946
Region Total	29,946	0	0	0	0	29,946



Tuolumne County Multi-Jurisdictional Hazard Mitigation plan

Waste Water Pipeline Damage

November 06, 2012

	Pipeline Length (KM)	Total Number of Leaks	Total Number of Breaks
California			
Tuolumne	3,373	180	89
Total	3,373	180	89
Region Total	3,373	180	89



Tuolumne County Multi-Jurisdictional Hazard Mitigation plan

Potable Water Pipeline Damage

November 06, 2012

	Pipeline Length (KM)	Total Number of Leaks	Total Number of Breaks
California			
Tuolumne	5,621	230	112
Total	5,621	230	112
Region Total	5,621	230	112



Tuolumne County Multi-Jurisdictional Hazard Mitigation plan

Direct Economic Loss For Transportation

November 06, 2012

All values are in thousands of dollars

	Highway	Railway	Light Rail	Bus Facility	Ports	Ferries	Airport	Total
California								
Tuolumne								
Segments	416,900	0	0					0
Bridges	208,000	0	0					0
Tunnels	0	0	0					0
Facilities	8,500	0	0	0	0	0	1	1
Total	633,400	0	0	0	0	0	1	1
Total	633,400	0	0	0	0	0	1	1
Region Total	633,400	0	0	0	0	0	1	1



Tuolumne County Multi-Jurisdictional Hazard Mitigation plan

Highway Bridge Damage

November 06, 2012

	# of Bridges	Average for Damage State				
		None	Slight	Moderate	Extensive	Complete
California						
Tuolumne	52	1.00	0.00	0.00	0.00	0.00
Total	52	1.00	0.00	0.00	0.00	0.00
Region Average	52	1.00	0.00	0.00	0.00	0.00

Tuolumne County Multi-Jurisdictional Hazard Mitigation plan



Hospital Functionality

November 6, 2012

	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	208	207	99.65	207	99.65	208	99.90	208	99.90	208	99.90
Total	208	207	99.70	207	99.70	208	99.90	208	99.90	208	99.90
Total	208	207	99.70	207	99.70	208	99.90	208	99.90	208	99.90
Region Total	208	207	99.65	207	99.65	208	99.90	208	99.90	208	99.90



Risk Assessment Conclusion

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.

Based on the past history of damaging earthquakes and the fact that Tuolumne County is located within a seismically inactive region, the probability is rated **Low**. Given the properties at risk and the cascading effects, the severity is rated as **High**.



2. HAZARD: FLOODING

Severity: Low	Probability: Medium
----------------------	----------------------------

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 all of 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.

History

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

DATE	EVENT DETAILS
Winter of 1887	The earliest record rainfall amount found in The Union Democrat indicates that 67 inches of rain fell. No damages were noted.
December of 1964	The County Board of Supervisors declares a state of emergency based on localized flooding within the County.
Winter of 1969	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 snow plows were unable to keep the roads open. Flooding was reported as snow melted.

Tuolumne County Multi-Jurisdictional Hazard Mitigation plan



February of 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 of 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 of 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.

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.

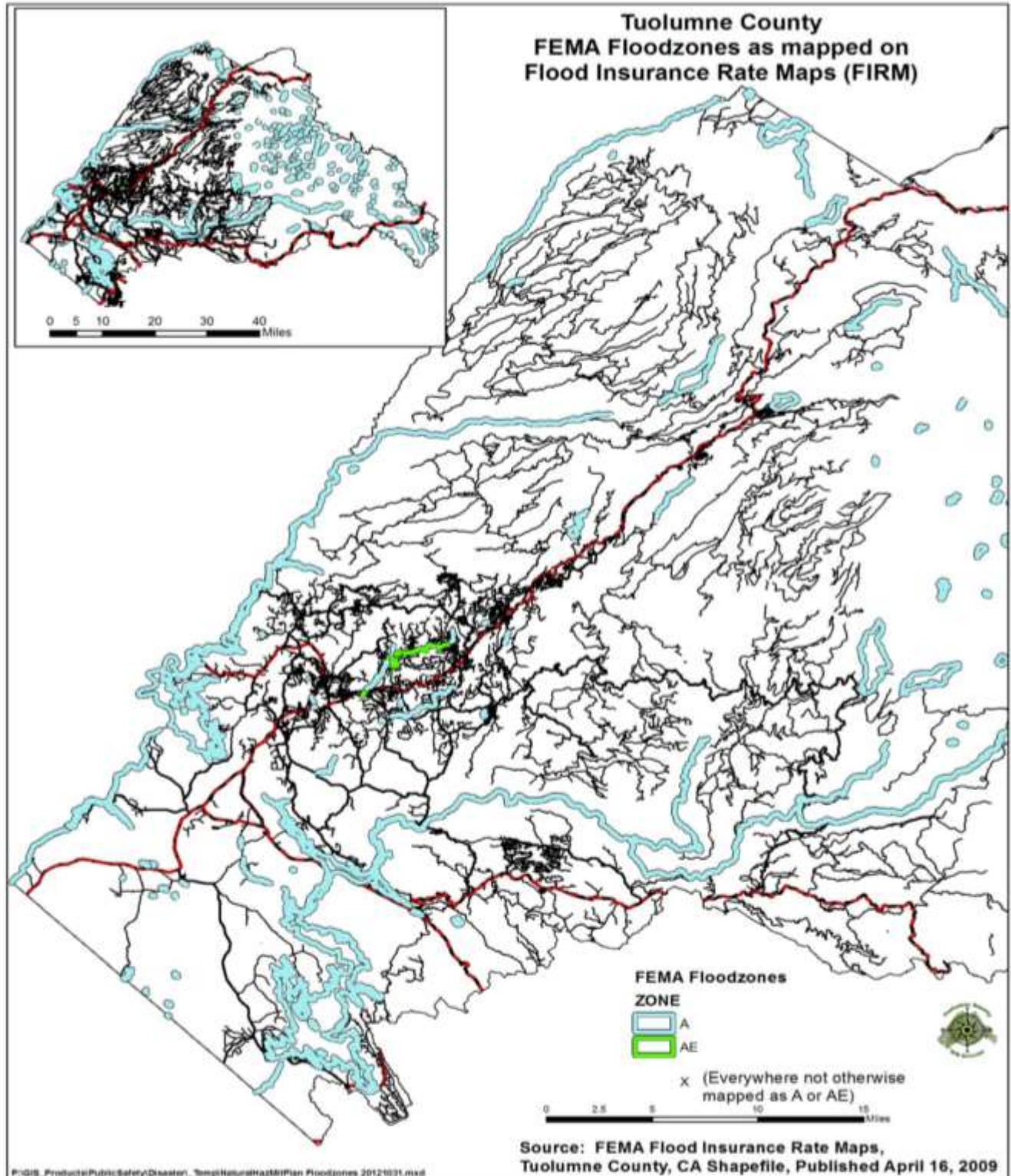
The FIRM map below indicates Flood Zones A and AE.

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

Tuolumne County Multi-Jurisdictional Hazard Mitigation plan



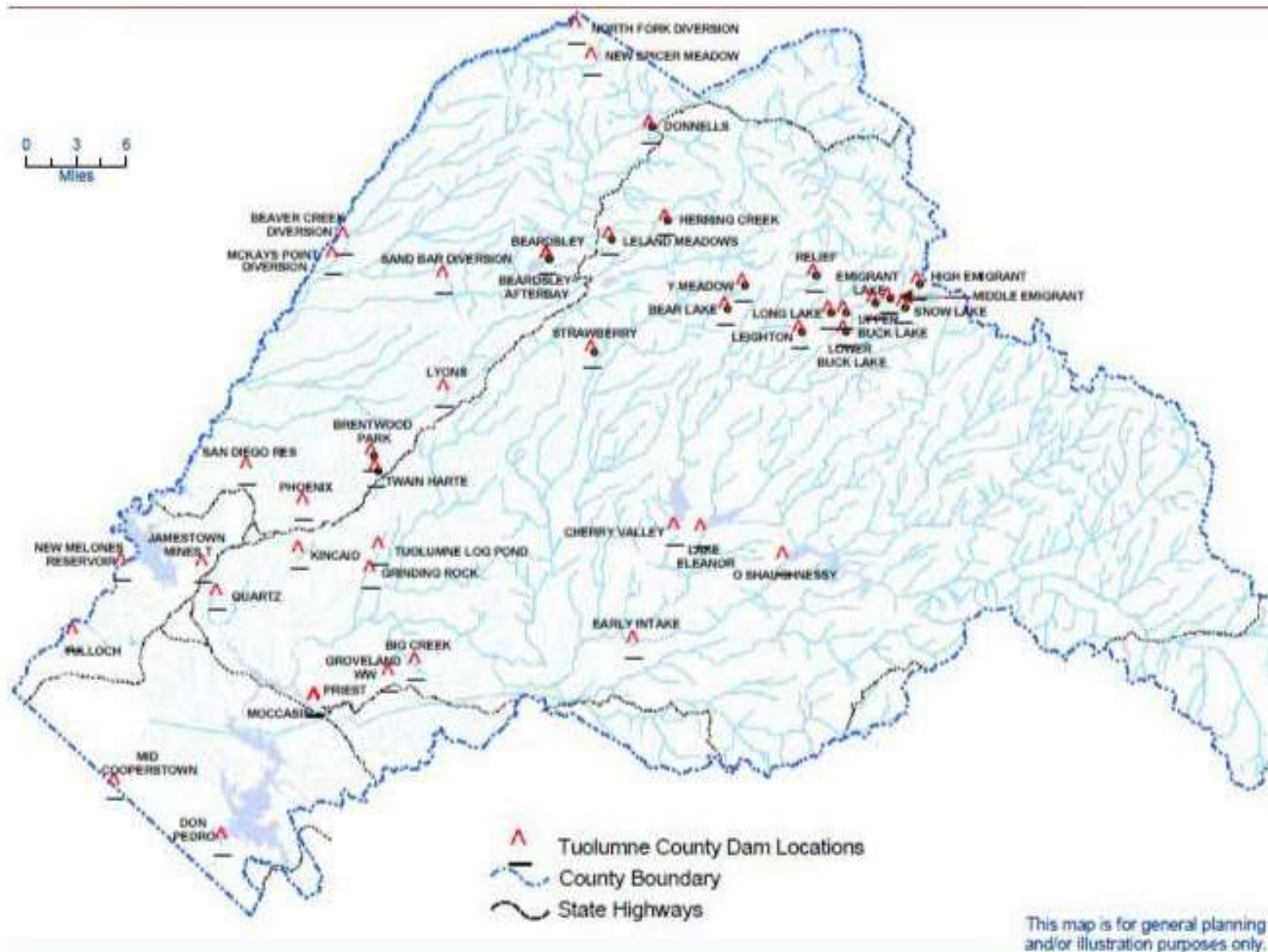
- Flood Zone AE indicates areas subject to inundation by the 1-percent-annual-chance flood event determined by detailed methods.





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

Tuolumne County Multi-Jurisdictional Hazard Mitigation plan



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	Located on the Middle Fork of the Stanislaus River below the Donnell's Dam	Earth and rock fill with gated spillway	3,397 feet	60 minutes	Reservoir contents would flow into New Melones Dam
Big Creek Dam (Also known as Pine Mountain)	Located on Big Creek, just off Highway 120 in Groveland, 30 miles south of Sonora; 26 miles west of the entrance to Yosemite National Park.	Homogenous earth filled dam with an internal granular chimney drain and downstream drainage system and clay core.	120 feet Crest width-555 feet	Unknown	Big Creek flows approx. 4 miles from the dam to the Tuolumne River. Failure could potentially impact people and property on Deerbrush Ct, Cottonwood St. and Wells Fargo Drive.
Cherry Valley Dam	Located on Cherry Creek, ~3 miles upstream from the confluence of Cherry Creek and Eleanor Creek and 7 miles upstream from the Tuolumne River	Earth and rock fill	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	Located on the Middle Fork of the Stanislaus River	Concrete arch dam with gated spillway	4,915 feet	12 minutes	Flood waters would overtop Beardsley Dam by over 30 feet likely causing Beardsley Dam to immediately fail. Beardsley would then empty into New Melones Reservoir.

Tuolumne County Multi-Jurisdictional Hazard Mitigation plan



Don Pedro Dam	Located ~30 miles east of Modest in the foothills of the Sierra Nevada. The Dam and reservoir is on the Tuolumne River, which rises in the high elevations of Yosemite National Park and discharges into the San Joaquin River southwest of Modesto.	Earth and rock fill structure in a v-shaped Gorge	855 feet	90 minutes	Water would flow down 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 LaGrange, Modesto and Waterford.
Early Intake Dam	Located on the Tuolumne River, ~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	Located ~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 of the Goodwin Dam would not pose a major threat to property or human lives.
Lake Eleanor Dam	Located in the Yosemite National Park at its Western edge ~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.

Tuolumne County Multi-Jurisdictional Hazard Mitigation plan



McKay's Point Diversion Dam	Located on the 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 and into the New Melones Reservoir.
Moccasin Dam	Located on Moccasin Creek, ~ 3 miles upstream of the confluence of the Moccasin Creek.	Earth and rock fill	918 feet	18 minutes	Damage to many man-made facilities downstream of the dam.
New Melones Dam	Located on the Stanislaus River near the City of Sonora	Earth and rock fill	808 feet	Unknown	Water would flow downstream impacting people and property in the cities of Escalon, Oakdale and Riverbank.
New Spicer Meadow Dam	Located 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 then 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	Located on the Tuolumne River ~ 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

Tuolumne County Multi-Jurisdictional Hazard Mitigation plan



					between the Hetch Hetchy and Don Pedro Reservoirs. The peak of the flood wave would reach the headwaters of the downstream reservoir about 90 minutes after the dam failure.
Priest Dam	Located on Rattlesnake Creek, a tributary to Moccasin Creek, ~ 7 miles upstream from the confluence of the Moccasin Creek	Earth fill with a central concrete core	2,240	Unknown	Rattlesnake Creek, Big Jackass Creek, and Moccasin Creek will be affected, flowing on down to the Don Pedro Reservoir on the Tuolumne river.
Lyons Dam	Located on the South Fork of the Stanislaus River about 13.7 miles northeast of Sonora	Concrete arch dam	4,226 ft.	6 min	Italian Bar and Melones Reservoir will be inundated with water traveling at speeds of 62-95 MPH.
Strawberry Dam aka Pinecrest Dam	Located on the South Fork of the Stanislaus River about 31 miles northeast of Sonora	Concrete-faced rockfill	5,623 ft.	30 min	The areas of Strawberry, Boy Scouts of America camp, Philadelphia Ditch, Lyons Dam and Italian Bar would be inundated with swift water flow



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 has adopted a Flood Damage Prevention Ordinance and has developed a Storm Drainage Master Plan to assist in long range plan efforts for the improvement of flood control efforts.

Plans and Programs

The County and City of Sonora have and 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 Resource Agency, 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.

Relationship to Other Hazards - Cascading Effects

While there are some benefits associated with flooding, such as the scouring of river beds, 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.** 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.

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, based on the fact that only limited areas of the developed areas of the County are exposed, is **Low**.



3. HAZARD: LANDSLIDES AND SINKHOLES

Severity: Low	Probability: Low
----------------------	-------------------------

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.

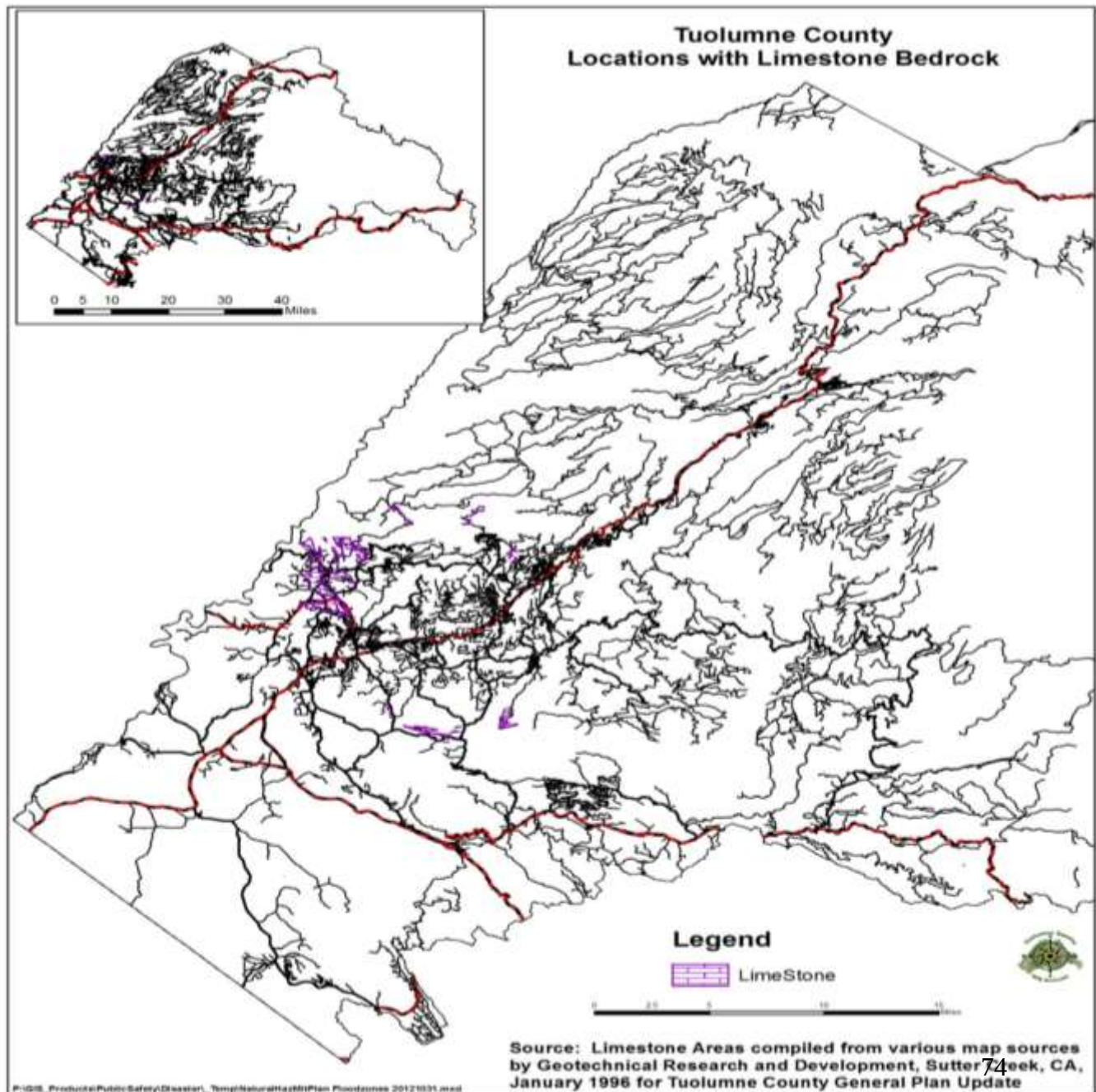
A sinkhole, also known as a sink, or cenote, is a natural depression or hole in the earth's surface caused by a process known as karst — the chemical dissolution of carbonate rocks; more commonly known as limestone and marble. Rainfall absorbs small amounts of some carbon dioxide as it falls through 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.



Tuolumne County Multi-Jurisdictional Hazard Mitigation plan

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.

Significant carbonate rock deposits (limestone) are found in Tuolumne County (see map below).





History

Natural occurring landslides do not typically occur in the County and there have been no significant documented incidents of landslides. 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.

Sinkhole activity from abandoned mining activity has, and could possible 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.

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.



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 in the area of 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.

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



4. HAZARD: VOLCANO

Severity: Low	Probability: Medium
----------------------	----------------------------

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. The table below 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

Tuolumne County Multi-Jurisdictional Hazard Mitigation plan



100.1	Steamboat Springs	Nevada, United States	39.375	-119.72	1415	Lava dome	Pleistocene-Fumarol	Quaternary 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.

Volcano Index:	
Tuolumne County	----- 0.0102
California	----- 0.0070
United States	0.0021

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.

Risk Assessment Conclusion

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.

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



5. HAZARD: WILDFIRE

Severity: High	Probability: High
-----------------------	--------------------------

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

History

The County has a significant wildfire history. The following is a listing of major wildfires (750 acres or more) 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.

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 rain fall. 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. The lower elevations of the County,

Tuolumne County Multi-Jurisdictional Hazard Mitigation plan



or foothills, have a wide variety of topography features, from rolling grass lands to severe bluffs and table top 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).

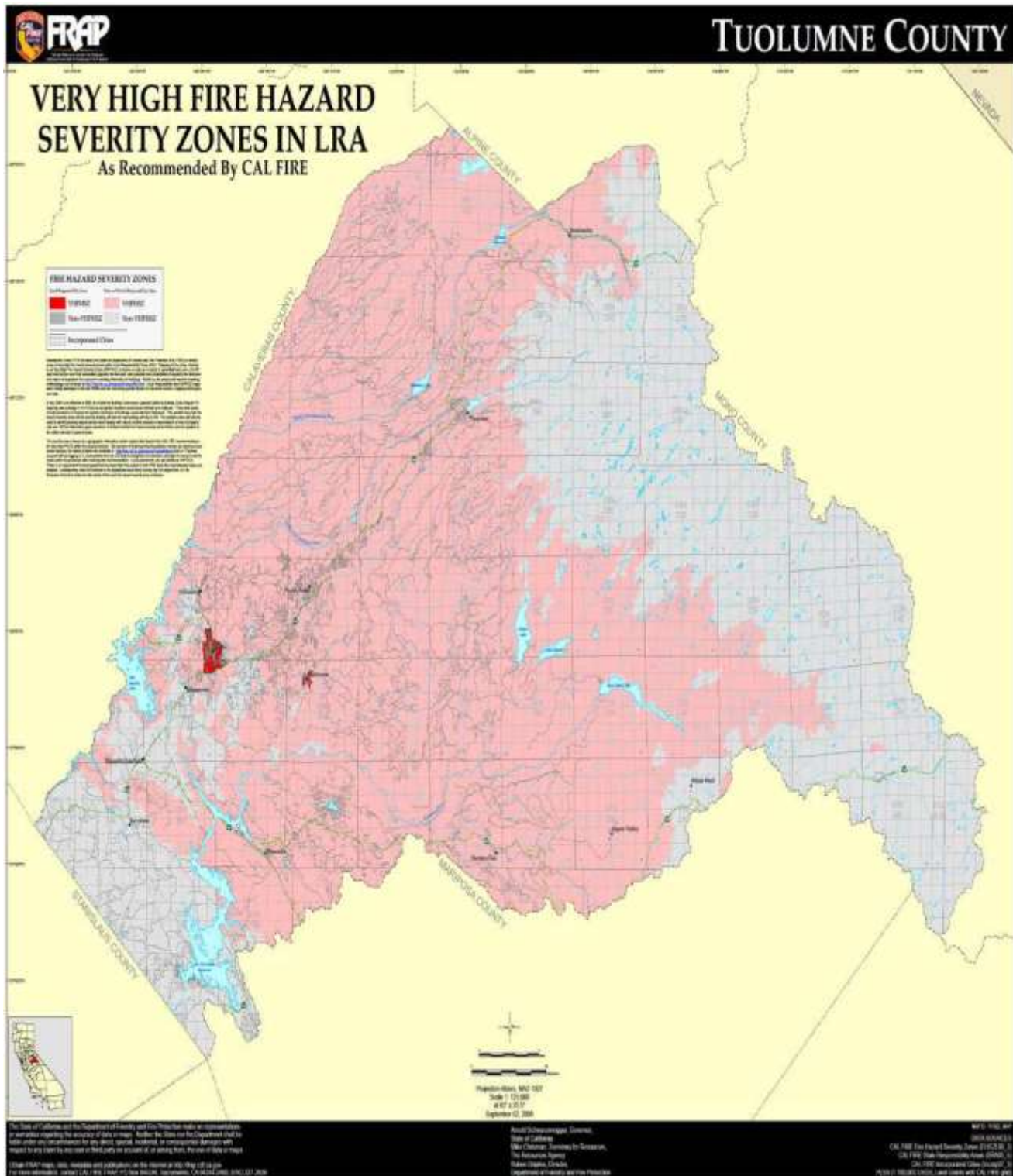
Fuel Hazards in Tuolumne

Fuel	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 Colombia, Sonora, and Jamestown
Brush	Very High	Large fuel beds along Highway 49 in the southwest portions of the County. (Moccasin area)
Brush/Hardwood	High	Oak woodland areas generally found east of Highway 49 in elevations of 1000 to 4000 feet
Heavy Timber	Very High	Primarily found above 3,500 feet; Twain Harte, Mi-Wuk, Sugar Pine, Pinecrest, and Long Barn

Tuolumne County Multi-Jurisdictional Hazard Mitigation plan



Tuolumne County Wildfire High-Value High-Risk Map





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.

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 resistive building and roofing materials, and other fire-related construction methods.

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 wildland fire areas.

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 located in areas designated as being a "Very High Fire Hazard Severity Zone".

Plans and Programs

Existing Fire Protection Services

Within the County, Tuolumne County Fire/CAL FIRE along with seven fire districts and one city fire department provide life and property emergency response. In addition to services traditionally provided by most fire protection agencies nationwide, these agencies work cooperatively with U.S. Forest Service and the National Park Service in providing wildfire response in Tuolumne County.

FireSafe Council

The Highway 108 and Yosemite Foothills (South County) FireSafe Councils are operated entirely by volunteers and is a 501(C)3 non-profit organization incorporated in 2001/2003. The FireSafe Councils are composed of individuals, public and private businesses, and governmental agencies that share a common interest in preventing and reducing loss from wildfires. Both FireSafe Councils are members of the California State FireSafe Council.



Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan

The Mission of the FireSafe Councils are:

- To educate the public in order to significantly increase public awareness about fire risk and ways that property owners can reduce that risk.
- To develop creative ways to make compliance with fire safety regulations easier and more effective for property owners.
- To reduce this risk through fire prevention, fire safety, fuel reductions, and community preparedness. This involves cooperation with other agencies and organizations to identify and provide for needed evacuation routes in affected areas.
- To 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



Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan

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.

Source: Tuolumne County Community Wildfire Protection Plan (CWPP) and USFS – Stanislaus National Forest, Fire Management Officer Tom James (Retired). Updated by Allen Johnson SWIFT Coordinator and USFS – Stanislaus National Forest, District Fire Management Officer (Retired) 10/2017

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.

Risk Assessment Conclusion

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



6. HAZARD: EXTREME WEATHER

Severity: Medium	Probability: Medium
-------------------------	----------------------------

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.

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.

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 Multi-Jurisdictional Hazard Mitigation Plan

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 working to write 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.

Wind Storms

Resulting from air movement from areas of high pressure to those of low air pressure, wind storms 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 wind storm has sustained winds of 55 to 74 miles/hour.

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.

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.

Heavy Snow Fall

Heavy snow fall is common in the higher elevations of the County. Occasionally, unsuspecting travelers 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.



Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan

Freeze

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.

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 day time 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

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

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 storm. The County came to a standstill as the limited number of snow plows 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 together into one large fire that caused millions of dollars in damage to timber resources and structures.
December 1998	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 a number of traffic accidents.
February 1999	Freeze – A large winter storm impacted central California during the afternoon of February 7 th . 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.



Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan

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 occurring from July 1 – 31.
Winters 2007, 2008, 2009	Drought – Three extremely dry winters resulted in a considerably reduced snow pack throughout the Sierra Nevada range and reduced rainfall in the Central Valley. Agricultural losses were significant statewide. Increased fire activity and more severe fire seasons were reported. 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 winds, caused nearly \$750,000 in damages across the County. Damages to the flume systems, road ways, the electrical distribution system, and tree damage to numerous residences resulted 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 wash-outs, 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.



Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan

Hazard Potential

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 in Severe Drought in October 2013. 5 years later, Tuolumne County is classified as abnormally dry.

Drought Classification

None D0 (Abnormally Dry) D1 (Moderate Drought) D2 (Severe Drought) D3 (Extreme Drought) D4 (Exceptional Drought)



October 1, 2013



October 2, 2018

Wind Storms

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.



Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan

Thunderstorms/Lightning

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.

Hail Storms

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

Freeze and Heavy Snow Fall

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.

Extreme Heat

In the United States, heat waves are the most lethal type of weather phenomenon. Between 1992 and 2001, deaths from excessive heat in the United States numbered 2,190, compared with 880 deaths from floods and 150 from hurricanes. 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.

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 routinely issues advisories and warnings when unusual periods or life-threatening extreme weather is forecasted.

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.



Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan

The Tuolumne County Community Resource Agency – 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

Risk Assessment Conclusion

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.



7. HAZARD: HAZARDOUS MATERIALS

Severity: Medium	Probability: Low
-------------------------	-------------------------

Hazard Definition

A hazardous material is any substance, natural or man-made, that may be harmful to life or to the environment. Hazardous material incidents may occur at fixed facilities where as required by law, most likely, the occupants have filed site specific emergency response contingency and evacuation plans. Incidents may also occur along land, water or air transportation routes as a result of aircraft or other transportation accidents. Improper use of agricultural chemicals and illegal dumping will also pose a hazardous materials risk.

Hazardous material incidents differ from other emergency response situations because of the wide diversity of causative factors and the pervasiveness of the potential threat. Circumstances such as the prevailing wind and geographic features in the vicinity of emergency incidents are relevant factors that may greatly increase the danger.

The threat of a major hazardous material incident in the planning area would be likely derived from one of the following sources:

- Industrial/Agriculture
- Transportation
- Utilities – propane
- Clandestine Operations

History

The County has a very limited history of hazardous materials spills and releases. Most incidents are accidental and are transportation based (automobile accidents) and are very limited in number. Occasionally, once or twice a year, a clandestine lab operation will be discovered requiring a cleanup operation. Law enforcement reports these incidents to be on the decline as more sophisticated, out of the area, operations have replaced small part time operators.

Hazard Potential

Industrial/Agriculture

Tuolumne County currently has over 200 industrial and agricultural sites identified as using hazardous materials in quantities that require filing a Business Emergency Response Plan. The primary hazardous materials used in the County for industrial and agricultural applications are anhydrous ammonia, sulfuric acid and chlorine gas.

Anhydrous ammonia is an efficient and widely used source of nitrogen fertilizer. However, it is one of the most potentially dangerous chemicals used in agriculture. Ammonia gas is



Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan

colorless and has a sharp, penetrating odor. When used as an agricultural fertilizer, it is compressed into a liquid. In the liquid state, it is stored in specially designed tanks strong enough to withstand internal pressures of at least 250 pounds per square inch (psi). During warm weather, the temperature of the liquid anhydrous ammonia in the tank increases and the liquid expands, causing the vapor pressure in the tank to increase.

When pressure is released, liquid anhydrous ammonia quickly converts to a gas. When injected into the soil, the liquid ammonia expands into a gas and is readily absorbed in the soil moisture. Similarly, in contact with the eyes, skin, or mucous membranes, ammonia will cause rapid dehydration and severe burns as it combines with the moisture of the body.

Dangers associated with sulfuric acid include: 1) It is corrosive if inhaled, ingested or comes into contact with the eyes or skin, 2) It poses a risk of fire and explosion on contact with base(s), combustible substances, oxidants, reducing agents or water, and 3) It gives off irritating or toxic fumes in a fire.

Chlorine is a highly toxic, corrosive gas. Although chlorine doesn't burn, it is a strong oxidizing agent that poses a serious fire and explosion risk because it promotes combustion, like oxygen. Most combustible materials will ignite and/or burn in chlorine atmospheres, forming irritating and toxic gases. Containers or cylinders may rupture violently due to over-pressurization if exposed to fire or excessive heat for a sufficient period of time. Intense local heat (above 200 degrees C) on the steel walls of chlorine cylinders can cause an iron/chlorine fire resulting in rupture of the container. Chlorine gas is heavier than air and will collect and persist in pits, hollows, depressions, and other confined or low-lying areas.

In addition to the above listed hazardous chemicals, radiological materials are used within the County for medical testing and research. They are used under closely controlled conditions.

Transportation Related Hazardous Materials

Highways 120, 49 and 108 are the major transportation routes through this County. As none of these State Routes are Interstates, the likelihood of a significant quantity of hazardous materials being routinely transported through the County is low.

Two airports exist in Tuolumne County, Columbia Airport and Pine Mountain Lake Airport. Both of these airports contain electronic component manufacturers and aircraft repair shops. Thus, solvents, etching agents, stored fuel, and radioactive materials may be encountered.

Utilities-Propane

Natural gas service to the area does not exist therefore the use of propane tanks and bottles are very common. Propane is a colorless compressed gas with a faint odor at high concentrations. Fuel grades contain mercaptans which have a disagreeable odor. Propane



Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan

is extremely flammable. The gas is heavier than air and may spread long distances. As a result, distant ignition and flashback are possible. It is also a simple asphyxiant which means the gas may reduce oxygen available for breathing. When there is rapid evaporation of liquid from cylinder, frostbite may occur.

Clandestine Operations

The illegal dumping of hazardous waste from clandestine methamphetamine lab operations solvents can occur on both public and private property. As the costs and restrictions increase for legitimate hazardous waste disposal sites, it can be anticipated that illegal dumping of hazardous materials will increase proportionately. Of special concern is the impact of illegal dumping into the municipal sewer systems which service the urban areas and the associated impacts on the waste water treatment plants.

Plans and Programs

The local resources to handle a hazardous materials emergency are limited. The county has established mutual aid agreement with neighboring Calaveras County for the response of their Hazardous Materials Response Team. This HAZMAT team is made up of individuals from a variety of participating fire departments in Calaveras County. This team takes time to assemble and respond. It is estimated that significant out-of-county assistance will not be available for a period of at least four to five hours.

Relationships to Other Hazards – Cascading Effects

Hazardous materials events can be very problematic due to the following: 1) The need to evacuate large areas of a community, 2) There is a high fear factor associated with hazardous materials, and 3) A significant amount of resources is needed to contain and clean up spills and releases.

Risk Assessment Conclusion

Hazardous Material emergencies in the planning area have occurred on a very limited basis and that trend will most likely continue. In general, the potential for a large hazardous material emergency exists primarily through transportation accidents of surface vehicles on major highways. In this regard, the exposure in Tuolumne County is low given the limited use of these materials and the lack of fixed facilities countywide. Clandestine operations, while often difficult and expensive to resolve do not typically present a significant threat to the general public. Based on the past history, limited exposure to transportation accidents, and the lack of fixed facilities the severity has been rated as **Medium** and the probability as **Low**.

Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan



VI. VULNERABILITY ASSESSMENT

A. DMA 2000 Requirements

DMA Requirement §201.6(c)(2)(ii):	The risk assessment shall include a description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community.
DMA Requirement §201.6(c)(2)(ii)(A):	The plan should describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas.
DMA Requirement §201.6(c)(2)(ii)(B):	The plan should describe vulnerability in terms of an estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(i)(A) of this section and a description of the methodology used to prepare the estimate.
DMA Requirement §201.6(c)(2)(ii)(C):	[The plan should describe vulnerability in terms of] providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land decisions.
DMA Requirement §201.6(c)(2)(iii):	For multi-jurisdictional plans, the risk assessment must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.

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	Haz Mat	Sinkholes
Probability	L	H	M	M	M	L	L
Severity	H	H	M	L	L	M	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



Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan

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.

Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan



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	Square Footage	Year Built	Total Value (\$)	Wildfire	Flood	Earthquake	Landslides/ Sinkholes	Volcano	Extreme Weather	Hazardous Materials
SHERIFFS DEPARTMENT	28 LOWER SUNSET DRIVE	SONORA	95370	23,768	1964	8,408,561			√	√	√	√	√
TUOLUMNE GENERAL HOSPITAL (Out of Service)	101 HOSPITAL ROAD	SONORA	95370	33,849	1968	20,607,261		√	√	√	√	√	√
HEALTH AND WELLNESS BUILDING	105 HOSPITAL ROAD	SONORA	95370	20,700	1967	15,190,485			√	√	√	√	√
LONG TERM CARE FACILITY	101 HOSPITAL ROAD	SONORA	95370	8,506	1960	1,535,425			√	√	√	√	√
OLD COUNTY COURTHOUSE	41 WEST YANEY AVENUE	SONORA	95370	18,882	1899	4,149,222			√	√	√	√	√
VETERAN'S MEMORIAL HALL	9 N. WASHINGTON STREET	SONORA	95370	10,170	1950	2,080,072			√	√	√	√	√
SONORA YOUTH CENTER	732 SOUTH BARRETTA	SONORA	95370	2,960	1960	444,622			√	√	√	√	√
YOUTH CENTER RESTROOMS	732 SOUTH BARRETTA	SONORA	95370	198	1983	19,757			√	√	√	√	√
PROBATION BUILDING	465 SOUTH WASHINGTON	SONORA	95370	8,400	1946	1,069,736		√	√	√	√	√	√
STORAGE BUILDING	465 SOUTH WASHINGTON	SONORA	95370	370		66,094			√	√	√	√	√
SUPERIOR COURT BUILDING	60 NORTH WASHINGTON ST	SONORA	95370	6,042	1945	1,131,575			√	√	√	√	√
COUNTY - ADMINISTRATION CENTER	2 SOUTH GREEN STREET	SONORA	95370	39,864	1980	12,096,014			√	√	√	√	√



Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan

FRANCISCO BUILDING	48 WEST YANEY AVENUE	SONORA	95370	57,005	1983	9,585,712		√	√	√	√	√
MEMORIAL HALL	18375 FIR STREET	TUOLUMNE	95379	11,610	1936	2,589,923	√	√	√	√	√	√
COUNTY YARD - EQUIPMENT SHED	18870 BIRCH STREET	TUOLUMNE	95379	4,180	1950	199,630		√	√	√	√	√
COUNTY YARD - OIL SHED	18870 BIRCH STREET	TUOLUMNE	95379	28		1,446		√	√	√	√	√
COUNTY YARD-OFFICE/LIBRARY	18870-18880 BIRCH STREET	TUOLUMNE	95379	1,326	1950	205,231		√	√	√	√	√
COUNTY YARD-VEHICLE SERVICE BLDG	10727 NORTH AIRPORT ROAD	COLUMBIA	95310	5,521	1960	855,283		√	√	√	√	√
COUNTY YARD-SHOP BUILDING	10727 NORTH AIRPORT ROAD	COLUMBIA	95310	2,758	1960	231,842		√	√	√	√	√
COUNTY YARD-WAREHOUSE BLDG	10727 NORTH AIRPORT ROAD	COLUMBIA	95310	2,800	1960	189,482		√	√	√	√	√
FUEL SHED	10727 NORTH AIRPORT ROAD	COLUMBIA	95310	66	1960	1,683		√	√	√	√	√
AIRPORT HANGAR	10723 AIRPORT ROAD	COLUMBIA	95310	2,400	1955	245,395		√	√	√	√	√
AIRPORT/BIGBEE HANGAR	10723 AIRPORT ROAD	COLUMBIA	95310	4,026	1965	419,975		√	√	√	√	√
AG. COMM LAB	22365 SOUTH AIRPORT ROAD	SONORA	95370	592	1985	47,852		√	√	√	√	√
AIRPORT	10723 AIRPORT ROAD	COLUMBIA	95310	26,100	1960	324,986		√	√	√	√	√
AIRPORT	10723 AIRPORT ROAD	COLUMBIA	95310	20,800	1980	258,992		√	√	√	√	√
EQUIPMENT	BALD MOUNTAIN ROAD	COLUMBIA	95310	0	0	49,885		√	√	√	√	√
COUNTY YARD	18165 7TH AVE.	JAMESTOWN	95327	945	1945	114,106		√	√	√	√	√
COUNTY YARD	18188 7TH AVE.	JAMESTOWN	95327	4,387	1950	419,846		√	√	√	√	√
COUNTY YARD	18188 7TH AVE.	JAMESTOWN	95327	216		3,875		√	√	√	√	√
COUNTY YARD	18188 7TH AVE	JAMESTOWN	95327	96		2,176		√	√	√	√	√
COUNTY YARD	18165 SEVENTH AVENUE	JAMESTOWN	95327	504	1950	102,012		√	√	√	√	√
COUNTY YARD	18165 7TH AVE.	JAMESTOWN	95327	117		2,490		√	√	√	√	√



Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan

3-240-02	10633 RESERVOIR ROAD	JAMESTOWN	95327	904	1955	82,213			√	√	√	√	√
COUNTY YARD	11240 WARDS FERRY ROAD	BIG OAK FLAT	95305	3,956	1960	561,039			√		√	√	√
COUNTY YARD	11240 WARDS FERRY ROAD	BIG OAK FLAT	95305	960	1950	56,892			√		√	√	√
COUNTY YARD	11240 WARDS FERRY ROAD	BIG OAK FLAT	95305	224	1950	11,206			√		√	√	√
COUNTY YARD	11240 WARDS FERRY ROAD	BIG OAK FLAT	95305	104	1950	2,891			√		√	√	√
COUNTY YARD	11240 WARDS FERRY ROAD	BIG OAK FLAT	95305	1,082	1950	60,790			√		√	√	√
COUNTY YARD	11240 WARDS FERRY ROAD	BIG OAK FLAT	95305	900	1950	20,739			√		√	√	√
COUNTY YARD	22099 LAVA ROAD	TWAIN HARTE	95383	1,100	1960	37,505			√		√	√	√
COUNTY YARD	PINECREST DUMP ROAD	PINECREST	95364	3,747	1955	475,917			√		√	√	√
COUNTY YARD	30740 HWY 108 PINECREST DUMP ROAD	PINECREST	95364	1,400	1955	66,096			√		√	√	√
COUNTY YARD	30740 HWY 108 PINECREST DUMP ROAD	PINECREST	95364	2,130	1955	84,895			√		√	√	√
COUNTY YARD	30740 HWY 108 PINECREST DUMP ROAD	PINECREST	95364	336	1955	5,454			√		√	√	√
PIONEER PARK	24369 PARROTS FERRY ROAD	COLUMBIA	95310	400	1975	36,524			√	√	√	√	√
VEHICLES	2 SOUTH GREEN STREET	SONORA	95370	0		18,843,000			√	√	√	√	√
ADULT DAY HEALTHCARE	101 E. HOSPITAL ROAD	SONORA	95370	5,242	1987	1,013,360			√	√	√	√	√
HUMAN SERVICES	20075 CEDAR ROAD NORTH	SONORA	95370	21,075	1986	3,043,062			√	√	√	√	√
MAIN LIBRARY (RENTS REQ.)	480 GREENLEY ROAD	SONORA	95370	15,992	1987	5,642,057			√	√	√	√	√
OLD FIRE STATION #55	PINECREST AVE.	PINECREST	95364	2,542	2000	160,501			√		√	√	√
CONTRACTORS	2 SOUTH GREEN	SONORA	95370	0	0	3,208,163			√	√	√	√	√



Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan

EQUIPMENT	STREET												
SENIOR CENTER	540 GREENLEY RD	SONORA	95370	9,672	1990	885,940			√	√	√	√	√
STORAGE #1 & STORAGE #2	540 GREENLEY RD	SONORA	95370	120	1990	2,408			√	√	√	√	√
STATION #58	24190 KEWIN MILL ROAD	CEDAR RIDGE	95924	2,000	1984	270,528	√		√	√	√	√	√
STATION #56	16925 MONO VISTA ROAD	SONORA	95370	1,876	1970	336,802	√		√	√	√	√	√
STATION #52	JACKSONVILLE ROAD	SONORA	95370	2,000	1965	269,038	√		√	√	√	√	√
STATION #61	HWY 120 AT RED HILL ROAD	CHINESE CAMP	95309	2,000	1990	471,614	√		√		√	√	√
STATION #63	23260 ELMORE RD	GROVELAND	95321	2,780	1988	272,012	√		√		√	√	√
STATION #64	2990 HIGHWAY 132	DON PEDRO	95329	2,000	1960	270,528	√		√		√	√	√
GROVELAND YOUTH CENTER	18933 FERRETTI ROAD	GROVELAND	95370	1,196	1973	134,911	√		√		√	√	√
STORAGE	229 W. JACKSON STREET	SONORA	95370	4,700	1960	547,190			√	√	√	√	√
HUMAN SERVICES BUILDING	20111 CEDAR RD. NORTH	SONORA	95370-5939	15,621	1983	2,548,026			√	√	√	√	√
PUBLIC DEFENDERS OFFICE	99 NORTH WASHINGTON	SONORA	95370-9127	2,706	1949	613,751			√	√	√	√	√
TELEPHONE EQUIPMENT	2 SOUTH GREEN STREET	SONORA	95370	0		1,083,277			√	√	√	√	√
ANIMAL CONTROL FACILITY	10040 VICTORIA WAY	JAMESTOWN	95327	5,338	1997	940,288			√	√	√	√	√
AMBULANCE MEDIC	20591 NORTH SUNSHINE ROAD	SONORA	95370	14,640	1985	1,076,745			√	√	√	√	√
INDEPENDENT LIVING SHELTER	20591 NORTH SUNSHINE ROAD	SONORA	95370	36,130	2008	1,367,735			√	√	√	√	√
FIRE STATION #57	21720 PHOENIX LAKE ROAD	SONORA	95370	2,200	1998	382,878			√	√	√	√	√
FIRE STATION #53	20810 TOMIRA MEADOWS	SONORA	95370	1,764	2002	382,878			√	√	√	√	√
COUNTY AIRPORT	10713 AIRPORT ROAD	COLUMBIA	95310-9727	950	1950	41,909			√	√	√	√	√



Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan

COUNTY AIRPORT	10723 AIRPORT ROAD	COLUMBIA	95310-9727	407	1960	46,769			√	√	√	√	√
COUNTY AIRPORT	10800 AIRPORT ROAD	COLUMBIA	95310-9727	10,500	1940	425,559			√	√	√	√	√
COUNTY AIRPORT	10723 AIRPORT ROAD	COLUMBIA	95310-9727	960	1940	36,700			√	√	√	√	√
COUNTY AIRPORT	10749 AIRPORT ROAD	COLUMBIA	95310-9727	289	1973	8,345			√	√	√	√	√
COUNTY AIRPORT	10747 AIRPORT ROAD	COLUMBIA	95310-9727	159	1975	3,552			√	√	√	√	√
COUNTY AIRPORT	10753 AIRPORT ROAD	COLUMBIA	95310-9727	228	1975	4,940			√	√	√	√	√
COUNTY AIRPORT	10767 AIRPORT ROAD	COLUMBIA	95310-9727	196	1960	4,321			√	√	√	√	√
COUNTY AIRPORT	10759 AIRPORT ROAD	COLUMBIA	95310-9727	171	1966	17,638			√	√	√	√	√
COUNTY AIRPORT	10723 AIRPORT ROAD	COLUMBIA	95310-9727	27,000	1950	1,566,112			√	√	√	√	√
COUNTY AIRPORT	22353B SOUTH AIRPORT ROAD	COLUMBIA	95310	2,800	1955	1,430,860			√	√	√	√	√
COUNTY AIRPORT	22365 SOUTH AIRPORT ROAD	SONORA	95370-9096	700	1977	110,003			√	√	√	√	√
COUNTY AIRPORT	10723 AIRPORT ROAD	COLUMBIA	95310-9727	3,920	1967	93,983			√	√	√	√	√
COUNTY AIRPORT	10723 AIRPORT ROAD	COLUMBIA	95310-9727	600	1967	12,349			√	√	√	√	√
JAMESTOWN YOUTH CENTER	10540 7TH STREET	JAMESTOWN	95327	1,440	1950	270,284			√	√	√	√	√
ADMINISTRATION BUILDING	14 SECO STREET	SONORA	95370-4947	1,450	1980	2,594,153			√	√	√	√	√
PATROL BUILDING	11 ELM STREET	SONORA	95370	1,450	1999	153,968			√	√	√	√	√
GROVELAND LIBRARY/MUSEUM	18990 HIGHWAY 120	GROVELAND	95321	4,284	1999	1,088,005	√		√		√	√	√
DISTRICT ATTORNEY'S OFFICE	423 NORTH WASHINGTON	SONORA	95370	9,625	1960	1,471,826			√	√	√	√	√
LIBRARY BRANCH	24411 SIERRA PARK DRIVE	MI-WUK	95346	1,069	1958	175,994			√		√	√	√



Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan

LIBRARY BRANCH	18701 TIFFENI RD-STE. 1E & F	TWAIN HARTE	95383	1,713	1985	5,245	√		√		√	√	√
MENTAL HEALTH OFFICE	310 STOCKTON RD	SONORA	95370	1,000	1945	19,668			√	√	√	√	√
ROCCA PARK-RESTROOM	18226 MAIN ST.	JAMESTOWN	95327	850		193,140			√	√	√	√	√
ROCCA PARK-GAZEBO	18226 MAIN ST.	JAMESTOWN	95327	200		62,082			√	√	√	√	√
TUOLUMNE COUNTY OFFICE/STORAGE	12980 CLEMENTS RDOAD	PINE MOUNTAIN LAKE	95321	1,164	1988	270,859			√		√	√	√
BOAT PATROL/SEARCH AND RESCUE	10915 NORTH AIRPORT ROAD	COLUMBIA	95310	4,500	1980	953,241			√		√	√	√
SHERIFF'S SUB STATION	13769A MONO WAY	SONORA	95370	2,000	1984	73,535			√	√	√	√	√
SHERIFF'S SUB STATION	1274 MUELLER DR	GROVELAND	95321	1,705	1960	71,362			√		√	√	√
SHERIFF'S SUB STATION	22698 MEADOW DRIVE	TWAIN HARTE	95333	750	1930	57,788			√		√	√	√
SHERIFF'S SUB STATION	18394 BAY STREET	TUOLUMNE	95379	300	1940	23,298			√		√	√	√
SHERIFF'S SUB STATION	2290 HIGHWAY 132	LA GRANGE	95309	100		16,399			√		√	√	√
CHILDREN'S SHELTER	20635 NORTH SUNSHINE ROAD	WILLOW SPRINGS	93560	4,836	2004	944,613			√		√	√	√
LIBRARY/MUSEUM BUILDING	18990 HIGHWAY 120	GROVELAND	95321	10,758	2001	1,609,981			√		√	√	√
SHERIFF'S DEPT- INVESTIGATIONS	1000 TECHNOLOGY DR.	COLUMBIA	95310	28,500	1995	1,611,915			√	√	√	√	√
LEASED COPIERS	2 SOUTH GREEN STREET	SONORA	95370-4699	0		441,203			√	√	√	√	√
AMBULANCE GROVELAND	11850 POWDER HOUSE ROAD	GROVELAND	95321	1,386	2003	1,384,510			√		√	√	√
AIRPORT COLUMBIA HOUSE	10915 NORTH AIRPORT ROAD	COLUMBIA	95370	3,224	1966	289,998			√		√	√	√
EMERGENCY CHILDREN'S SHELTER #2	20591 NORTH SUNSHINE ROAD	SOULSBYVILLE	95372	1,084	1978	252,172			√		√	√	√
FIRE STATION MI-WUK #77	24397 SIERRA PARK ROAD	MI-WUK	95346	885	1958	201,656			√		√	√	√
LIBRARIES PINECREST	421 PINECREST LAKE RESORT	PINECREST	95364	297	1986	62,637			√		√	√	√



Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan

TUOLUMNE YOUTH CENTER/LIBRARY	18636 MAIN STREET	TUOLUMNE	95379	3,370	2004	1,133,963		√	√	√	√
COMPUTER EQUIPMENT	2 SOUTH GREEN STREET	SONORA	95370	0		3,490,086		√	√	√	√
INFORMATION SYSTEMS & SERVICES	1015 MORNING-STAR DRIVE	SONORA	95370	6,510	2004	1,224,496		√	√	√	√
FACILITIES MGMT STORAGE BLDG	226 W. JACKSON STREET	SONORA	95370	1,500	1930	203,719		√	√	√	√
JAMESTOWN MINE-LAB	HISTORICAL BUILDING	JAMESTOWN	95327	3,200		456,535		√	√	√	√
JAMESTOWN MINE-VACANT HOUSE	NO ADDRESS	JAMESTOWN	95327	1,000		55,566		√	√	√	√
FIRE STATION 54 / SCHOOL	25910 LONG BARN ROAD	LONG BARN	95335	7,194	1958	834,300		√	√	√	√
FIRE ADMINISTRATION / AMBULANCE	18440 STRIKER CT	SONORA	95370	11,360	2006	3,692,462		√	√	√	√
JAIL	SMOKE STREET	JAMESTOWN	95327	400	1852	78,908		√	√	√	√
HISTORIC "BALL" MILL	21250 HWY 120	GROVELAND	95321	0		0		√	√	√	√
BEHAVIORAL HEALTH OFFICES	197 MONO WAY	SONORA	95370	8,800	1975	1,241,463		√	√	√	√
JAMESTOWN MINE - HAZMAT LOCKER	17855 HIGH SCHOOL ROAD	SONORA	95370	440		67,668		√	√	√	√
FACILITIES OFFICE-MED. RECORDS/BALLOTS	9 CALAVERAS ST	SONORA	95370	6,083		20,396		√	√	√	√
HAZARDOUS WASTE LOCKER/CARGO CONT.	17855 HIGH SCHOOL ROAD	JAMESTOWN	95327	0		19,857		√	√	√	√



Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan

TUOLUMNE YOUTH CENTER/LIBRARY	18636 MAIN STREET	TUOLUMNE	95379	3,370	2004	1,133,963		√	√	√	√	√	√
COMPUTER EQUIPMENT	2 SOUTH GREEN STREET	SONORA	95370	0		3,490,086		√	√	√	√	√	√
INFORMATION SYSTEMS & SERVICES	1015 MORNING-STAR DRIVE	SONORA	95370	6,510	2004	1,224,496		√	√	√	√	√	√
FACILITIES MGMT STORAGE BLDG	226 W. JACKSON STREET	SONORA	95370	1,500	1930	203,719		√	√	√	√	√	√
JAMESTOWN MINE-LAB	HISTORICAL BUILDING	JAMESTOWN	95327	3,200		456,535		√	√	√	√	√	√
JAMESTOWN MINE-VACANT HOUSE	NO ADDRESS	JAMESTOWN	95327	1,000		55,566		√	√	√	√	√	√
FIRE STATION 54 / SCHOOL	25910 LONG BARN ROAD	LONG BARN	95335	7,194	1958	834,300		√	√	√	√	√	√
FIRE ADMINISTRATION / AMBULANCE	18440 STRIKER CT	SONORA	95370	11,360	2006	3,692,462		√	√	√	√	√	√
JAIL	SMOKE STREET	JAMESTOWN	95327	400	1852	78,908		√	√	√	√	√	√
HISTORIC "BALL" MILL	21250 HWY 120	GROVELAND	95321	0		0		√	√	√	√	√	√
BEHAVIORIAL HEALTH OFFICES	197 MONO WAY	SONORA	95370	8,800	1975	1,241,463		√	√	√	√	√	√
JAMESTOWN MINE - HAZMAT LOCKER	17855 HIGH SCHOOL ROAD	SONORA	95370	440		67,668		√	√	√	√	√	√
FACILITIES OFFICE-MED. RECORDS/BALLOTS	9 CALAVERAS ST	SONORA	95370	6,083		20,396		√	√	√	√	√	√
HAZARDOUS WASTE LOCKER/CARGO CONT.	17855 HIGH SCHOOL ROAD	JAMESTOWN	95327	0		19,857		√	√	√	√	√	√
JUVENILE JUSTICE CENTER	12785 JUSTICE CENTER DR	SONORA	95370	22,114	2017	16,000,000		√	√	√	√	√	√

Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan



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) | \$10.4 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
---------------------------------------	--------------

<i>Roads, bridges and support structures total cost:</i>	<i>\$756 million</i>
---	-----------------------------



Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan

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.

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
- Utilization of Spheres of Influence to guide future development of agency boundaries.



Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan

VII. CAPABILITY ASSESSMENT

A. 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 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.



Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan

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 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.
- **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.



Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan

- **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 Multi-Jurisdictional Hazard Mitigation Plan

D. Financial

In order 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. 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, 3 Lieutenants, 11 Sergeants, and 52 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 30 volunteers, TCSAR has saved hundreds of lives. Tuolumne County is a central location for



Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan

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

Tuolumne County Fire Department (TCFD) is a cooperative fire department with California Department of Forestry and Fire Protection (CAL FIRE). Within the County, TCFD/CAL FIRE along with six Fire Districts 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 protective services in Tuolumne County responded to 7422 emergency calls during the 2016 calendar year, and currently serve approximately 54,000 residents in an area of more than 2,200 square miles.

The TCFD relies on paid staff, part-time staff and volunteer firefighters who provide, fire suppression, emergency medical services, public education and other related services to the citizens and visitors of Tuolumne County. The department also participates in automatic and mutual aid agreements throughout the County and provides fire apparatus to the State-wide mutual aid system as requested.

The TCFD/CAL FIRE is equipped with 28 Engines, 5 Water Tenders (both County and State), 1 Rescue Squad, 1 Fast Attack Unit, 1 Breathing Support Unit and 10 support vehicles. In addition to the ground resources the County has the California Department of Forestry (CAL FIRE) Air Attack Base located at the Columbia Airport. The Air Base has 1 OV-10 Bronco Air Attack, 2 S2-T Air Tankers and 1 Super Huey helicopter with air and ground crews onboard.



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	County Staff takes advantage of educational opportunities to ensure the public is aware of risks and hazards and methods to mitigate risk. This has occurred for such hazards as drought, tree mortality, winter, and fire seasons in the area.
Natural disaster or safety related school programs	Y	Great Shake Out/ Fire Drills
Storm Ready Certification	N	
Firewise Communities certification	N	
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.

Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan



VIII. MITIGATION STRATEGY

A. DMA 2000 Requirements

DMA Requirement §201.6(c)(3)(i):	The hazard mitigation strategy shall include a description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.
DMA Requirement §201.6(c)(3)(ii):	The mitigation strategy shall include a 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.

B. 2013 Goals Progress Report

2013 Tuolumne County Goals	Notes
Support the development of a County-Regional Community Emergency Response Team (CERT) in local areas	Completed: Multiple Cert Teams have been developed in the local area.
Review Columbia Airport flight restrictions regarding air traffic over Columbia Elementary School and work with Airport manager to minimize this exposure.	Completed: SOP is posted and exposure has been addressed.
Study and seek funding to increase the raw water storage of the Tuolumne Utilities District to ensure service for both domestic consumption and sanitary waste removal.	Completed: Utilized Prop 84 grant and CDPH to increase water supply.
Develop a program that would, in emergency situations, enable water districts and water companies to share water resources through inter-connections.	Completed: Multiple mutual assistance programs have been developed between local and state agencies.

Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan



Goal 1	<u>Promote understanding and support for hazard mitigation by key stakeholders and the public within Tuolumne County.</u>
---------------	--

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:	Conduct periodic workshops and exercise on the Emergency Notification Systems available to the public to ensure familiarity of the public to warning applications.

Goal 2	<u>Ensure that future development is protected from natural disasters.</u>
---------------	---

Applies to:	Tuolumne County, City of Sonora, Tuolumne Band of Me-Wuk Indians, and the Tuolumne Utilities District.
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.



Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan

Goal 3	<u>Build and support local capacity and commitment to minimize the jurisdictions within Tuolumne County's vulnerability to potential hazards.</u>
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:	In order 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:	Review the initial planning requirements and research the development of standard operating procedures which would minimize helicopter operations over Sonora Elementary School as they utilize the helistop at Sonora Regional Medical Center
Mitigation Action 3.2B:	Support the efforts of the Tuolumne Utilities District to better protect public health by initiating a Watershed Sanitary Survey
Mitigation Action 3.2C:	Assist the County in identifying opportunities for additional evacuation routes within single-access areas
Mitigation Action 3.2D:	TUD will 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 3.2E:	Make improvements to wastewater systems by replacing or relining collection pipes so as to reduce sewer overflows and

Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan



limit inflow and infiltration subsequently reducing the public health threat

Mitigation Action 3.2F: Develop a program that would, in emergency situations, enable water districts and water companies to share water resources through interconnections

Mitigation Action 3.2G: Develop a program to secure water rights for Tuolumne County

Mitigation Action 3.2H: Promote a county-wide sewer connection to reduce septic failure impacts and improve water quality

Mitigation Action 3.2I: Promote land use recommendations that new developments occur adjacent to public water and wastewater facilities

Mitigation Action 3.3: Build and maintain communications between County agencies, Special Districts, and the Tuolumne Band of Me-Wuk Indians 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: Tuolumne County, City of Sonora, Curtis Creek School District, Belleview School District

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: Through the Development process Review Team, restrict construction of essential service facilities in the 100-year flood plain



Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan

- 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	<u>Minimize the level of damage and losses to people, existing and future critical facilities and infrastructure due to wildland fires.</u>
---------------	--

- | | |
|-------------------------|--|
| 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: | 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 |
| Mitigation Action 5.1B: | Continue to work with the Hwy 108 Fire Safe Council, Yosemite Foothills FireSafe Council, and SWIFT 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 state owned lands in the county

Mitigation Action 5.1C: Work with the Hwy 108 Fire Safe Council, Yosemite Foothills Fire Safe Council, and SWIFT 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: Develop a wildfire evacuation plan which includes sheltering in place at Curtis Creek School

Mitigation Action 5.1E: Work with the Tuolumne Utilities District 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 5.1G: Work with the Lake Don Pedro Community Services District to improve system reliability and redundancy, and increased water supply in their responsibility areas

Mitigation Action 5.1H: Work with the Lake Don Pedro Community Services District and PG&E to improve the reliability of the electrical grid in Don Pedro 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 Districts, the County and the City of Sonora



Goal 6	<u>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).</u>
---------------	---

Applies to: All jurisdictions

Objective 6 Continue public education efforts so as 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	<u>Limit risk to, and impacts from hazardous materials spills, intentional discharges, illegal disposals, transportation accidents, or system failures</u>
---------------	---

Applies to: All Jurisdictions

Objective 7.1 Continue efforts to manage the use, sale, distribution and disposal of hazardous materials in Tuolumne County.

Objective 7.2 Improve emergency response efforts in the control and clean-up of accidental spills and releases.

Mitigation Action 7.1A: Educate community members on the dangers associated with household hazardous materials including proper storage techniques.

Mitigation Action 7.1B: Continue efforts to educate applicable employees on the handling, use, storage and disposal of hazardous materials utilized in the workplace.

Mitigation Action 7.2A: In coordination with the Environmental Health Director, develop procedures to enhance the response to Hazardous Material Incidents



Goal 8	<u>Minimize the level of damage and losses to people, existing and future infrastructure, and critical facilities due to extreme weather</u>
---------------	---

Applies to:	All Jurisdictions
-------------	-------------------

Objective 8.1	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 8.1A:	Analyze and remove hazards that threaten public safety due to the cascading effects of drought such as dry wells and tree mortality
-------------------------	---

Mitigation Action 8.1B:	Encourage water agencies to conduct water supply evaluations public water system to determine the effect of drought on community water supply
-------------------------	---

Mitigation Action 8.1C:	Work with the Lake Don Pedro Community Services District to improve the availability and reliability of Lake McClure pumping capacities at lower water surface elevations
-------------------------	---

Mitigation Action 8.1D:	Work with the Lake Don Pedro Community Services District 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 from Lake McClure
-------------------------	--



Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan

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.

MITIGATION ACTIONS	EXISTING BUILDINGS AND INFRASTRUCTURE						
	Electrical and Power Infrastructure	Dams and Water Management	Communication Facilities	Critical Roads and Bridges	Essential Service 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



Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan

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, landslide and sinkholes.	X	X	X	X	X	X	X
Goal 7-Hazardous Materials: Limit risk to, and impacts from hazardous materials spills, intentional discharges, illegal disposals, transportation accidents, or system failures		X			X	X	X
Goal 8- 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



Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan

MITIGATION GOALS	NEW PROJECTS/BUILDINGS AND INFRASTRUCTURE					
	Residential Subdivisions	Various mixed use projects (residential and commercial)	Ag Clusters (residential, open space, and 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



Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan

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, landslide and sinkholes.	X	X	X	X	X	X
Goal 7- Hazardous Materials: Limit risk to, and impacts from hazardous materials spills, intentional discharges, illegal disposals, transportation accidents, or system failures	X	X	X	X	X	X
Goal 8- Extreme Weather: Minimize the level of damage and losses to people, existing and future critical facilities, and infrastructure due to extreme weather.	X X	XX		X	X	X X



IX. MITIGATION ACTION IMPLEMENTATION

A. DMA 2000 Requirements

**DMA Requirement
§201.6(c)(3)(iii):**

The mitigation strategy section shall include an action plan describing how the actions identified in section (c)(3)(ii) 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.

**DMA Requirement
§201.6(c)(3)(iv):**

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

**DMA Requirement
§201.6(c)(4)(i):**

The plan maintenance process shall include a section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

**DMA Requirement
§201.6(c)(4)(ii):**

The plan shall include 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.

**DMA Requirement
§201.6(c)(4)(iii):**

The plan maintenance process shall include a discussion on how the community will continue public participation in the plan maintenance process.

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



Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan

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.

Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan



ACTION PLAN FOR TUOLUMNE COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

MITIGATION ACTION		IMPLEMENTATION STRATEGY			
ID	DESCRIPTION	RESPONSIBLE DEPARTMENT	FUNDING SOURCES	TIME TO COMPLETE	PRIORITY
1.A	Educate Public and Stakeholders	OES - lead All support	General Funds	Ongoing	Medium
1.B	Promote Everbridge	OES- lead All Support	None Required	Ongoing	Low
2.A	Educate Staff	OES – lead All support	None Required	Ongoing	Medium
2.B	Continuing Education	OES –lead All support	General Funds	Ongoing	Medium
2.C	Improve GIS Capabilities	County CRA, City of Sonora & CAL Fire	General Funds	36 Months	Medium
3.1A	Develop/ Adopt Family Support Plan	All agencies OES support	General Funds	12 Months	Medium
3.1B	Emergency Operations Plans	All agencies OES support	None Required	12 Months	Medium
3.1C	Medical Preparedness	Public Health-Lead All Support	None Required	Ongoing	Medium
3.2A	Helicopter Operations	OES	None Required	Ongoing	Low
3.2B	Watershed Survey	TUD	Grant	12 Months	Medium
3.2C	Single Access Routes	Fire Safe Council and Community Resources Agency	Grant and General Fund	36 Months	Medium
3.2D	Raw Water Storage	TUD	Grant	24 Months	Medium

Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan



3.2E	Wastewater System Improvements	TUD	General Fund & Grants	24 Months	High
3.2F	Water Interconnections	All water agencies	None Required	36 Months	Medium
3.2G	Water Rights	All water agencies	Grants & General Funds	Ongoing	Medium
3.2H	Promote Sewer Connection	Water Agencies with support of all agencies	None Required	Ongoing	Low
3.2I	Promote Development adjacent water facilities	Water Agencies with support of all agencies	None Required	Ongoing	Low
3.3	Maintain Communications	All agencies	None Required	Ongoing	Medium
4.A	Creek/Storm Drain Management	County CRA and City of Sonora	General Fund	Fall of each year	Low
4.B	NFIP Requirements	County CRA and City of Sonora	General Fund	Ongoing	Medium
4.C	Development Review	County CRA and City of Sonora	General Fund	Ongoing	Medium
4.D	Notice Property Owners	County CRA and City of Sonora	General Fund	24 Months	Medium
4.E	Storm Drain Improvements	County CRA and City of Sonora	Grants	Ongoing	Medium
4.F	County Watershed Projects	County CRA	Grants	36 Months	Medium
4.G	Drainage	Curtis Creek School District	Grants	24 Months	Medium
4.H	Drainage	Bellevue School District	Grants	24 Months	Medium
4.I	Single Access Routes	Bellevue School	Grants	24 Months	Medium
5.1A	Improve GIS Mapping and Tracking	CAL Fire-County Fire	General Fund	36 Months	Medium
5.1B	Fuel Thinning and Chipping Projects	All fire agencies	Grants	Ongoing	High

Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan



5.1C	Community Wildfire Protection Plan Update	CAL Fire-County Fire	General Fund	12 Months	Medium
5.1D	Evacuation Plans for Curtis Creek	District Superintendent with fire agencies supporting	None Required	12 Months	High
5.1E	Water Supply/Fire Flow	TUD, with fire agencies supporting	General Funds and Grants	36 Months	High
5.1F	Protect Flumes	TUD, with fire agencies supporting	General Funds and Grants	Ongoing	Medium
5.1G	Increase Water Supply for Lake Don Pedro CSD	Lake Don Pedro CSD- Lead OES-Support	General Funds and Grants	36 Months	Medium
5.1H	Increase Alternate Power Source for Lake Don Pedro	Lake Don Pedro CSD- Lead OES-Support	General Funds and Grants	24 Months	Medium
5.2A	Fire Chiefs Association	All fire agencies	None Required	Ongoing	Medium
5.2B	Mutual/Auto Aid	All fire agencies	None Required	Ongoing	Medium
6.A	Earthquake Preparedness Exercises	OES – lead All support	None Required	Fall of Each Year	Medium
6.B	Replace Vulnerable Water/Sewer Lines	TUD	General Fund	24 Months	Medium
7.1A	Educate Community on Hazardous Materials	OES – lead All support	None Required	Ongoing	Medium
7.1B	Educate Staff on Hazardous Materials	OES – lead All support	None Required	Ongoing	Medium

Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan



7.2A	Improve Response Capabilities	Environmental Health– lead fire agencies support	None Required	Ongoing	Medium
8.1A	Removal of safety hazards caused by dry wells and Tree Mortality	All Agencies	Grant	36 Months	High
8.1B	Water Supply Evaluation at Lake McClure	Lake Don Pedro CSD- Lead OES Support	Grant and General Fund	24 Months	Medium
8.1C	Improve Pumping Capacity at Lake McClure	Lake Don Pedro CSD- Lead OES Support	Grant and General Fund	24 Months	Medium
8.1D	Alternate Water Sources to Lake McClure	Lake Don Pedro CSD- Lead OES Support	Grant and General Fund	36 Months	Medium

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.

The 2014 update to the Multi-Jurisdictional Hazard Mitigation Plan was adopted into the General Plan's Safety Element in March of 2014. The update is also referenced to assist in the annual review of the Emergency Operations Plan, Community Wildfire Protection Plan, and the 2018 update to the Tuolumne County's General Plan.



Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan

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

DMA 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 if for approval within 5 years in order to continue to be eligible for mitigation project grant funding.

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 updated every 5 years to reflect progress in mitigation efforts, changes in priorities, and ensure all requirements are met for mitigation project funding.

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 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



Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan

- 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. Resultantly, 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
- Members of the Public wishing to submit feedback for the plan may contact the Tuolumne County Office of Emergency Services at (209) 533-5511 or may send correspondence to the following address:

**Office of Emergency Services, 4th Floor
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.



Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan

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.



Tuolumne County Multi-Jurisdictional Hazard Mitigation Plan

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
LHMP	Local 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