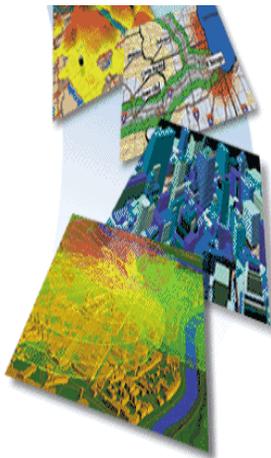




# Calaveras County Local Hazard Mitigation Plan



Chronicle / Penni Gladstone





# EXECUTIVE SUMMARY

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The purpose of hazard mitigation is to reduce or eliminate long-term risk to people and property from hazards. Calaveras County and Angels Camp developed this local hazard mitigation plan to make the County and its residents less vulnerable to future hazard events. This plan was prepared pursuant to the requirements of the Disaster Mitigation Act of 2000 so that Calaveras County would be eligible for the Federal Emergency Management Agency's (FEMA) Pre-Disaster Mitigation and Hazard Mitigation Grant programs as well as lower flood insurance premiums (in jurisdictions that participate in the National Flood Insurance Program's Community Rating System).

The County followed a planning process prescribed by FEMA, which began with the formation of a hazard mitigation planning committee (HMPC) comprised of key county, city, and district representatives and other stakeholders. The HMPC conducted a risk assessment that identified and profiled hazards that pose a risk to Calaveras County, assessed the County's vulnerability to these hazards, and examined the capabilities in place to mitigate them. The County is vulnerable to several hazards that are identified, profiled, and analyzed in this plan. Floods, wildfires, severe weather, drought, and agricultural hazards are among the hazards that can have a significant impact on the County.

Based on the risk assessment, the HMPC identified goals and objectives for reducing the County's vulnerability to hazards. The six goals of this multi-hazard mitigation plan are:

- Provide Protection for People's Lives from Hazards
- Improve Communities' Capabilities to Mitigate Hazards and Reduce Exposure to Hazard-Related Losses
- Improve Community and Agency Awareness about Hazards and Associated Vulnerabilities that Threaten Calaveras County Planning Area Communities
- Provide Protection for Critical Facilities, Utilities, and Services from Hazard Impacts
- Maintain Coordination of Disaster Planning
- Maintain/Provide for FEMA Eligibility and Work to Position Jurisdictions for Grant Funding

To meet identified goals and objectives, the plan recommends 7 mitigation actions, which are summarized in the table that follows. This plan will be formally adopted by the County and the participating jurisdictions and will be updated every five years at a minimum.

## Mitigation Actions

Action	Jurisdiction	Priority	Hazards Addressed
Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	Calaveras County OES	High	All
Develop and Conduct a Multi-Hazard Seasonal Public Awareness Program	Calaveras County OES	High	All
Identify critical facilities/infrastructure needing backup power sources	Calaveras County Public Works Department	Low	All
Improve channel maintenance and upkeep to prevent debris build-up at road bridges	Calaveras County Public Works Department	High	Flood
Implement fuel reduction along County right of ways	Calaveras County Public Works Department	Medium	Wildfire
Identify storm water flooding projects	Calaveras County Public Works Department	Low	Flood
Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	City of Angels Camp	High	All



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# 1 INTRODUCTION AND PLANNING AREA PROFILE

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## 1.1 Purpose

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Calaveras County and the City of Angels Camp prepared this Local Hazard Mitigation Plan (LHMP) to guide hazard mitigation planning to better protect the people and property of the County from the effects of hazard events. This plan demonstrates the communities' commitment to reducing risks from hazards and serves as a tool to help decision makers direct mitigation activities and resources.

The five goals of the Calaveras County Multi-Hazard Mitigation Plan are the following:

- Goal 1: Reduce risk to the people, property, economy, and environment in Calaveras County from the impacts of natural hazards
- Goal 2: Reduce the vulnerability of future development to natural hazards
- Goal 3: Improve education and awareness of hazards and risk
- Goal 4: Enhance partnerships for communication and coordination in the region
- Goal 5: Implement identified mitigation activities

This plan was also developed to make Calaveras County and Angels Camp eligible for certain federal disaster assistance, specifically, the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Grant Program, Pre-Disaster Mitigation program, and Flood Mitigation Assistance program.

## 1.2 Background and Scope

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Each year in the United States, natural disasters take the lives of hundreds of people and injure thousands more. Nationwide, taxpayers pay billions of dollars annually to help communities, organizations, businesses, and individuals recover from disasters. These monies only partially reflect the true cost of disasters, because additional expenses to insurance companies and nongovernmental organizations are not reimbursed by tax dollars. Many natural disasters are predictable, and much of the damage caused by these events can be alleviated or even eliminated.

Hazard mitigation is defined by FEMA as "any sustained action taken to reduce or eliminate long-term risk to human life and property from a hazard event." The results of a three-year, congressionally mandated independent study to assess future savings from mitigation activities provides evidence that mitigation activities are highly cost-effective. On average, each dollar spent on mitigation saves society an average of \$4 in avoided future losses in addition to saving lives and preventing injuries (National Institute of Building Science Multi-Hazard Mitigation Council 2005).

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Hazard mitigation planning is the process through which hazards that threaten communities are identified, likely impacts of those hazards are determined, mitigation goals are set, and appropriate strategies to lessen impacts are determined, prioritized, and implemented. This plan documents Calaveras County's hazard mitigation planning process and identifies relevant hazards and vulnerabilities and strategies the County and Angels Camp will use to decrease vulnerability and increase resiliency and sustainability in Calaveras County.

The Calaveras County Multi-Hazard Mitigation Plan is a multi-jurisdictional plan that geographically covers everything within Calaveras County's jurisdictional boundaries (hereinafter referred to as the planning area). The participating jurisdictions in this plan are Calaveras County and the City of Angels Camp.

This plan was prepared pursuant to the requirements of the Disaster Mitigation Act of 2000 (Public Law 106-390) and the implementing regulations set forth by the Interim Final Rule published in the *Federal Register* on February 26, 2002, (44 CFR §201.6) and finalized on October 31, 2007. The 2007 amendments also incorporate mitigation planning requirements of the Flood Mitigation Assistance (FMA) program authorized by the National Flood Insurance Act of 1968. While the Disaster Mitigation Act emphasized the need for mitigation plans and more coordinated mitigation planning and implementation efforts, the regulations established the requirements that local hazard mitigation plans must meet in order for a local jurisdiction to be eligible for certain federal disaster assistance and hazard mitigation funding under the Robert T. Stafford Disaster Relief and Emergency Act (Public Law 93-288).

Information in this plan will be used to help guide and coordinate mitigation activities and decisions for local land use policy in the future. Proactive mitigation planning will help reduce the cost of disaster response and recovery to communities and their residents by protecting critical community facilities, reducing liability exposure, and minimizing overall community impacts and disruptions. The Calaveras County planning area has been affected by hazards in the past and is thus committed to reducing future impacts from hazard events and becoming eligible for mitigation-related federal funding.

This plan addresses natural hazards and one manmade hazard—hazardous materials release. Although the members of the Calaveras County Hazard Mitigation Planning Committee (HMPC) recognize that FEMA encourages communities to integrate manmade hazards into the mitigation planning process, the scope of this effort did not address other manmade hazards for two reasons.

First, many of the planning activities for the mitigation of these hazards are either underway or complete and are addressed in the emergency operations plan for Calaveras County. Second, the Disaster Mitigation Act of 2000 requires extensive public information and input, and this is in direct conflict with the confidentiality necessary in planning for chemical, biological, and radiological terrorism.

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## 1.3 Jurisdictional Annexes

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The City of Angels Camp is a participating jurisdiction in the plan and developed its own annex, which provides a more detailed assessment of the jurisdiction's unique risks as well as their mitigation strategy to reduce long-term losses. Annex A contains the following:

- Community profile summarizing geography and climate, history, economy, and population
- Hazard information on location, previous occurrences, probability of future occurrences, and magnitude/severity for geographically specific hazards
- Hazard map(s) at an appropriate scale for the jurisdiction, if available
- Number and value of buildings, critical facilities, and other community assets located in hazard areas, if available
- Vulnerability information in terms of future growth and development in hazard areas
- A capability assessment describing existing regulatory, administrative, technical, and fiscal resources and tools as well as outreach efforts and partnerships and past mitigation projects
- Mitigation actions specific to the jurisdiction

## 1.4 Plan Organization

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The Calaveras County Multi-Hazard Mitigation Plan is organized as follows:

- Executive Summary
- Prerequisites
- Chapter 1: Introduction and Planning Area Profile
- Chapter 2: Planning Process
- Chapter 3: Risk Assessment
- Chapter 4: Mitigation Strategy
- Chapter 5: Plan Implementation and Maintenance
- Annex A: Angels Camp
- Appendices

## 1.5 Planning Area Profile

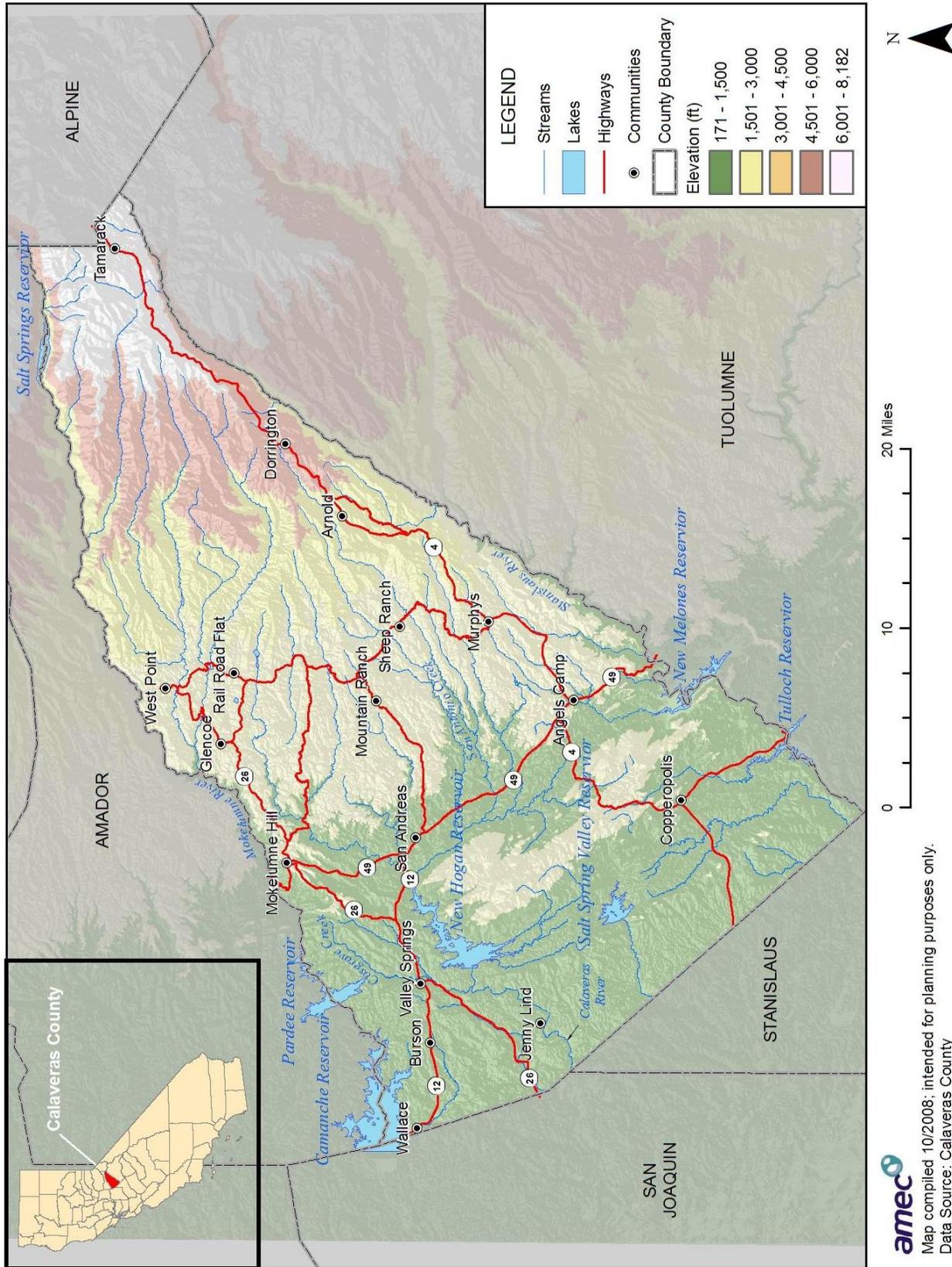
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The planning area boundaries for this plan are coterminous with the boundaries of the County itself. This includes the incorporated City of Angels Camp and all unincorporated areas including the towns and communities listed below:

Arnold, Avery, Copperopolis, Dorrington, Forest Meadows, Mokelumne Hill, Mountain Ranch, Murphys, Rail Road Flat, Rancho Calaveras, San Andreas, Sheepranch, Vallecito, Valley Springs, Wallace, West Point.

Figure 1.1 shows a map of the Calaveras County planning area.

Figure 1.1. Calaveras County Planning Area



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## 1.5.1 Geography and Climate

Calaveras County is situated in central California on the western slopes of the Sierra Nevada Range, roughly 100 miles east of the San Francisco Bay area and 350 miles north of Los Angeles. The planning area covers 1,037 square miles ranging from low foothills on the northeastern fringe of the San Joaquin Valley to forested high elevations in the eastern portion of the County. Together with neighboring foothill counties, Calaveras County forms a central part of the Mother Lode Region, an area with remarkably rich mineral deposits.

The Calaveras County General Plan Baseline Report notes that less than one percent (0.71 percent) of Calaveras County is urbanized. The majority of the planning area is composed of natural habitat areas such as annual grassland (22 percent), Montane Hardwood (15 percent), and Sierran Mixed Conifer habitat areas (14 percent). Major watersheds include the Mokelumne River watershed at the county's northern border, the Stanislaus River watershed at the county's southern border, and the Calaveras River watershed in the north-central portion of the county.

Calaveras County's climate is influenced by prevailing westerly weather patterns and transitional topographic aspects between San Joaquin Valley and the Sierra Nevada. Climate varies significantly due to great differences in elevation, ranging from 300 feet in the western portion to over 8,000 feet near the border with Alpine County. Temperatures in the higher country generally range from the low 20s to the middle 80s. The lower foothills range in temperature from the low 30s to the high 90s, exceeding 100 degrees at times during the summer months.

Precipitation generally increases with altitude. Average precipitation is 20 inches a year in the western region to 60 inches in the northeast. The rainy season is October 1 through May 1. Snow accounts for much of the precipitation in the higher elevations (up to 300 inches per year), while snowfall is rare in the foothills (Calaveras County 2008).

## 1.5.2 Population

The California Department of Finance (DOF) population estimate for Calaveras County in January 2008 is 46,127. From 1940 to 2008, the population of Calaveras County has increased nearly six-fold, from 8,221 to 46,127. Rapid growth occurred from 1980 to 2000 with an average annual growth rate (AAGR) of approximately 4.35 percent per year over that 20 year period. State of California Department of Finance (DOF) population data indicates that the rate of population growth has slowed from 2000-2008, particularly in the most recent years measured. Tables 1.1 and 1.2 below show historic and recent population trends and components of population change for Calaveras County.

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**Table 1.1 Calaveras County Historic Population Trends**

Period	Population	Change from Previous Period	AAGR* from Previous Period (%)
1940	8,221	--	--
1950	9,902	1,681	1.90

Period	Population	Change from Previous Period	AAGR* from Previous Period (%)
1960	10,289	387	0.40
1970	13,585	3,296	2.80
1980	20,710	7,125	4.30
1990	31,998	11,288	4.40
2000	40,554	8,556	2.40
2007**	45,850	5,296	1.86
2008**	46,127	277	0.60

Source: Calaveras County; California Department of Finance, Table 2a Historical Census Populations of California State, Counties, Cities, Places, and Towns, 1850-2000 and State of California, Department of Finance, E-5 Population and Housing Estimates for Cities, Counties and the State, 2001-2008, with 2000 Benchmark. Sacramento, California, May 2008.

\*AAGR: Average Annual Growth Rate expressed in terms of percentage increase from previous period total.

\*\*Population figures for 2007 and 2008 are dated January 1.

**Table 1.2 Calaveras County Population Estimates and Components of Change 2000-2007**

Year	Population (July 1)	% Change	Numeric Change	Births	Deaths	Natural Increase	Net Migration	Net Foreign Immigration	Net Domestic Migration
1999	40,288	--	--	--	--	--	--	--	--
2000	40,733	1.1	445	311	388	-77	522	19	503
2001	41,538	2.0	805	309	374	-65	870	34	836
2002	42,269	1.8	731	327	414	-87	818	20	798
2003	43,337	2.5	1,068	359	392	-33	1,101	23	1,078
2004	44,007	1.6	670	301	432	-131	801	27	774
2005	45,047	2.4	1,040	343	384	-41	1,081	43	1,038
2006	45,663	1.4	616	395	428	-33	649	30	619
2007	45,950	0.6	287	390	429	-39	326	32	294
Sum*			5,662	2,735	3,241	-506	6,168	228	5,940
Average*			781	377	447	-70	851	31	819

Source: State of California, Department of Finance, Population Estimates and Components of Change by County, July 1, 2000-2007. Sacramento, California, December 2007.

Housing data from the U.S. Census and DOF indicate that the increase in number of housing units for 2007-2008 is lower than average increases in previous years. The average annual growth rate of housing units for the period 2006-2008 is higher than population growth for the same period. Table 1.3 below shows housing data and trends for the period 1990-2008.

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**Table 1.3 Calaveras County—Housing Unit Trends 1990-2008**

Period	Housing Units	Average Annual Increase from Previous Period (#)	Average Annual Growth Rate from Previous Period (%)
1990	19,153	--	--
2000	22,946	379	2.0
2006	26,685	623	2.7
2007	27,349	664	2.5
2008	27,803	454	1.7

Source: Calaveras County; California Department of Finance, Table 2a Historical Census Populations of California State, Counties, Cities, Places, and Towns, 1850-2000 and State of California, Department of Finance, E-5 Population and Housing Estimates for Cities, Counties and the State, 2001-2008, with 2000 Benchmark. Sacramento, California, May 2008.

\*AAGR: Average Annual Growth Rate expressed in terms of percentage increase from previous period total.

### 1.5.3 History

Calaveras County has been inhabited for many thousands of years and the Miwok and Washoe are two of the more recent Native American tribes. Calaveras is named for the Spanish word meaning skulls, reportedly for the bones of fighters left behind after an war amongst Native Americans that were discovered by Captain Gabriel Moraga. European settlers migrating westward across the U.S. began arriving in the western portion of Calaveras County the first half of the 19<sup>th</sup> Century.

The discovery of gold in the region in the mid 19<sup>th</sup> century was unquestionably the most important development of the modern history of the County. Gold mining fostered a robust economy and spurred the formation of the towns, many of which are still present. Changes in land use after the end of the Gold Rush were relatively minor, until the growth of outdoor recreation beginning in the 1960's. Visitors seeking recreation and open space have created major changes in the area's economy and land use patterns. The rapid growth of subdivisions in recent decades, including both seasonal and permanent homes, has resulted from these demands.

### 1.5.4 Economy

Calaveras County's economy is based in six main sectors: tourism and recreation; forest products; mineral extraction and processing; agriculture; private business; and the public sector.

According to the 2000 U.S. Census, the industries that employed the highest percentages of Calaveras County's labor force were educational, health and social services (18.7 percent); retail trade (13.1 percent) and construction (11.5 percent).

Based on Census data from 2000, poverty rates for both individuals and families in Calaveras County are lower than state and national averages. Per capita income and median household income are lower than the state overall but comparable to national levels. Economic characteristics for Calaveras County compared to California and the U.S. overall are shown in Table 1.4.

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**Table 1.4 Calaveras County—Comparative Economic Characteristics 2000**

Characteristic	Calaveras County	California	U.S.
Families below Poverty Level, (%) 1999	8.7	10.6	9.2
Individuals below Poverty Level, (%) 1999	11.8	14.2	12.4
Median Home Value (\$)	156,900	211,500	119,600
Median Household Income, (\$) 1999	41,022	47,493	41,994
Per Capita Income, (\$) 1999	21,420	22,711	21,587
Population in Labor Force (%)	54.0	62.4	63.9

Source: U.S. Census Bureau (2000), [www.census.gov/](http://www.census.gov/)

Table 1.5 compares household income characteristics for Calaveras County to state and national averages.

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**Table 1.5 Calaveras County—Comparative Household Income Characteristics 2000**

Household Income Range	Percent of Total (Calaveras County)	Percent of Total (California)	Percent of Total (U.S.)
Less than \$35,000	41.8	36.9	41.4
\$35,000 to \$49,999	18.7	15.2	16.5
\$50,000 to \$74,999	19.1	19.1	19.5
\$75,000 to \$99,999	10.3	11.5	10.2
\$100,000 to \$149,999	6.7	10.4	7.7
\$150,000 to \$199,999	1.7	3.3	2.2
\$200,000 or more	1.8	3.6	2.4

Source: U.S. Census Bureau (2000), [www.census.gov/](http://www.census.gov/)



## 2 PLANNING PROCESS

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

The Calaveras County Office of Emergency Services recognized the need and importance of this plan and was responsible for its initiation and for securing funding. The County contracted with AMEC Earth and Environmental (AMEC) in November 2007 to facilitate and develop a multi-jurisdictional, multi-hazard mitigation plan. AMEC's role was to:

- Assist in establishing a Hazard Mitigation Planning Committee (HMPC) for the County that incorporates key stakeholders and representatives from each participating jurisdiction
- Meet all of the planning requirements of the Disaster Mitigation Act (DMA) and the Flood Mitigation Assistance program as established by federal regulations and following FEMA's planning guidance
- Facilitate the planning process
- Identify the data requirements that the HMPC can provide and conduct the research and documentation necessary to augment that data
- Develop and facilitate the public input process
- Produce the draft and final plan documents
- Coordinate the California Emergency Management Agency (CalEMA) and FEMA Region IX reviews of the plan and its formal adoption by the Calaveras County Board of Supervisors and the governing bodies of each participating jurisdictions

The remainder of this chapter provides a narrative description of the steps taken to prepare the hazard mitigation plan.

### 2.1 Multi-Jurisdictional Participation

**44 CFR Requirement §201.6(a)(3): Multi-jurisdictional plans may be accepted, as appropriate, as long as each jurisdiction has participated in the process and has officially adopted the plan.**

Calaveras County invited the City of Angels Camp, the only incorporated city in the County, and special districts in the County to participate in the multi-jurisdictional Calaveras County Multi-Hazard Mitigation Plan. The Disaster Mitigation Act requires that each jurisdiction participate in the planning process and officially adopt the multi-jurisdictional hazard mitigation plan. Each jurisdiction that chose to participate in the planning process and development of the plan was required to meet strict plan participation requirements defined at the beginning of the process, which included the following:

- Designate a representative to serve on the HMPC

- Participate in HMPC meetings
- Complete and return the AMEC Data Collection Guide
- Identify mitigation actions for the plan
- Review and comment on plan drafts
- Inform the public, local officials, and other interested parties about the planning process and provide opportunity for them to comment on the plan
- Formally adopt the mitigation plan

This multi-jurisdictional mitigation plan covers the local governments of Calaveras County and the City of Angels Camp, both of which met these participation requirements. Table 2.1 shows the attendance of representatives at each HMPC meeting; sign-in sheets are on file with the County.

**Table 2.1. Jurisdictional Participation in HMPC Meetings**

Jurisdiction	Kickoff Meeting	Meeting #2	Meeting #3	Board of Supervisors Meeting
Calaveras County	✓	✓	✓	✓
City of Angels Camp		✓	✓	

## 2.2 The 10-Step Planning Process

AMEC and the Calaveras County Office of Emergency Services worked together to establish the framework and process for this planning effort using FEMA’s *Local Multi-Hazard Mitigation Planning Guidance* (2008) and the *State and Local Mitigation Planning How-To Guides* (2001), which include *Multi-Jurisdictional Mitigation Planning* (2006). The plan is structured around a four-phase process:

- 1) Organize resources
- 2) Assess risks
- 3) Develop the mitigation plan
- 4) Implement the plan and monitor progress

Into this process, AMEC integrated a more detailed 10-step planning process used for FEMA’s Community Rating System (CRS) and Flood Mitigation Assistance programs. Thus, the modified 10-step process used for this plan meets the funding eligibility requirements of the Hazard Mitigation Grant Program, Pre-Disaster Mitigation program, Community Rating System, and Flood Mitigation Assistance program. Table 2.2 shows how the modified 10-step process fits into FEMA’s four-phase process.

**Table 2.2 Mitigation Planning Process Used to Develop the Plan**

<b>DMA Process</b>	<b>Modified CRS Process</b>
1) Organize Resources	
201.6(c)(1)	1) Organize the Planning Effort
201.6(b)(1)	2) Involve the Public
201.6(b)(2) and (3)	3) Coordinate with Other Departments and Agencies
2) Assess Risks	
201.6(c)(2)(i)	4) Identify the Hazards
201.6(c)(2)(ii)	5) Assess the Risks
3) Develop the Mitigation Plan	
201.6(c)(3)(i)	6) Set Goals
201.6(c)(3)(ii)	7) Review Possible Activities
201.6(c)(3)(iii)	8) Draft an Action Plan
4) Implement the Plan and Monitor Progress	
201.6(c)(5)	9) Adopt the Plan
201.6(c)(4)	10) Implement, Evaluate, and Revise the Plan

## Phase I Organize Resources

### Step 1: Organize the Planning Effort

The planning process officially began with a kickoff meeting in San Andreas, California, on January 16, 2008. The Calaveras County Office of Emergency Services mailed letters of invitation to the kickoff meeting to county, municipal, district, state, and other stakeholder representatives. This list is included in Appendix A.

The Disaster Mitigation Act requires that each jurisdiction participate in the planning process and officially adopt the multi-jurisdictional hazard mitigation plan. A planning committee was created that includes representatives from each participating jurisdiction, departments of the County, and other local, state, and federal organizations responsible for making decisions in the plan and agreeing upon the final contents. Kickoff meeting attendees discussed potential participants and made decisions about additional stakeholders to invite to participate on the HMPC.

The following agencies or organizations participated on the HMPC:

- Calaveras Office of Emergency Services
- Calaveras County Sheriff’s Office
- Calaveras County Planning Department
- Calaveras County Technology Services Department/GIS
- Calaveras County Environmental Management Agency Agriculture & Weights and Measures

- Calaveras County Public Works
- Calaveras County Health Services Agency
- Calaveras County Office of Education
- Angels Camp Police Department
- California Department of Forestry and Fire Protection
- U.S. Army Corps of Engineers

The HMPC contributed to this planning process by:

- providing facilities for meetings,
- attending meetings,
- collecting data,
- managing administrative details,
- making decisions on plan process and content,
- submitting mitigation action implementation worksheets,
- reviewing drafts, and
- coordinating and assisting with public involvement and plan adoptions.

The HMPC communicated during the planning process with a combination of face-to-face meetings, phone interviews, email correspondence, and an FTP (file transfer protocol) site. The meeting schedule and topics are listed in Table 2.3. The HMPC contact list, HMPC meeting agendas, and meeting attendees for each of the meetings are included in Appendix A.

**Table 2.3. Schedule of HMPC Meetings**

Meeting	Topic	Date
Kickoff Meeting	Introduction to DMA and the planning process; Identification of hazards impacting Calaveras County	January 16, 2008
HMPC #2	Review of risk assessment; Identification of goals and objectives	May 28, 2008
HMPC #3	Identification and prioritization of mitigation actions; Discussion of process to monitor, evaluate, and update plan	October 8, 2008

During the kickoff meeting, AMEC presented information on the scope and purpose of the plan, participation requirements of HMPC members, and the proposed project work plan and schedule. Plans for public involvement (Step 2) and coordination with other agencies and departments (Step 3) were discussed. AMEC also introduced hazard identification requirements and data. The HMPC discussed past events and impacts and future probability for each of the hazards required by FEMA for consideration in a local hazard mitigation plan. The HMPC refined the list of hazards to make it relevant to Calaveras County. Participants were given the AMEC Data Collection Guide to facilitate the collection of information needed to support the plan, such as data on historic hazard events, values at risk, and current capabilities. The sample Data

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Collection Guide is also included in Appendix A. Each participating jurisdiction completed and returned the worksheets in the data collection guide to AMEC.

## **Step 2: Involve the Public**

**44 CFR Requirement 201.6(b): 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.**

At the kickoff meeting, the HMPC discussed options for soliciting public input on the mitigation plan and developed an outreach strategy by consensus.

During the plan's drafting stage, the HMPC presented the purpose of the plan and its planning process, the results of the risk assessment, and ideas for the mitigation strategy at an open study session of the Calaveras County Board of Supervisors. The meeting took place at the Board's chambers in San Andreas, California, on October 7, 2008. The public was informed of the meeting through announcements in the *Calaveras Enterprise* newspaper and ThePineTree.net website. A sample copy of these announcements from pinetree.net is provided in Appendix A.

At the study session, AMEC presented information on the purpose of the plan and its planning process, the results of the risk assessment, and ideas for the mitigation strategy. Questions and comments from the public were invited during the study session.

The public was also given an opportunity to provide input on a draft of the complete plan prior to its submittal to the State and FEMA. Calaveras County provided the plan draft for review and comment on the County website. The website can be accessed at <http://ccwgov.co.calaveras.ca.us/FileArchives/tabid/58/FolderID/231/Default.aspx> and in hard copy at the Calaveras County Sheriff's Office at 391 Mountain Ranch Road, San Andreas, CA 95249.

The plan is online and has been available for review since October 20, 2009. The jurisdictions announced the availability of the draft plan and the public comment period on the Calaveras County Sheriff's home page under Press Releases. The press release is included in Appendix A.

No public comments were submitted on the draft plan. Other stakeholder comments and input were incorporated during the HMPC team review of the draft plan prior to development of the public review draft.

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### Step 3: Coordinate with Other Departments and Agencies

**44 CFR Requirement 201.6(b): 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: (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. (3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.**

There are numerous organizations whose goals and interests interface with hazard mitigation in Calaveras County. Coordination with these organizations and other community planning efforts is vital to the success of this plan. The Calaveras County Office of Emergency Services invited other local, state, and federal departments and agencies to the kickoff meeting to learn about the hazard mitigation planning initiative. Many of the agencies participated throughout the planning process on the HMPC and were listed previously in Step 1: Organize the Planning Effort.

Several opportunities were provided for the above agencies to participate in the planning process. At the beginning of the planning process, invitations were extended to these groups to actively participate on the HMPC. These groups were also invited to participate through the public outreach process which included attendance at the board of supervisors meeting, and review and comment on the draft plan as previously described. The initial series of three multi-jurisdictional outreach/public education meetings was developed to provide an overview of the Disaster Mitigation Act of 2000 and the LHMP development process in order to get as many active participants involved in the planning process. Others assisted in the process by providing data directly as requested in the Data Collection Guide or through data contained on their websites. Further as part of both the HMPC and public outreach processes, all groups were invited to review and comment on the plan prior to submittal to CalEMA and FEMA.

In addition, the HMPC developed a list of neighboring communities and local and regional agencies involved in hazard mitigation activities, as well as other interested parties, to invite by letter to the presentation at the open study session of the Calaveras County Office of Emergency Services on October 7, 2008. The list of stakeholders invited is included in the contact list in Appendix A. All of these stakeholders were also invited to comment on the draft plan during the public comment period previously described.

As part of the coordination with other agencies, the HMPC collected and reviewed existing technical data, reports, and plans. State and federal agency data sources, including National Weather Service web pages and FEMA Flood Insurance Studies, were used to collect information. Calaveras County uses a variety of comprehensive planning mechanisms, such as land use and general plans, emergency operations plans, and municipal ordinances and building codes, to manage community growth and development. This information was used in the development of the hazard identification, vulnerability assessment, and capability assessment and in the formation of goals, objectives, and mitigation actions. These sources are documented

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throughout the plan and specifically in the capability assessment sections. Appendix B provides a complete list of references.

## **Phase 2 Assess Risk**

### **Step 4: Identify the Hazards**

AMEC assisted the HMPC in a process to identify the natural hazards that have impacted or could impact communities in Calaveras County. At the kickoff meeting, the HMPC discussed past events and impacts and future probability for each of the hazards required by FEMA for consideration in a local hazard mitigation plan. The HMPC refined the list of hazards to make it relevant to Calaveras County. A profile of each of these hazards was then developed. Web resources, existing reports and plans, and existing GIS layers were used to compile information about past hazard events and determine the location, previous occurrences, probability of future occurrences, and magnitude/severity of each hazard. The AMEC Data Collection Guide distributed at the kickoff meeting helped identify hazards and vulnerabilities. Information on the methodology and resources used to identify and profile hazards is provided in Sections 3.1-3.2, and included in Appendix B.

### **Step 5: Assess the Risks**

After profiling the hazards that could affect Calaveras County, the HMPC collected information to describe the likely impacts of future hazard events on the participating jurisdictions. This step included two parts: a vulnerability assessment and a capability assessment.

**Vulnerability Assessment**—Both jurisdictions inventoried their assets at risk to natural hazards—overall and in identified hazard areas. These assets included total number and value of structures; critical facilities and infrastructure; natural, historic, and cultural assets; and economic assets. The HMPC also analyzed development trends in hazard areas.

**Capability Assessment**—This assessment consisted of identifying the existing mitigation capabilities of both participating jurisdictions. This involved collecting information about existing government programs, policies, regulations, ordinances, and plans that mitigate or could be used to mitigate risk to disasters. The jurisdictions collected information on their regulatory, personnel, fiscal, and technical capabilities, as well as ongoing initiatives related to interagency coordination and public outreach. This information is included in Chapter 3 Risk Assessment for Calaveras County and in Annex A for the City of Angels Camp.

AMEC provided the draft risk assessment to the HMPC in May 2008 for review and comment. Results of the risk assessment were presented and comments discussed at the second meeting of the HMPC.

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## **Phase 3 Develop the Mitigation Plan**

### **Step 6: Set Goals**

AMEC facilitated a brainstorming and discussion session with the HMPC during their second meeting to identify goals and objectives for the overall multi-jurisdictional mitigation plan. The HMPC discussed definitions and examples of goals, objectives, and actions and considered the goals of the state hazard mitigation plan and other relevant local plans when forming their own goals and objectives. Then, each attendee identified and presented three ideas for plan goals and relevant objectives for each one. The group discussed the ideas and came to consensus on the final goals and objectives for the multi-jurisdictional plan, which are further discussed in Chapter 4.

### **Step 7: Review Possible Activities**

The HMPC identified and prioritized mitigation actions at their third meeting. The group was presented with six different categories of mitigation actions and examples of each. The HMPC then participated in a brainstorming process, in which each committee member identified at least three mitigation actions to address any three out of the plan's five goals. The HMPC then reviewed potential mitigation alternatives and identified new actions by hazard to ensure that all of the plan's profiled hazards were addressed.

The HMPC discussed criteria for narrowing down and prioritizing the identified actions. The group approved the STAPLEE criteria, which assesses the social, technical, administrative, political, legal, economic, and environmental implications of each action. Each member used this criterion to vote for their four highest priority projects. Projects were then sorted into high, medium, or low priority based upon the number of votes they received. This process is described in more detail in Chapter 4 Mitigation Strategy and support information is provided in Appendix C Mitigation Strategy.

The HMPC also identified the responsible agency for implementing each action. The identified agencies then completed a mitigation action implementation worksheet for each action. The purpose of these worksheets is to document background information, ideas for implementation, alternatives, responsible agency, partners, potential funding, cost estimates, benefits, and timeline for each identified action.

### **Step 8: Draft the Plan**

Drafts of the jurisdictional annexes to the plan were developed and submitted to the HMPC for internal review in November 2008. Once the committee's comments were incorporated, a complete draft of the plan was made available online and in hard copy for review and comment by the public and other agencies and interested stakeholders. This review period was from October 20<sup>th</sup> to November 5<sup>th</sup>. Methods for inviting interested parties and the public to review and comment on the plan were discussed in Steps 2 and 3, and materials are provided in

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Appendix A. Comments were integrated into a final draft for submittal to the CalEMA and FEMA Region IX.

## **Phase 4 Implement the Plan and Monitor Progress**

### **Step 9: Adopt the Plan**

To secure buy-in and officially implement the plan, the governing bodies of each participating jurisdiction adopted the plan and their jurisdictional annex. A sample resolution is included in Appendix D. Scanned copies of resolutions of adoption are included at the beginning of this plan (Pending).

### **Step 10: Implement, Evaluate, and Revise the Plan**

The HMPC developed and agreed upon an overall strategy for plan implementation and for monitoring and maintaining the plan over time during Meeting #3. This strategy is described in Chapter 5.



## 3 RISK ASSESSMENT

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

This chapter examines hazards and vulnerability across the entire planning area. The risk assessment process identifies and profiles relevant hazards and assesses the exposure of lives, property, and infrastructure to these hazards. The risk assessment process helps communities in the County better understand their potential risk to natural hazards and provides a framework for developing and prioritizing mitigation actions to reduce risk from future hazard events.

The risk assessment for Calaveras County followed the methodology described in the FEMA publication 386-2, *Understanding Your Risks: Identifying Hazards and Estimating Losses* (2002), which includes a four-step process:

- 1) Identify hazards
- 2) Profile hazard events
- 3) Inventory assets
- 4) Estimate losses

This chapter is divided into four parts: hazard identification, hazard profiles, vulnerability assessment, and capability assessment.

- **Section 3.1 Hazard Identification** identifies the hazards that threaten the planning area and describes why some hazards have been omitted from further consideration.
- **Section 3.2 Hazard Profiles** discusses the geographic location, past events, future probability, magnitude/severity, and overall vulnerability of the planning area to each hazard.
- **Section 3.3 Vulnerability Assessment** assesses the county's total exposure to natural hazards and inventories potential assets at risk, including critical facilities and infrastructure; natural, historic, and cultural resources; and economic assets. This section also describes vulnerability and estimates potential losses to existing development in identified hazard areas and addresses future development and land use trends.
- **Section 3.4 Capability Assessment** describes the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. The capabilities assessment is divided into five sections: regulatory, administrative and technical, fiscal, outreach and partnerships, and past mitigation efforts.

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## 3.1 Hazard Identification

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**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.**

### Methodology

The Calaveras County Hazard Mitigation Planning Committee (HMPC) reviewed data and discussed the impacts of each of the hazards required by FEMA for consideration, which are listed alphabetically below, to determine the natural hazards that threaten the planning area:

- Avalanche
- Coastal Erosion
- Coastal Storm
- Dam/Levee Failure
- Drought
- Earthquake
- Expansive Soils
- Extreme Heat
- Flood
- Hailstorm
- Hurricane
- Land Subsidence
- Landslide
- Severe Winter Storm
- Tornado
- Tsunami
- Volcano
- Wildfire
- Windstorm

Data on past impacts and the probability of future occurrences of these hazards was collected from the following sources:

- Spatial Hazard Event and Loss Database (SHELDUS), a component of the University of South Carolina Hazards Vulnerability Research Institute that compiles county-level hazard data for 18 different natural hazards (information on past hazard events)
- National Oceanic and Atmospheric Administration's (NOAA) National Climatic Data Center (information on past extreme weather and climate events)
- Disaster declaration history from FEMA, the Public Entity Risk Institute, and the USDA Farm Service Agency
- State of California Multi-Hazard Mitigation Plan (2007)
- Calaveras County General Plan Public Review Draft Baseline Report (2008)
- Various articles and publications available on the Internet (sources are indicated where data is cited)

The HMPC eliminated some hazards from further profiling because they do not occur in the planning area or their impacts were not considered significant in relation to other hazards. Table 3.1 lists these hazards and provides a brief explanation for their elimination.

**Table 3.1 Hazards Not Identified/Profiled in the Plan**

<b>Hazard</b>	<b>Explanation for Omission</b>
Avalanche	HMPC determined a lack of occurrence and vulnerability
Coastal Storm	Planning area is not near coastal areas
Coastal Erosion	Planning area is not near coastal areas
Hailstorm	Insignificant history of impacts and vulnerability
Hurricane	Planning area is not near coastal areas
Land Subsidence	Lack of previous occurrence and limited/no conditions associated with land subsidence (unstable soils types, high surface pressure due to loading from high rise buildings, high water table and large scale groundwater or oil extraction)
Tornado	Only one tornado event on record for planning area that resulted in no public safety impacts or property losses. High wind impacts addressed in windstorm
Tsunami	Planning area is not near coastal areas

Source: Calaveras County Hazard Mitigation Planning Committee, 2008

The HMPC identified 11 natural hazards that significantly affect the planning area and organized these hazards to be consistent with the State of California Multi-Hazard Mitigation Plan (2007):

- Dam and Levee Failure
- Drought
- Earthquake
- Expansive Soils
- Extreme Heat
- Flood
- Landslide/Erosion
- Volcano
- Wildfire
- Windstorm
- Winter Storm

These hazards are profiled in further detail in Section 3.2. The committee agreed not to address manmade hazards, such as industrial accidents or acts of terrorism in this plan, as manmade hazards are addressed in detail in the County’s emergency operations plan.

### **Disaster Declaration History**

One method of identifying hazards is to examine past events that triggered federal and/or state disaster declarations that included Calaveras County. Disaster declarations are granted when the severity and magnitude of the event’s impact surpasses the ability of the local government to respond and recover.

Disaster assistance is supplemental and sequential. When the local government’s capacity has been surpassed, a state disaster declaration may be issued, allowing for the provision of state

assistance. When a severe disaster occurs, and both the local and state governments' capacity to respond are exceeded, a federal disaster declaration may be issued, allowing for the provision of federal disaster assistance. The federal government may issue a disaster declaration through FEMA, the U.S. Department of Agriculture (USDA), and/or the Small Business Administration. FEMA also issues emergency declarations, which are more limited in scope and without the long-term federal recovery programs of major disaster declarations. The quantity and types of damage are the determining factors.

Table 3.2 lists state and/or federal disaster declarations that included Calaveras County. Many of the hazard events affected multiple counties. Reported injuries, fatalities, and economic damage are estimates of losses for all counties affected by the hazard event disaster declaration.

**Table 3.2 State and Federal Disaster Declarations that Include Calaveras County**

Hazard Type	Disaster Name	State Declaration	Federal Declaration	Disaster Number	Deaths	Cost*
Heat	Heat Wave		USDA 7/2006-	--	--	--
Severe Storm, Flood	Severe Storms, Flooding, Landslides, Mudslides	--	6/5/06	DR-1646	--	\$4.0 million**
Fire	Wildfire	9/10/01	--	--	--	
Winter Storm	Severe Winter Storms and Flooding	--	2/9/1998	DR-1203	17	\$465 million (2006 \$)
Flood	January 1997 Floods	1/3/97	1/4/97	DR-1155	8	\$1.8 billion
Winter Storm, Flood	Severe Winter Storms, Flooding, Landslides, Mudflows	--	3/12/1995	DR-1046	--	\$214 million (2006 \$)
Severe Storm/ Flood	Late Winter Storms	--	1/10/95	DR-1044	17	\$1.1 billion
Fire	Old Gulch-Fountain Fires	8/2/92	8/29/92	DR-958	--	\$54.0 million
Fire	Wildfire	7/21/88	--	N/A		
Severe Storm	Storms	2/20/86	2/18/86	DR-758	13	\$407.5 million
Drought	Drought		USDA 1/20/77	EM-3023	--	--
Drought	Drought	2/9/76		N/A	--	\$2.7 billion
Flood	1969 Storms	2/8/69	1/26/69	DR-253	47	\$300.0 million
Flood	Storm/Flood Damage	4/2/58	4/4/58	DR-82	13	\$24.0 million
Flood	Floods	12/22/55	12/23/55	DR-47	74	\$200.0 million

Hazard Type	Disaster Name	State Declaration	Federal Declaration	Disaster Number	Deaths	Cost*
Flood	Floods	11/21/50	--	CDO 50-01	9	\$32.2 million

Source: California Emergency Management Agency, [www.oes.ca.gov/](http://www.oes.ca.gov/); Public Entity Risk Institute, [www.peripresdecusa.org/mainframe.htm](http://www.peripresdecusa.org/mainframe.htm)

\*Except for DR-1646, death and cost totals are for all declared jurisdictions and not just Calaveras County

\*\*Cost estimates for DR-1646 include only agricultural crop damage for Calaveras County

To date, Calaveras County has received nine federal disaster declarations involving flooding and severe winter storms. Another federal disaster declaration was enacted for the 1992 Old Gulch-Fountain Fires, which cost an estimated \$54 million and caused 8 injuries. State only disaster declarations include one for drought in 1976, with recorded losses of \$2.7 billion, and two for wildfires in 1988 and 2001. The most recent federally declared disaster was DR-1646 for severe storms, flooding, landslides, and mudslides in 2006. Calaveras County was one of 17 counties designated as eligible for Public Assistance funds for emergency work and the repair or replacement of disaster-damaged facilities. More details on this event are provided in the flood and landslide profiles in the next section.

A USDA disaster declaration certifies that the affected county suffered at least a 30 percent loss in one or more crop or livestock areas and provides affected producers with access to low-interest loans and other programs to help mitigate the impact of the disaster. In accordance with the Consolidated Farm and Rural Development Act, all counties neighboring those receiving disaster declarations are named as contiguous disaster counties and are eligible for the same assistance. Due to the record-setting heat wave that occurred July 1-31, 2006, the USDA declared 16 California counties, including Calaveras, as primary natural disaster areas.

## 3.2 Hazard Profiles

**44 CFR Requirement §201.6(c)(2)(i): The risk assessment shall include a description of the type, location, and magnitude of all natural hazards that can affect the jurisdiction. The plan should include information on previous occurrences of hazard events and on the probability of future hazard events.**

**44 CFR 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.**

### Methodology

The hazards identified in Section 3.1 Hazard Identification are profiled individually in this section. The section will conclude by summarizing the geographic scale, the probability of future occurrence, and the overall vulnerability rating of each hazard.

The sources used to collect information for these profiles include the following:

- 
- Spatial Hazard Event and Loss Database (SHELDUS), a component of the University of South Carolina Hazards Vulnerability Research Institute that compiles county-level hazard data for 18 different natural hazards (information on past hazard events)
  - National Oceanic and Atmospheric Administration’s (NOAA) National Climatic Data Center (information on past extreme weather and climate events)
  - Disaster declaration history from FEMA, the Public Entity Risk Institute, and the USDA Farm Service Agency
  - State of California Multi-Hazard Mitigation Plan (2007)
  - FEMA’s HAZUS-MH loss estimation software
  - Geographic information systems (GIS) data from the Calaveras County GIS Department
  - Statewide GIS datasets compiled by state and federal agencies
  - Existing plans and reports
  - Personal interviews with HMPC members and other stakeholders
  - Worksheets completed by each participating jurisdiction documenting past events

Detailed profiles for each of the identified hazards include information on the following characteristics of the hazard:

### **Hazard Description**

This section consists of a general description of the hazard and the types of impacts it may have on a community.

### **Geographic Location**

This section describes the geographic extent or location of the hazard in the planning area and assesses the affected areas as isolated, small, medium, or large.

- Large—More than 50 percent of the planning area affected
- Medium—25-50 percent of the planning area affected
- Small—10-25 percent of the planning area affected
- Isolated—Less than 10 percent of the planning area affected

### **Previous Occurrences**

This section includes information on historical incidents, including impacts, if known. A historical incident worksheet was used to capture information from participating jurisdictions on past occurrences. Information from the HMPC was combined with other data sources, including those previously mentioned.

### **Probability of Future Occurrence**

The frequency of past events is used to gauge the likelihood of future occurrences. Based on historical data, the probability of future occurrences is categorized as follows:

- 
- Highly Likely—Near 100 percent chance of occurrence next year or happens every year
  - Likely—10-100 percent chance of occurrence in next year or has a recurrence interval of 10 years or less
  - Occasional—1-10 percent chance of occurrence in the next year or has a recurrence interval of 11 to 100 years
  - Unlikely—Less than 1 percent chance of occurrence in next 100 years or has a recurrence interval of greater than every 100 years

The probability, or chance of occurrence, was calculated where possible based on existing data. Probability was determined by dividing the number of events observed by the number of years and multiplying by 100. This gives the percent chance of the event happening in any given year. An example would be three droughts occurring over a 30-year period, which suggests a 10 percent chance of a drought occurring in any given year.

### **Magnitude/Severity**

This section summarizes the potential magnitude and severity of a hazard event in terms of deaths, injuries, property damage, and interruption of essential facilities and services. Magnitude and severity is classified in the following manner:

- Catastrophic—Multiple deaths; property destroyed and severely damaged; and/or interruption of essential facilities and service for more than 72 hours
- Critical—Isolated deaths and/or multiple injuries and illnesses; major or long-term property damage that threatens structural stability; and/or interruption of essential facilities and services for 24-72 hours
- Limited—Minor injuries and illnesses; minimal property damage that does not threaten structural stability; and/or interruption of essential facilities and services for less than 24 hours
- Negligible—No or few injuries or illnesses; minor quality of life loss; little or no property damage; and/or brief interruption of essential facilities and services

### **3.2.1 Dam Failure**

#### **Description**

Dam failure is defined as the breach of a manmade water retention structure. Failure can be caused by flood conditions leading to overtopping, mechanical failure, earthquake, or any combination of these factors. Two factors that influence the potential severity of a full or partial dam failure are the amount of water impounded and the density, type, and value of development and infrastructure located downstream.

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Other causes include:

- Inadequate spillway capacity
- Internal erosion
- Improper design
- Improper maintenance
- Negligent operation
- Failure of upstream dams

In general, speed of onset depends largely on the causal factors. Dam failure can occur in as little as a few minutes or more slowly over the course of many months. Thus, warning time can vary accordingly, but in the event of a catastrophic failure of a large dam, evacuation time for locations directly downstream would be extremely brief. Floodplain characteristics largely determine the available warning time for locations further downstream. With regard to duration of high water conditions that result from dam failure, this depends on the capacity and stage of the reservoir at time of breach as well as the severity of the breach.

### **Geographic Location**

The geographic extent of this hazard in Calaveras County is **small**.

Dam failure affects downstream areas, and the size of the inundation area increases with the severity of the breach. These inundation areas are less than 25 percent of the county's total area, therefore the geographic scale of the hazard is small, with 10-25 percent of the planning area affected. However, longer term impacts of a dam failure, such as decreased water supply for irrigation, diminished flood control capabilities, decreased hydroelectric generation, and road closures would affect a much larger area of the county and region.

The National Inventory of Dams lists 42 dams in Calaveras County and classifies dams based on the potential hazard to the downstream area resulting from failure or misoperation of the dam or facilities:

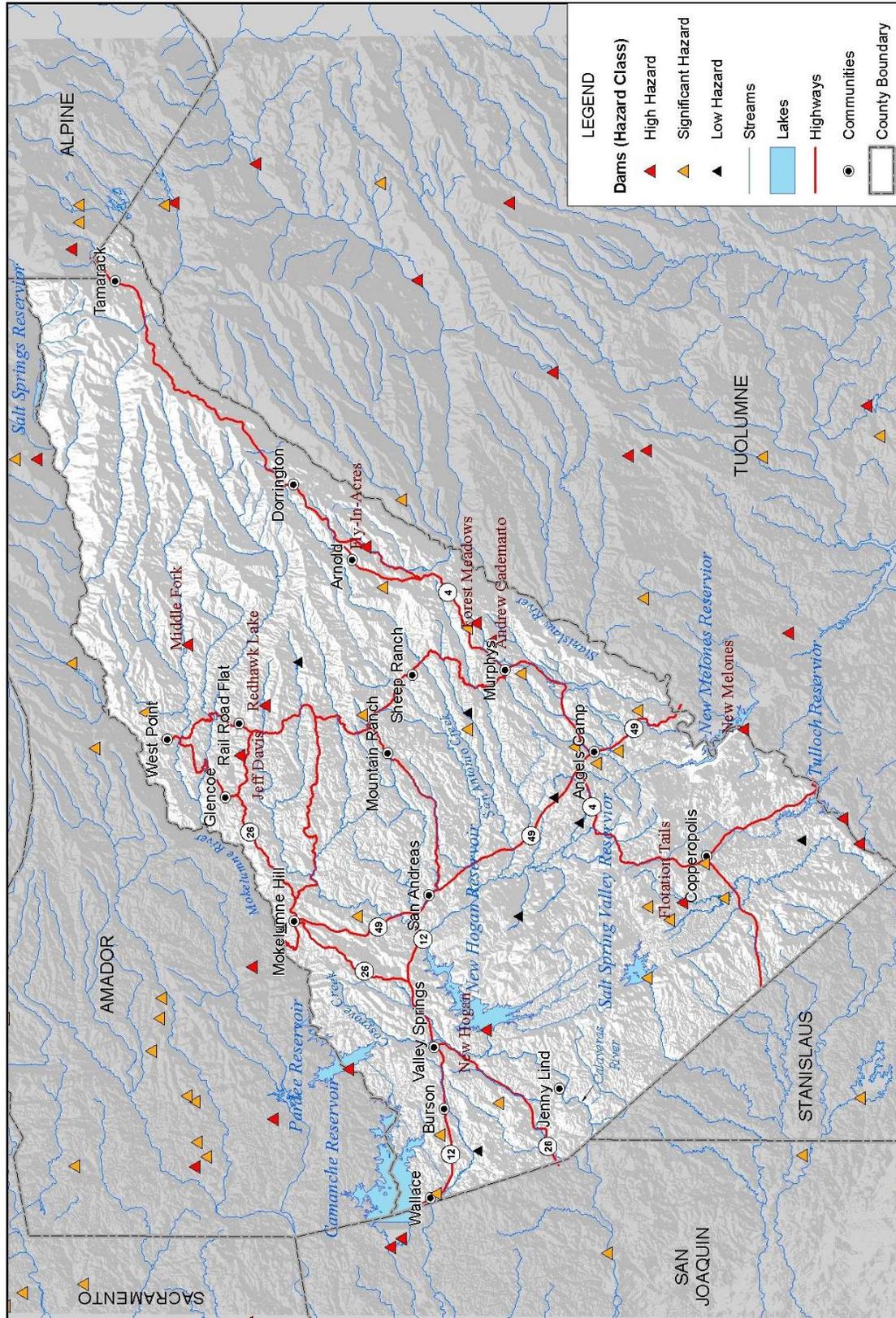
- **High Hazard Potential**—Probable loss of life (one or more)
- **Significant Hazard Potential**—No probable loss of human life but can cause economic loss, environment damage, disruption of lifeline facilities, or impact other concerns; often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure
- **Low Hazard Potential**—No probable loss of human life and low economic and/or environmental losses; losses are principally limited to the owner's property

Based on these classifications, there are 7 high hazard dams and 30 significant hazard dams in Calaveras County. These dams are illustrated in Figure 3.1 and listed in Table 3.3.

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There was one levee in Calaveras County at Cosgrove Creek. The levee is no longer needed because a developer filled in land behind it and homes are now built on the fill. The County is seeking a Letter of Map Revision to remove the levee from the preliminary digital flood insurance rate maps.

Figure 3.1 Dams in Calaveras County



amec  
 Map compiled 10/2008; intended for planning purposes only.  
 Data Source: Calaveras County, HAZUS-MH MR3

**Table 3.3 High (H) and Significant (S) Hazard Dams in Calaveras County**

Dam Name	River	Height	Storage	Year Completed	Owner Name	Hazard Rating
New Melones	Stanislaus	637	2,420,000	1979	Department of Interior Bureau of Reclamation	H
New Hogan Dam	Calaveras	210	317,100	1963	CESPK	H
Jackson Creek Spillway	Mokelumne	37	200,000		East Bay Municipal Utility District	H
Tulloch	Stanislaus	205	68,400	1958	South San Joaquin and Oakdale Irrigation Districts	H
CPUD Middle Fork	Middle Fork Mokelumne	95	2000	1939	Calaveras Public Utility District	H
Goodwin	Stanislaus	101	500	1912	Oakdale South San Joaquin Irrigation District	H
Murphys Forebay South	Angels Creek	67	60	1953	Utica Power Authority	H
Salt Springs Valley	Rock Creek	47	10,900	1882	Rock Creek Water District	S
McKays Point Diversion	North Fork Stanislaus	246	2930	1989	Calaveras County Water District	S
Redhawk Lake	North Fork Calaveras	33	2760	1882	Calaveras Public Utility District	S
Tiger Creek Afterbay	North Fork Mokelumne	120	2750	1931	Pacific Gas And Electric Company	S
Jeff Davis	Wet Gulch Creek	114	1800	1973	Calaveras Public Utility District	S
Skyrocket	Littlejohn Creek	44	1715	1999	Meridian Gold Company	S
Flowers	Littlejohn Creek	41	724	1957	Steven Rottman, CEO	S
Emery	McKinney's Creek	53	630	1850	M-24 Ranch Association	S
Cherokee	Cherokee Creek	44	630	1959	W A Spence Et Ux	S
Wallace	Bear Creek	29	410		Carter Estates, LLC	S
LCRMF	Clover Creek	45	391	1989	Meridian Gold Company	S
White Pines	San Antonio Creek	35	262	1970	Calaveras County Water District	S
Hunters	Mill Creek	59	260	1927	Utica Power Authority	S
Ferrario	Bear Creek	25	250	1955	Robert & Lynn Wilson	S
Copperopolis	Penney Creek	33	225	1905	Jon & Angelita Janofsky	S
Lacontenta	Cosgrove Spring	43	172		Calaveras County Water District	S
Stevenot	Carson Creek	70	150	1987	Sutton Enterprises	S

Dam Name	River	Height	Storage	Year Completed	Owner Name	Hazard Rating
Andrew Cademartori	Seasonal Stream	80	142	1983	Union Public Utility District	S
Murphys WW	Offstream	24	140	1980	Murphys Sanitary District	S
Tanner	Cowell Creek	35	124	1959	Lake Mont Pines Homeowners	S
Forest Meadows	Angels Creek	60	117	1975	Forest Meadows Development Company	S
Fly-In-Acres	Moran Creek	41	100	1953	Blue Lakes Springs Homeowners	S
Bevanda	Calaveras	29	90	1925	C David Callahan	S
Ross	French Gulch Creek	44	85	1895	Utica Power Authority	S
Pine Peak No 4	North Fork Calaveras	45	73	1955	The Mariner Group	S
Reid	Esperanza Creek	32	70	1969	Raymond J Vernazza	S
West Point Reg	Ruse Creek	36	60	1965	Calaveras County Water District	S
Mokelumne Hill	Mokelumne	52	52	1973	Mokelumne Hill Sanitary District	S
Murphys Afterbay	Angels Creek	43	36	1953	Utica Power Authority	S
Stanislaus Afterbay	Middle Fork Stanislaus	19	35	1963	Pacific Gas And Electric Company	S

Source: National Inventory of Dams, <http://crunch.tec.army.mil/nidpublic/webpages/nid.cfm>

## Previous Occurrences

There is a history of dam failure in Calaveras County. In 1895, the Angels Dam collapsed, resulting in one fatality. The cause cited for the failure was flooding that undermined the poorly constructed dam foundation. In 1997, the Don Pedro Dam in neighboring Tuolumne County overtopped, resulting in flooding across a 300 square-mile area that included parts of Calaveras County. Also, in April of 2006, flooding caused significant damage and threat of failure to a small dam at Peachtree Pond near Valley Springs.

## Probability of Future Occurrence

**Occasional**—1-10 percent chance of occurrence in the next year or has a recurrence interval of 11 to 100 years

With only a single previous occurrence, probability of future occurrence is difficult to accurately estimate for dam failure. Because dam failure is a manmade hazard, the methodology for calculating probability based on past occurrences does not necessarily reflect the actual risk of future occurrence. Another way to estimate future occurrence is to consider the probability of

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other hazards that are considered causes or contributing factors of dam failure. These include flooding and earthquake, which are classified as likely and unlikely respectively.

### **Magnitude/Severity**

**Catastrophic**—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths

Water released by a failed dam generates tremendous energy and can cause a flood that is catastrophic to life and property. There are seven high hazard dams in Calaveras County. By definition, this hazard classification indicates that loss of human life is probable in cases of dam failure or misoperation. Areas considered most vulnerable to inundation due to dam failure are downstream of the larger reservoirs, particularly New Melones, New Hogan, Tulloch, Pardee, Camanche, Hunter, Spicer, and McKays.

A catastrophic dam failure in Calaveras County could easily overwhelm local response capabilities and require mass evacuations to save lives. Factors that influence the potential severity of a full or partial dam failure are the amount of water impounded and the density, type, and value of development and infrastructure located downstream, which varies greatly for each of the 42 dam basins in Calaveras County.

## **3.2.2 Drought**

### **Description**

Drought is a condition of climatic dryness severe enough to reduce soil moisture and water below the minimum necessary for sustaining plant, animal, and human life systems. Lack of precipitation over extended periods is the primary cause of drought, and poor water conservation practices can magnify the effects.

Regarding speed of onset, duration, and warning time, droughts develop gradually, over a multi-month/year period, and it is not always easy to quantify when a drought begins and ends. Although droughts are sometimes characterized as emergencies, they differ from typical emergency events. Most natural disasters, such as floods or forest fires, occur relatively rapidly and afford little time for preparing for disaster response.

Drought is a complex issue involving many factors. It occurs when a normal amount of moisture is not available to satisfy an area's usual water-consuming activities.

- **Meteorological drought** is usually defined by a period of below average water supply.
- **Agricultural drought** occurs when there is an inadequate water supply to meet the needs of the state's crops and other agricultural operations such as livestock.
- **Hydrological drought** is defined as deficiencies in surface and subsurface water supplies. It is generally measured as streamflow, snowpack, lake, reservoir, and groundwater levels.

- 
- **Socioeconomic drought** occurs when a drought impacts health, well-being, and quality of life or when a drought starts to have an adverse economic impact on a region.

## **Geographic Location**

The geographic extent of this hazard in Calaveras County is **large**.

Drought can affect all areas of Calaveras County. Drought conditions over the previous eight years have tended to be more pronounced in the eastern section of the county. However, as human population and agriculture are more concentrated in the western and central portions, the impacts of drought, when it occurs, tend to be amplified in these locations.

## **Previous Occurrences**

Historically, California has experienced severe drought conditions. According to the CalEMA, from 1950 to 1997, Calaveras County was included in two state emergency declarations due to drought: 1976-1977 and 1987-1992. The 1976-1977 drought involved 31 counties with a total damage and loss assessment of \$2.7 billion. Local effects of this drought included water restrictions for the Copperopolis and Ebbetts Pass areas. The longer drought between 1987 and 1992 diminished water supply and quality for the Calaveras County Water District but voluntary conservation measures were adequate to avoid extreme shortages.

The Southwestern States Flood and Drought Summaries from the U.S. Geological Survey summarize California's drought history and report that the drought of 1976-77 was most severe in the northern three-quarters of California, but the impact was experienced statewide because of the dependence of southern California on water transfers from the north. The water year 1977 was the driest year of record at almost all gauging stations in the affected area of California, and the water year 1976 was among the five driest on record in the central and northern Sierra Nevada. The two-year runoff and precipitation deficiency is unequalled in California's history. More recently, during the 1987-1992 drought, overall runoff from the San Joaquin Valley was 47 percent of average.

Based on records from the Calaveras County Agricultural Commissioner, a combination of freezing conditions and drought caused \$4 million in damage to forage and the hay crop. Also, extreme heat and drought in July 2006 led to outdoor watering restrictions in the Jenny Lind area and \$200,000 in crop damage countywide. A drought over the summer of 2004 caused an estimated \$3.2 million in damage to rangeland.

In May 2008, ongoing drought conditions beginning in December 2006 caused ranchers in Calaveras County to experience 80 to 85 percent reductions in the amount of forage available for cattle resulting in low calf weight. Information collected from the Calaveras County Agricultural Commissioner indicated loss estimates exceeding \$6.1 million.

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## **Probability of Future Occurrence**

**Likely**—10-100 percent chance of occurrence in next year or has a recurrence interval of 10 years or less

In Calaveras County, two multi-year droughts are on record for the last 50 years. This pattern of previous occurrence equals a 4 percent chance of occurring in any given year. Available data for determining hydrologic risks is limited, only going back about 100 years. However, drought frequency estimates based on tree ring studies have shown extensive dry periods far exceeding the six-year maximum drought on record (California Water Plan Update 2005). Projections of the potential effects of climate change indicate a long-term trend toward warmer average temperatures, reduced annual snowpack, and a drier overall climate.

## **Magnitude/Severity**

**Critical**—Isolated deaths and/or multiple injuries and illnesses; major or long-term property damage that threatens structural stability; and/or interruption of essential facilities and services for 24-72 hours

Drought severity ratings by the U.S. Drought Monitor indicate that the far eastern section of the county has experienced extreme or severe drought in at least two of the last eight years. The county overall has experienced abnormally dry to moderate drought conditions in four of the last eight years. These conditions can lead to water use restrictions during certain summer months and agricultural losses among other impacts to the population and local economy. Figure 3.2 shows drought conditions present across the planning area as of October 2009. Abnormally dry conditions occur over most of the planning area.

Figure 3.2 Drought Conditions, California - October 2009

# U.S. Drought Monitor California

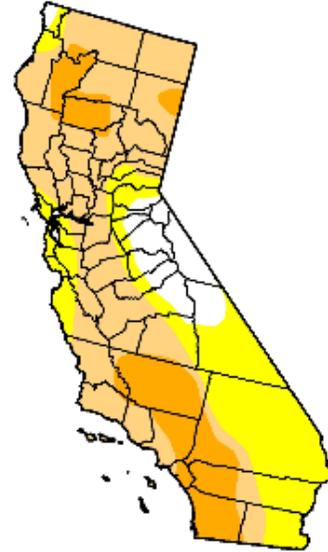
October 27, 2009  
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	9.1	90.9	62.5	17.7	0.0	0.0
Last Week (10/20/2009 map)	10.6	89.4	61.2	17.7	0.0	0.0
3 Months Ago (08/04/2009 map)	0.8	99.2	72.8	44.3	0.0	0.0
Start of Calendar Year (01/06/2009 map)	1.7	98.3	88.2	41.3	2.8	0.0
Start of Water Year (10/06/2009 map)	0.0	100.0	73.4	45.8	0.0	0.0
One Year Ago (10/28/2008 map)	0.0	100.0	93.6	55.6	0.0	0.0

Intensity:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional



The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements

<http://drought.unl.edu/dm>



Released Thursday, October 29, 2009  
Author: M. Rosencrans, CPC/NOAA

Source: National Drought Mitigation Center, [www.drought.unl.edu/](http://www.drought.unl.edu/)

Drought impacts in Calaveras County can be wide-reaching: economic, environmental, and societal. The most significant impacts associated with drought are those related to water intensive activities such as agriculture, wildfire protection, municipal usage, commerce, and recreation and tourism. A reduction of electric power generation and water quality deterioration are also potential problems. Drought conditions can also cause soil to compact and not absorb water well, potentially making an area more susceptible to flooding. Drought impacts increase with the length of a drought, as carry-over supplies in reservoirs are depleted and water levels in groundwater basins decline. Climate change is likely to increase the magnitude and severity of drought in Calaveras County in the future.

### 3.2.3 Earthquake

#### Description

Earthquake is defined as the potentially violent motion or shaking of the earth's surface resulting from shifts on plates and faults. Earthquakes can cause structural damage, injury, and loss of life,

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as well as damage to infrastructure networks, such as water, power, communication, and transportation. Other damage-causing earthquake hazards include surface rupture, fissuring, settlement, and permanent horizontal and vertical shifting of the ground. Secondary impacts can include landslides, seiches, liquefaction, fires, and dam failure. Speed of onset is usually very abrupt, with little or no warning time. Duration typically ranges from a few seconds to a minute or two, but aftershocks can occur for hours or weeks, usually with diminishing frequency and intensity.

## Geographic Location

The geographic extent of this hazard in Calaveras County is **large**.

Calaveras County is in the Sierra Block, an area of historically low seismic activity that is within Seismic Risk Zone 3 and roughly 100 miles east of the seismically active San Francisco Bay area. Identified locations of potential fault activity are near Valley Springs, Mokelumne Hill, and Copperopolis. These faults are part of the Melones-Bear Mountain-Foothills Fault System, which crosses the western portion of the county, but the level of seismic activity associated with this system is unknown.

Potential active faults in the Valley Springs/Mokelumne Hill area are the following:

- Youngs Creek
- Waters Peak
- Poorman Gulch
- Haupt Creek

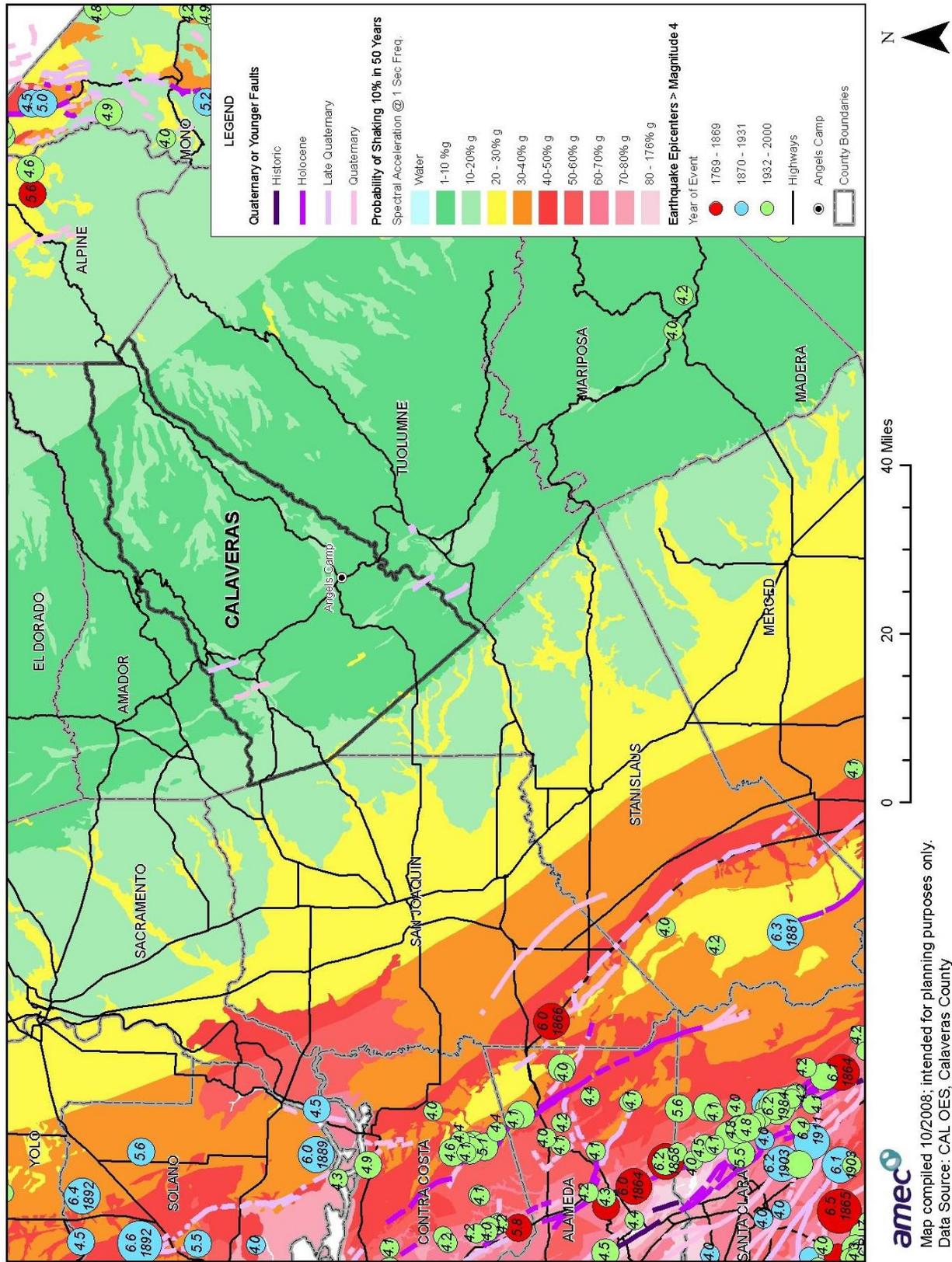
Potentially active faults in the Copperopolis area are the following:

- Bowie Flat
- Green Springs Run
- Rawhide Flat East
- Rawhide Flat West

The closest major fault is the Sierra Frontal Fault System along the eastern edge of the Sierra Nevada Range, which includes the Carson Valley fault, located 25 miles northeast of the county. More distant faults located generally to the south across the Central Valley region with the potential to cause ground shaking include the Ortigalita fault, Central Valley Coast Range blind thrust fault, Calaveras fault (Hollister vicinity), Greenville fault, and San Andreas fault.

Figure 3.3 below shows the location of faults, probability of seismic activity, and the location of previous large earthquake epicenters for the region that includes Calaveras County.

Figure 3.3 Calaveras County Ground Shaking Potential Map



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## Previous Occurrences

There has never been a state disaster declaration for an earthquake in Calaveras County or in any of the surrounding counties, and there is no record of damaging earthquakes. However, the Calaveras County General Plan (1996) does note that ground shaking has been felt in the past, notably during the Mono Lake earthquake in October 1990.

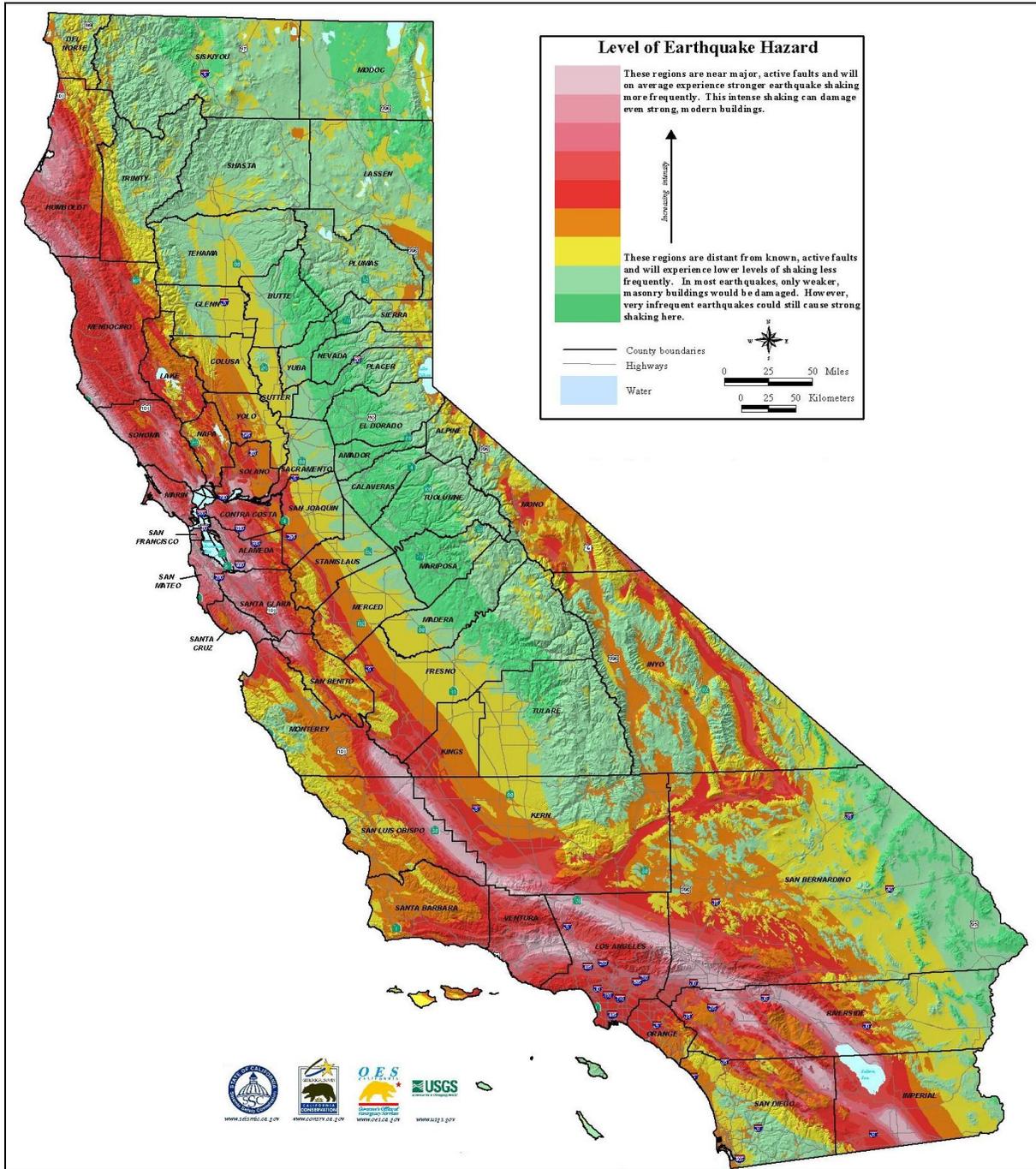
## Probability of Future Occurrence

**Occasional**—1-10 percent chance of occurrence in the next year or has a recurrence interval of 11 to 100 years

The State of California Multi-Hazard Mitigation Plan ranks the earthquake hazard for the majority of Calaveras County at its lowest earthquake risk. The California Geological Survey's probabilistic seismic assessment for Calaveras County estimates that peak ground acceleration could reach or exceed 0.1 to 0.2 g (intensity value I on the Modified Mercalli Intensity Scale, see Table 3.5) with a 0.21 percent chance of being exceeded each year. Thus, based on patterns of previous occurrences, probability of ground shaking is **occasional**, with a 1-10 percent chance of occurrence in the next year. The probability of a large, damaging earthquake is **unlikely**, with less than a 1 percent chance of occurrence in next 100 years.

Figure 3.4 indicates the level of earthquake hazard for California by County.

**Figure 3.4 Earthquake Hazard by County: State of California**



Source: State of California Multi-Hazard Mitigation Plan, 2007

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## Magnitude/Severity

**Limited**—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability

The amount of energy released during an earthquake is most commonly expressed on a moment magnitude scale and is measured directly from the earthquake as recorded on seismographs. Another measure of earthquake magnitude is intensity. Intensity is an expression of the amount of shaking, typically the greatest cause of losses to structures during earthquakes, at any given location on the surface as felt by humans and defined by the Modified Mercalli Intensity Scale. Table 3.4 features abbreviated descriptions of the 12 levels of intensity.

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**Table 3.4 Modified Mercalli Intensity (MMI) Scale**

MMI	Felt Intensity
I	Not felt except by a very few people under special conditions. Detected mostly by instruments.
II	Felt by a few people, especially those on upper floors of buildings. Suspended objects may swing.
III	Felt noticeably indoors. Standing automobiles may rock slightly.
IV	Felt by many people indoors, by a few outdoors. At night, some people are awakened. Dishes, windows, and doors rattle.
V	Felt by nearly everyone. Many people are awakened. Some dishes and windows are broken. Unstable objects are overturned.
VI	Felt by everyone. Many people become frightened and run outdoors. Some heavy furniture is moved. Some plaster falls.
VII	Most people are alarmed and run outside. Damage is negligible in buildings of good construction, considerable in buildings of poor construction.
VIII	Damage is slight in specially designed structures, considerable in ordinary buildings, great in poorly built structures. Heavy furniture is overturned.
IX	Damage is considerable in specially designed buildings. Buildings shift from their foundations and partly collapse. Underground pipes are broken.
X	Some well-built wooden structures are destroyed. Most masonry structures are destroyed. The ground is badly cracked. Considerable landslides occur on steep slopes.
XI	Few, if any, masonry structures remain standing. Rails are bent. Broad fissures appear in the ground.
XII	Virtually total destruction. Waves are seen on the ground surface. Objects are thrown in the air.

Source: Multi-Hazard Identification and Risk Assessment, FEMA 1997

There is no record of earthquake-related public safety impacts or property losses in Calaveras County. Due to the lack of previous occurrences, the potential magnitude and severity of earthquakes is speculative. The Foothills Fault System in western Calaveras County is considered to have a maximum magnitude of 6.5, which compares to other major earthquakes in California's history, including the San Simeon earthquake near Paso Robles-Templeton (December 2003). The magnitude 6.5 San Simeon earthquake killed two people, injured 40, and caused the collapse of 40 buildings.

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Risk of surface rupture is not considered high, and the potential for ground shaking is lower in Calaveras County than the majority of California. Most critical facilities are constructed of steel and/or cinder block and are compliant with the state's Uniform Building Code, which includes seismic requirements. One notable exception is the San Andreas Town Hall, which is constructed with unreinforced masonry. Other historic buildings in the downtown areas of Angels Camp, Murphys, and San Andreas are vulnerable to seismic events.

The vulnerability of utilities infrastructure and communications are additional concerns, particularly with regard to gas lines, water and sewer mains, and data and phone lines located below ground. Power and phone lines are vulnerable to falling trees and landslides created by earthquakes, and electrical substations could conceivably be damaged. General communications systems overload is another potential vulnerability. During or following an earthquake, communications volumes can overwhelm existing capacity, creating service disruptions with or without physical damage to the system itself.

Based on these assessments, overall vulnerability to direct impact from earthquakes for Calaveras County is considered low by the HMPC, with minimal potential impact and low exposure of assets, and where history of occurrence is extremely rare and/or potential cost of damage to life and property is minimal. However, a major earthquake in the San Francisco metropolitan area could create a surge of evacuees into Calaveras, which would strain local infrastructure, supplies of basic goods, and medical capacity.

### **3.2.4 Expansive Soils**

#### **Hazard Description**

Expansive soils are characterized by a high clay content, which swells with increased moisture content and contracts during dry periods. This change in volume, usually associated with seasonal changes, can damage building foundations, roads, and concrete pavement. On slopes, it can bury or break utility lines. Expansive soil types are also known to be associated with landslide risk and rockfall, as increased volume of expansive soil layers on slopes can create ground shifts and down-slope movement of materials. Onset of soil expansion tends to follow the seasons, with expansion occurring in the wetter months of the year and contraction over the summer. In regard to warning time, maps showing the location of expansive soils are available to guide future building and development on the potential presence of this hazard.

#### **Geographic Location**

The geographic extent of this hazard in Calaveras County is **small**.

In general, expansive soils are most likely to occur in the central part of the county north of Mountain Ranch.

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## Previous Occurrences

The HMPC reported that expansive have caused problems to building foundations and roads but no specific data on past damages was known.

## Probability of Future Occurrences

**Likely**—10-100 percent chance of occurrence in next year or has a recurrence interval of 10 years or less

Based number of vulnerable structures and infrastructure that are located in areas known for having expansive soils, it is likely that this hazard will continue to occur in the future.

## Magnitude/Severity

**Negligible**—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid.

Although this hazard is widespread across the County, it is unlikely to cause loss of life. The HMPC was had little information concerning this hazard and past impacts besides it causing some damage to shallow building foundations and pavement. Certain standard building practices can be used to mitigate damage caused by expansive soils. The impacts of this hazard are likely to increase in the future due to the increasing development in these areas.

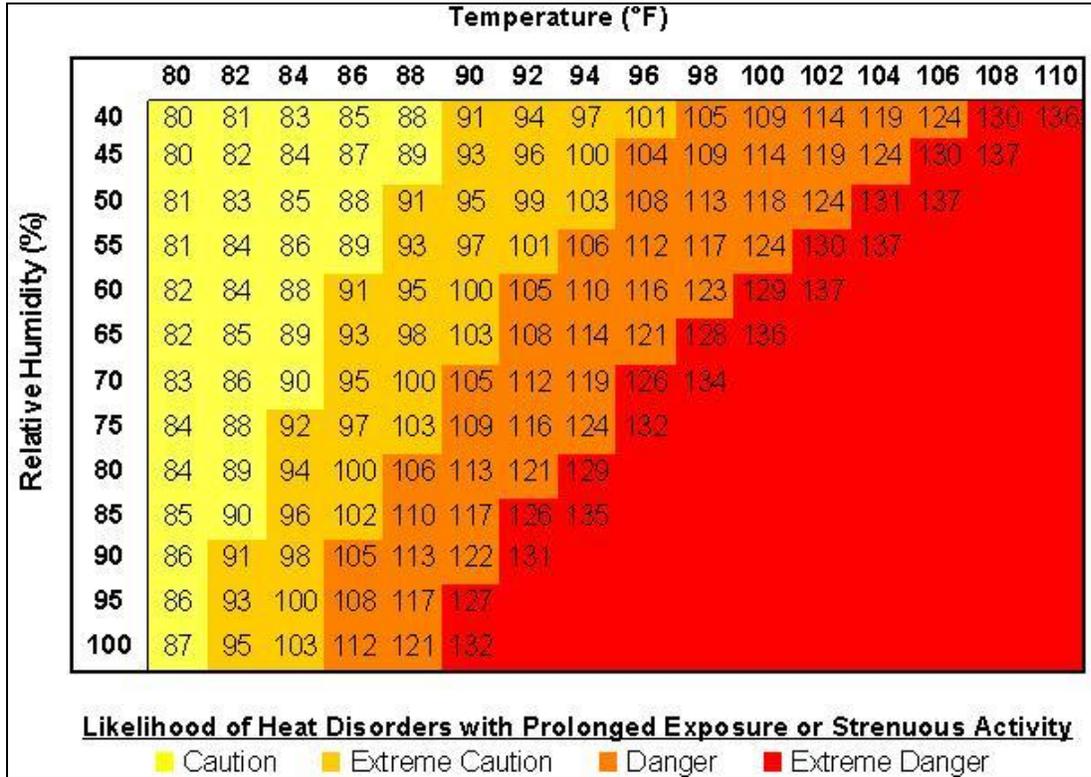
## 3.2.5 Extreme Heat

### Description

Periods of extreme heat can have serious impacts on human health, natural ecosystems, utilities and infrastructure, agriculture, and other economic sectors; particularly when these conditions persist for extended periods. FEMA defines extreme heat as temperatures 10 degrees or more above the average high temperature for the region that last for several weeks.

Ambient air temperature is one component of heat conditions, with relative humidity being the other. The relationship of these factors creates what is known as the apparent temperature. The Heat Index chart shown in Figure 3.5 considers both of these factors to produce a guide for the apparent temperature or relative intensity of heat conditions:

**Figure 3.5 Heat Index Chart**



Source: National Weather Service

Note: Note on the HI chart the shaded zone above 105°F. This corresponds to a level of HI that may cause increasingly severe heat disorders with continued exposure and/or physical activity.

When extreme heat conditions are forecast by the National Weather Service, excessive heat alerts/advisories may be issued. These alerts generally are issued when Heat Index levels are expected to exceed a daytime high of 105° F and a nighttime minimum high of 80°F or above for two or more consecutive days.

**Table 3.5 Typical Health Impacts of Extreme Heat**

Heat Index (HI)	Disorder
80-90° F (HI)	Fatigue possible with prolonged exposure and/or physical activity
90-105° F (HI)	Sunstroke, heat cramps and heat exhaustion possible with prolonged exposure and/or physical activity
105-130° F (HI)	Heatstroke/sunstroke highly likely with continued exposure

Source: National Weather Service Heat Index Program, [www.weather.gov/os/heat/index.shtml](http://www.weather.gov/os/heat/index.shtml)

### Geographic Location

The geographic extent of this hazard in Calaveras County is **large**.

All of Calaveras County is susceptible to extreme heat; however, the hazard is much more severe in the western part of the County where elevations are lower. The western section of Calaveras

County typically experiences warm, dry summers and temperate winters. Temperatures commonly range from the middle 30s in January to the high 90s in July, and often exceed 100°F for a number of days during the summer.

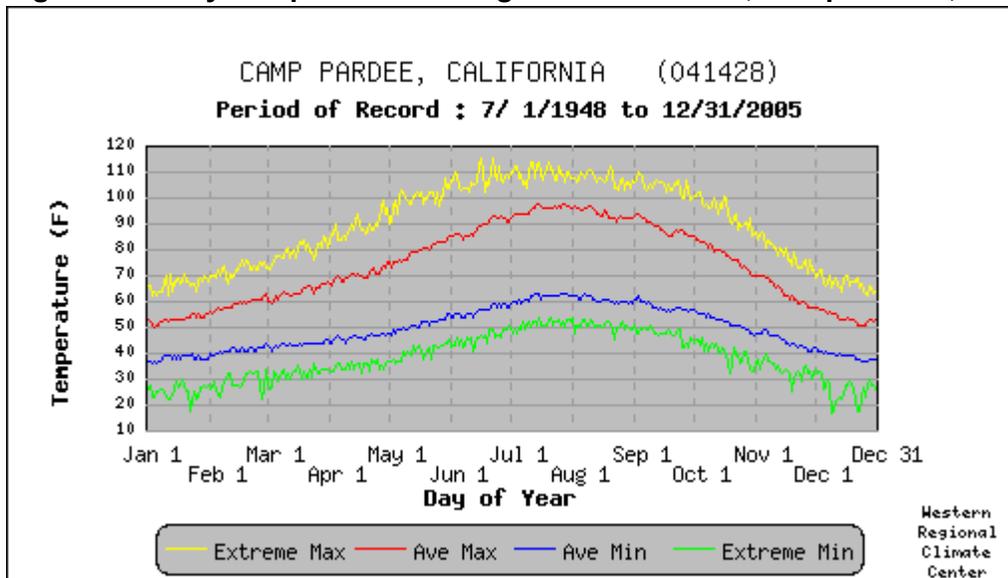
In the mountainous eastern region, average temperatures are lower in the summer and colder in winter, with year round temperatures ranging from the low 20s to the middle 80s. Extreme heat is a regional event but typically impacts the western and central portions of the county with somewhat greater severity. This is due to a combination of factors including lower density and higher elevation (and thus lower average temperatures) in the eastern section.

### Previous Occurrences

The most recent occurrence of extreme heat resulted in a USDA disaster declaration in July 2006. The National Weather Forecast Station in Sacramento reported 11 consecutive days of temperatures over 100. The USDA declared 16 California counties, including Calaveras, as primary natural disaster areas due to the record-setting heat wave that occurred July 1-31, 2006. Water use restrictions and crop damage resulted from this period of extreme heat that extended for an entire month. Damage to the walnut crop during this extended period of heat was estimated at \$200,000 based on records from the Calaveras County Agricultural Commissioner.

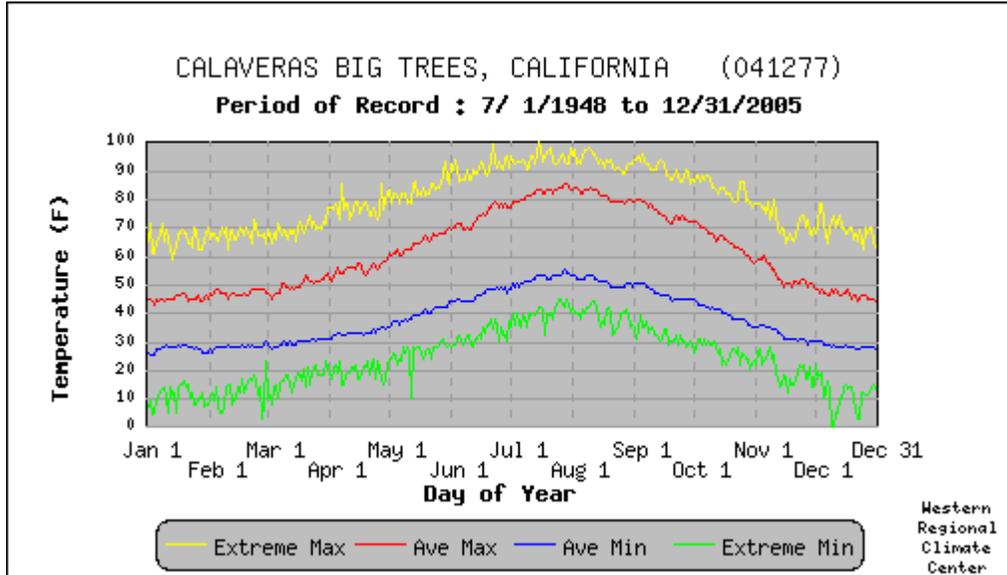
Figure 3.6 and 3.7 show average and extreme temperatures from 1948-2005 at the Camp Pardee weather station in northwest Calaveras County and the Calaveras Big Trees weather station in the southeast part of the County. At Camp Pardee, temperatures of 102°F or higher have been recorded for every month May through October, with an overall temperature extreme of 115°F (June 16, 1961). The average high temperature from July 15 to August 7 is 97°F.

**Figure 3.6 Daily Temperature Averages and Extremes, Camp Pardee, 1948-2005**



Source: Western Regional Climate Center, [www.wrcc.dri.edu/CLIMATEDATA.html](http://www.wrcc.dri.edu/CLIMATEDATA.html)

**Figure 3.7 Daily Temperature Averages and Extremes, Calaveras Big Trees, 1948-2005**



Source: Western Regional Climate Center, [www.wrcc.dri.edu/CLIMATEDATA.html](http://www.wrcc.dri.edu/CLIMATEDATA.html)

Notes: Extreme Max is the maximum of all daily maximum temperatures recorded for the day of the year.

Ave Max is the average of all daily maximum temperatures recorded for the day of the year.

Ave Min is the average of all daily minimum temperatures recorded for the day of the year.

Extreme Min is the minimum of all daily minimum temperatures recorded for the day of the year.

## Probability of Future Occurrence

**Highly Likely**— Near 100 percent chance of occurrence in next year or has a recurrence interval of 10 years or less

Extreme heat is most likely in western portions of the County. Temperatures at or above 90°F are common most summer days here, and it is highly likely that extreme heat will continue to occur on an annual basis in the future.

## Magnitude/Severity

**Critical**—Isolated deaths and/or multiple injuries and illnesses; major or long-term property damage that threatens structural stability; and/or interruption of essential facilities and services for 24-72 hours. There is limited data regarding the magnitude of extreme heat in Calaveras County in terms of previous public safety impacts. The highest temperature on record at Camp Pardee is 115°F recorded on June 16, 1961. This record was part of a summer of extreme heat where crop damage was relatively severe. Adjusted for inflation, the dollar estimate for crop losses from this event were nearly \$100,000 over the area affected (SHELDUS, 2008). Extreme heat can cause power outages and increase water usage. The greatest risk is often to agriculture and livestock. Outdoor workers are susceptible to heat exhaustion and heat stroke. Elderly residents who may live alone and are limited in their mobility are also vulnerable during heat waves.

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## 3.2.6 Flood

### Description

Riverine flooding is defined as watercourses exceeding “bank-full” capacity and is the most common type of flood event. Riverine flooding generally occurs as a result of prolonged rainfall, or rainfall that is combined with soils already saturated from previous rain events. The area adjacent to a river channel is its floodplain. In its common usage, “floodplain” refers to that area that is inundated by the 100-year flood, the flood that has a 1 percent chance in any given year of being equaled or exceeded. Other types of floods include thunderstorm generated flash floods, alluvial fan floods, snowmelt and rain on snow floods, dam failure floods (see Section 3.2.1), and urban or local drainage floods. The following is a description of the primary types of flooding that occur in Calaveras County from the Calaveras County Public Review Draft Baseline Report (2008).

- **Dam failure inundation**—This occurs as a result of structural dam failure that results in a large release of water from a reservoir that flows downstream and overtops the banks of rivers and/or creeks.
- **Flash flood**—A flood that rises very quickly, occurring suddenly, within a short time (from minutes to less than six hours), and usually is characterized by high flow velocities. Flash floods often result from intense rainfall over a small area, usually in areas of steep terrain.
- **Riverine flooding**—Occurs when a river or stream flows over its banks and causes considerable inundation of nearby land and roads. Riverine flooding is a longer-term event that may last a week or more. Overbank flows along the Mokelumne and Stanislaus Rivers and portions of the Calaveras River system usually result from heavy snow melt combined with heavy rainfall.
- **Urban flooding**—Occurs as land is converted from fields or woodlands to roads and parking lots and loses its ability to absorb rainfall.

The one percent annual flood, or base flood, is the national standard to which communities regulate their floodplains through the National Flood Insurance Program. The potential for flooding can change and increase through various land use changes and changes to land surface permeability relating to urbanization. A change in environment can create localized flooding problems inside and outside of natural floodplains by altering or confining watersheds or natural drainage channels.

Volume, onset, and duration characteristics for different types of floods are described below:

- **Snowmelt**—Flooding is characterized by moderate peak flows, large volume of runoff, moderate speed of onset, long duration, and marked daily fluctuation of flow.
- **Rain in a general storm system**—Flooding is characterized by high peak flows and moderate speed of onset and duration of flood flows.

- 
- **Rain in a localized intense thunderstorm**—Flooding is characterized by high peak flows, relatively sudden onset, short duration of flow, and smaller volumes of runoff.

## **Geographic Location**

The geographic extent of this hazard in Calaveras County is **small**.

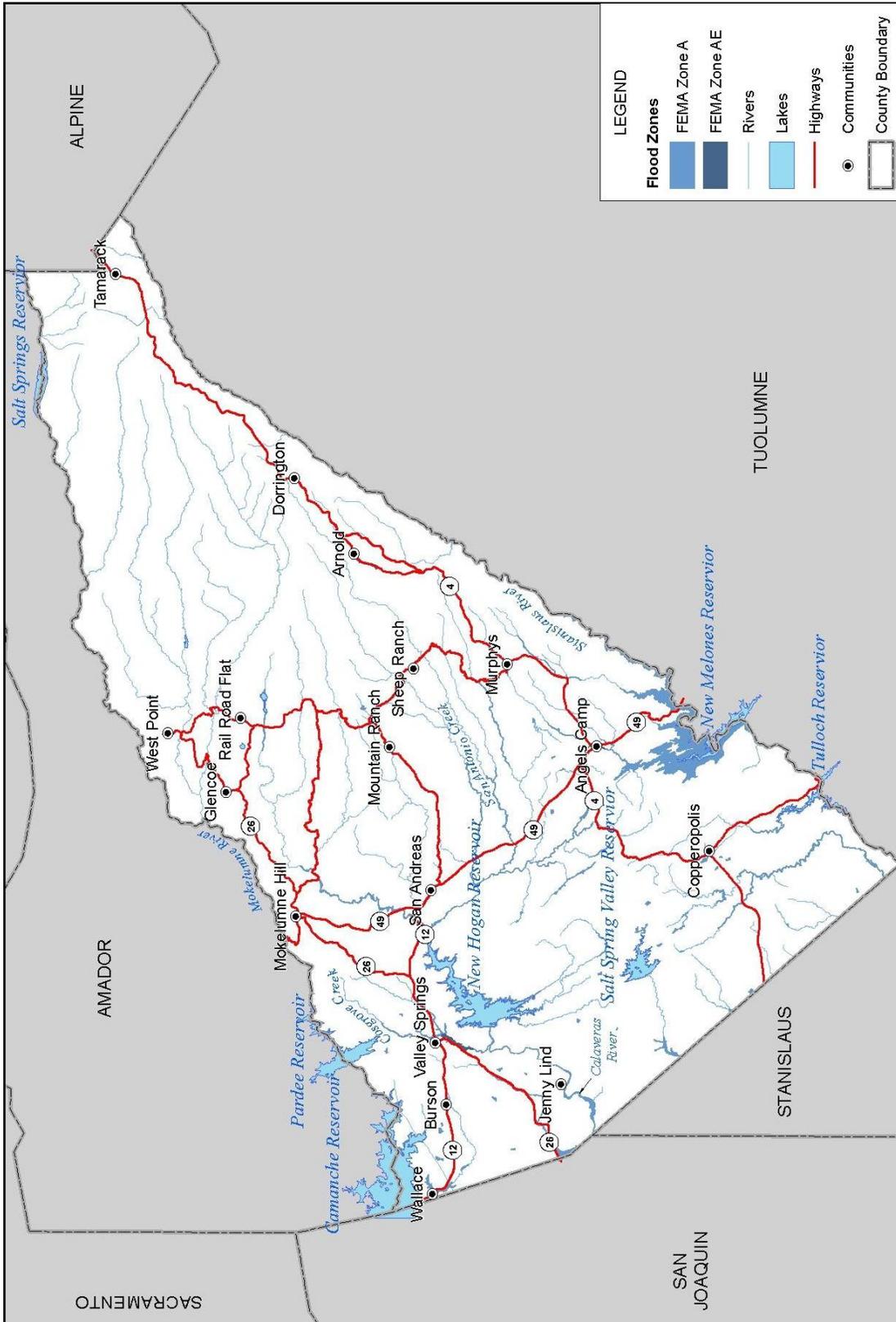
California is divided into 10 hydrologic regions. Calaveras County is in the San Joaquin region, which encompasses the middle portion of the Central Valley bounded by the Sierra Nevada Mountains, the Coast Range, the divide between the American and Consumnes River watersheds, and the divide between the San Joaquin and Kings river watersheds. Although predominantly agricultural, this region has experienced increased urbanization in recent years and is subject to flooding from winter storm events and snowmelt.

In Calaveras County, flooding may occur from heavy rainfall on saturated soils, rapid snowmelt, or a combination of these factors. Riverine flooding along the main channels of the Mokelumne and Stanislaus rivers, mid-elevation tributaries of the Mokelumne, and the upper reaches of the Calaveras usually results from heavy snowmelt in combination with heavy rainfall. In the western portion of the county, the sources of flooding are heavy rainfall associated with repeated winter storms and a saturated soil mantle. Summer thunderstorms can also lead to flooding (Calaveras County General Plan 1996). According to the HMPC, Cosgrove Creek floods every few years.

The western quarter of Calaveras County contains the majority of the properties and facilities that could be impacted by flooding. However, sustained heavy rains, particularly when combined with warm temperatures, can create riverine and/or flash flooding conditions throughout the central and eastern portions of the county.

The effective flood insurance rate map is from 1990. A preliminary digital flood insurance rate map (DFIRM) has been developed. Although not yet official, the preliminary DFIRM was used for this plan. Figure 3.8 shows the DFIRM with special flood hazard areas (1 percent annual flood or 100-year flood) indicated by Zone A and Zone AE.

Figure 3.8 Calaveras County 100-Year Flood Map (Preliminary DFIRM)



Map compiled 10/2008; intended for planning purposes only.  
 Data Source: Draft DFIRM 9/2007, Calaveras County  
 \*The Preliminary DFIRM Flood Data product is a digital representation of certain features of FEMA's FIRM product.  
 Intended for general planning purposes only.

## Previous Occurrences

Seven of the 16 state or federal disaster declaration including Calaveras County have been related to flooding. The SHELUDS database includes the following previous flood events recorded since 1973 summarized in Table 3.6.

**Table 3.6 Calaveras County Floods, 1973-2006**

Date	Hazard Type	Property Damage* (2005\$)	Crop Damage* (2005\$)
4/7/2006	Flooding	unknown	unknown
2/11/2000	Flooding	7,289	0
1/23/2000	Flooding	4,535	0
2/9/1999	Flooding	23,447	0
2/2/1998	Flooding	468,155	849,211
12/22/1996	Flooding	2,491	0
3/1/1995	Flooding, Severe Storm, Thunder Storm, Wind	0	14,412,025
12/10/1992	Flooding, Wind, Winter Weather	1,833	0
2/14/1992	Flooding, Winter Weather	12,661	0
2/11/1992	Flooding, Winter Weather	16,195	0
2/17/1986	Flooding	89,127	0
1/16/1973	Flooding, Severe Storm, Thunder Storm	379,766	0
<b>Totals</b>		<b>1,005,497</b>	<b>15,261,235</b>

Sources: Hazards Vulnerability Research Institute (SHELUDS), [www.cas.sc.edu/geog/hri/SHELUDS.html](http://www.cas.sc.edu/geog/hri/SHELUDS.html); Calaveras County  
 \*Loss estimates for Calaveras County are total damage for multi-county event divided by number of counties affected, expressed in 2005 dollars

More detailed information was available on the following recent flood events:

- **April 2006 flooding (DR-1646)**—In June 2006, FEMA designated 17 counties in northern California eligible for public assistance for severe storms and flooding, including Calaveras County. From April 2-6, 2006, Calaveras received 6.8 inches of rain, 168 percent of the average amount for the month of April (National Weather Service, 2006). Approximately 35 acres of farmland, several homes, and a mobile home park were flooded and many people evacuated. The flood also overflowed sewage treatment plants. There was also significant damage and risk of failure at a small dam at Peachtree Pond near Valley Springs. Crop damage from this event was estimated at \$4 million by the Calaveras County Agricultural Commission.
- **February 9, 1999 flash flood**—A flash flood near Valley Springs in Calaveras County occurred when Cosgrove Creek left its banks and flooded four homes and a low-lying golf course. The flood threatened sewage treatment ponds, temporarily closed Highway 26, and caused \$20,000 in property damage.
- **January 1997 floods**—Heavy rains caused Don Pedro Dam in neighboring Tuolumne County to overtop and 300 square miles of land were flooded; 23,000 homes and 2,000

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businesses were damaged or destroyed across the affected region. The event also caused a mudslide along Highway 4 in Calaveras County.

### **Probability of Future Occurrence**

**Likely**—10-100 percent chance of occurrence in next year or has a recurrence interval of 10 years or less.

Based on historical data, there have been at least nine damaging floods in the last 56 years (1950-2006), which equates to a 16 percent chance of a damaging flood in any given year, or an average 6-year recurrence interval.

### **Magnitude/Severity**

**Critical**—Isolated deaths and/or multiple injuries and illnesses; major or long-term property damage that threatens structural stability; and/or interruption of essential facilities and services for 24-72 hours

Past flood events in Calaveras County have damaged roads and bridges, public facilities, private property, and businesses and have caused evacuations. These events are likely to continue in the future and may be exacerbated by increasing development.

## **3.2.7 Landslide/Erosion**

### **Hazard Description**

A landslide is a general term for a variety of mass-movement processes that generate a down-slope movement of mud, soil, rock, and/or vegetation. For the purposes of this plan, the term landslide includes mudslides, debris flows, and rockfalls that tend to occur suddenly, whereas erosion is a similar process that tends to occur on smaller scales and more gradually.

Natural conditions that contribute to landslide and erosion are the following:

- Degree of slope
- Water (heavy rain, river flows, or wave action)
- Unconsolidated soil or soft rock and sediments
- Lack of vegetation (no stabilizing root structure)
- Previous wildfires and other forest disturbances
- Road building, excavation and grading
- Earthquake

In addition, many human activities tend to make the earth materials less stable and, thus, increase the chance of ground movement. Human activities contribute to soil instability through grading

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of steep slopes or overloading them with artificial fill, by extensive irrigation, construction of impermeable surfaces, excessive groundwater withdrawal, and removal of stabilizing vegetation.

Another hazard related to landslide and erosion is the fall of a detached mass of rock from a cliff or down a very steep slope (rockfall). Weathering and decomposition of geological materials produce conditions favorable to rockfalls. Other causes include ice wedging, root growth, or ground shaking (earthquake). Destructive landslides and rockfalls usually occur very suddenly with little or no warning time and are short in duration. A more gradual phenomenon is erosion, which can occur over periods of years and is generally viewed as a long-term problem as differentiated from other more sudden and catastrophic natural hazards.

### **Geographic Location**

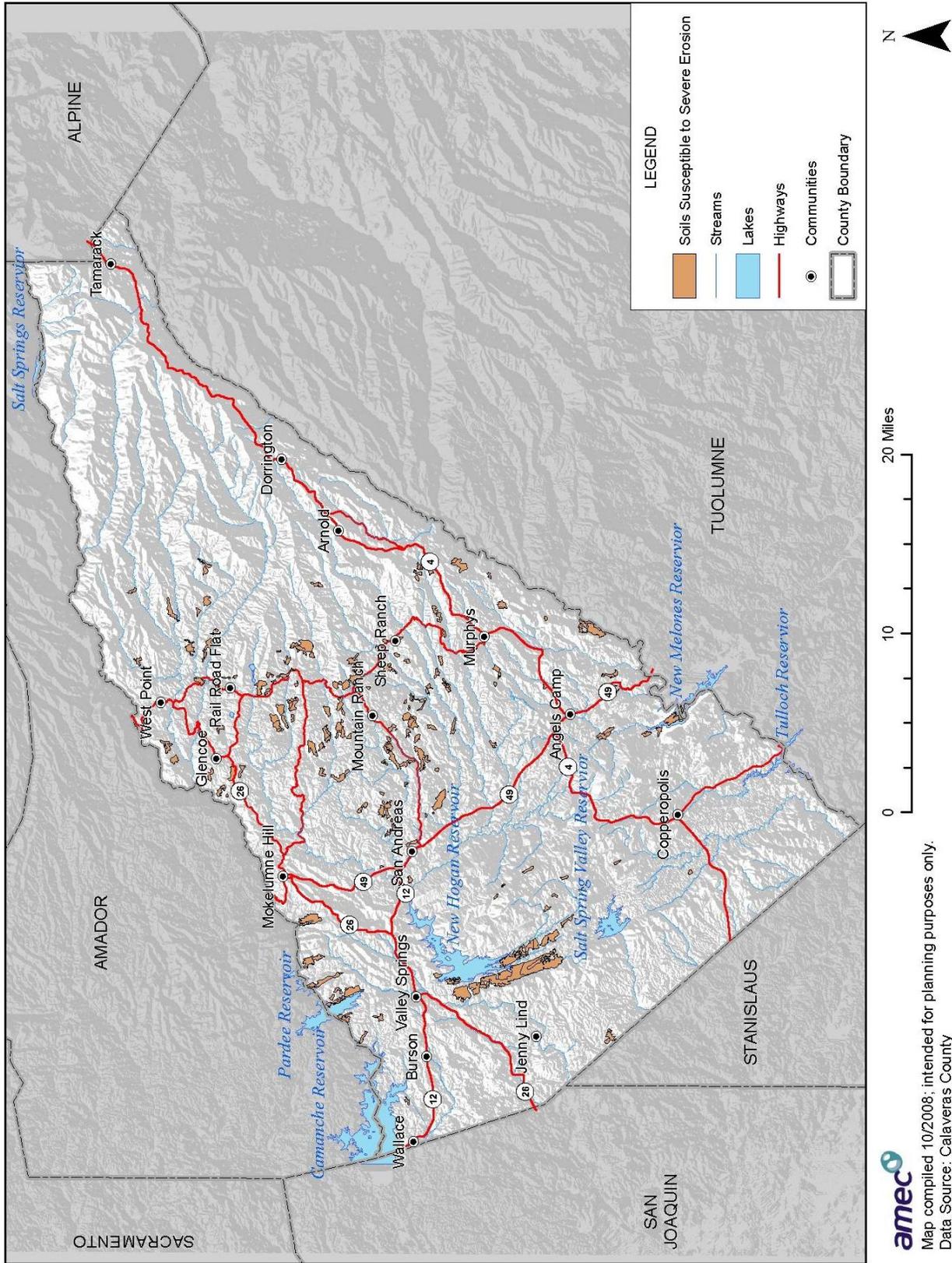
The geographic extent of this hazard in Calaveras County is **isolated**.

Based on analysis of areas with both highly erosive soils and steep slopes, locations near Jenny Lind and Ebbetts Pass are at greatest risk from landslide and erosion impacts. The western edge of New Hogan Reservoir and southwest of Ebbetts Pass contain significant areas of soils classified as having severe erosion potential. Another known area of elevated risk of land movement is near Murphys above McKays Reservoir.

Areas with slopes greater than 50 percent have extreme susceptibility to landslide and erosion. Areas of particular concern are those that include high elevations and steep ravines and gulches associated with river and stream channels. Generally, areas of steeper slopes and increased landslide/erosion risk are located in the more mountainous eastern portion of the county. Over two percent of the total land area of Calaveras County (14,574 acres) has soils classified as highly susceptible to erosion and landslide. These areas were identified based on characteristics of relatively low soil stability and steepness of slope.

Figure 3.9 shows areas with slopes greater than 20 percent and with elevated risk of landslide and erosion.

Figure 3.9 Calaveras County Soils Susceptible to Severe Erosion



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## Previous Occurrences

A landslide was a factor in the most recent federal disaster declaration for Calaveras County in 2006. Also, a large mudslide occurred in the Stanislaus National Forest near Highway 4 in January 1997. Other landslide and erosion incidents of varying degrees of magnitude tend to occur in places throughout the county several times in a given year, but in most cases do not cause significant damage or public safety risk.

## Probability of Future Occurrences

**Likely**—10-100 percent chance of occurrence in next year or has a recurrence interval of 10 years or less

Landslides in the form of debris flow, or mudslides, have occurred in the past in Calaveras County. Rockfalls and landslides occur more frequently in spring months, when high levels of precipitation and runoff combine with saturated soils and/or repeated freezing and thawing, which leads to general slope instability. Landslides often can occur as a result of other hazard events, such as floods, wildfires, or earthquakes.

## Magnitude/Severity

**Limited**—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability

Impacts from landslides and erosion can range from mere inconvenience to high maintenance costs in cases where erosion or small-scale slides are involved. Rapidly moving large slides have the capacity to completely destroy buildings, roads, bridges, and other costly manmade structures. Such slides also have the potential for inflicting loss of life when they occur in developed areas. Excessive sediment loads in rivers caused by erosion and landslides are known water quality issues that stress water treatment and water impoundment facilities.

The severity of landslide problems is directly related to the extent of human activity in hazard areas. Adverse effects can be mitigated by early recognition and avoiding incompatible land uses in these areas or by corrective engineering. Steep locations with susceptible soils that are in close proximity to development are the County's greatest landslide risk.

## 3.2.8 Volcano

### Description

A volcano is an opening or rupture in a planet's surface that allows ash, gases, and/or molten rock under tremendous pressure to emerge from below the surface. Volcanic activity over long time scales can either form mountains as molten rock is gradually extruded or rapidly obliterate mountains via eruptions of ash and rock.

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Volcanic eruptions can be among the more spectacular of natural hazard events, ejecting materials thousands of feet into the air, darkening skies, and blanketing surrounding areas with a fine powdery ash. Speed of onset of local impacts vary based on factors including distance from the eruption and wind speed. Due to advanced geologic and seismic monitoring techniques, warning time for major eruptions is usually measured in weeks or months, and the duration of volcanic activity typically ranges from a few weeks to a few years.

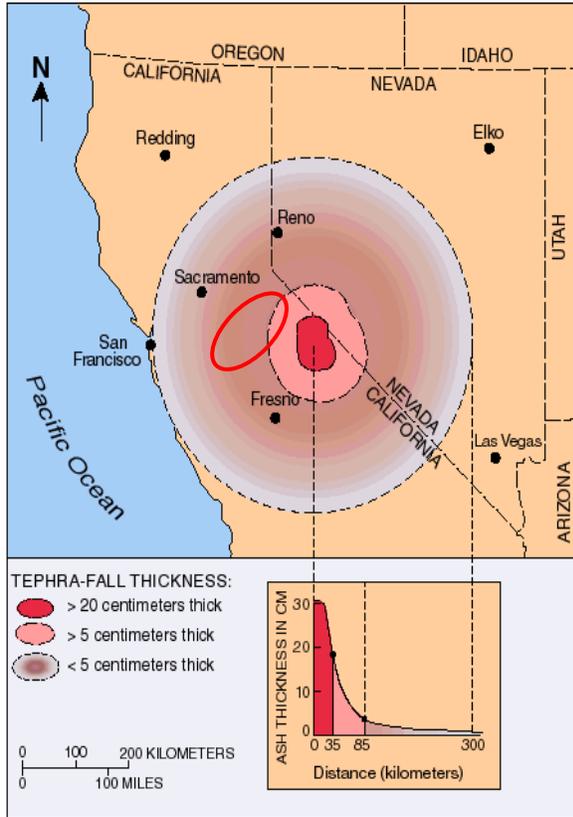
### **Geographic Location**

The geographic extent of this hazard in Calaveras County is **large**.

Volcanoes are generally found where tectonic plates are pulled apart or come together. Therefore areas along the San Andreas lateral strike-slip fault are not typical locations for volcano occurrence. The State of California Multi-Hazard Mitigation Plan identifies the Long Valley Caldera as the closest volcanic hazard that has been active in the last 2,000 years.

The U.S. Geologic Survey (USGS) does not include Calaveras County in their map of areas identified as subject to hazards from potential eruptions in California. The map in Figure 3.10 shows volcanic hazards based on activity in the last 15,000 years and indicates that the planning area is located close enough to the Long Valley Caldera to be impacted by ash fall less than 5 cm thick in most areas and 5-20 cm in the eastern sections of the planning area.

**Figure 3.10 Volcanic Ash Dispersal Map for the Long Valley Caldera**



Source: USGS Volcano Hazards Program; C.D. Miller, J. Johnson; <http://vo.wr.usgs.gov/zones/TephraFall.html>

### Previous Occurrences

There are no recorded instances of volcanic activity or impacts in the planning area. Lassen Peak was the closest and the most recent when it erupted approximately 150 miles north of Calaveras County in 1915.

### Probability of Future Occurrence

**Unlikely**—Less than 1 percent chance of occurrence in next 100 years or has a recurrence interval of greater than every 100 years

Probability of activity for the closest potentially active volcano (Long Valley Caldera) is estimated by the USGS to be somewhat less than one percent per year or one chance in a few hundred for occurrence in any given year. The probability of impacts for Calaveras County is likely to be some fraction of this percentage.

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## Magnitude/Severity

**Negligible**—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Based on available information, the potential magnitude of a volcanic hazard in Calaveras County is ashfall less than 5 cm thick.

### 3.2.9 Wildfire

#### Description

Fire conditions arise from a combination of hot weather, an accumulation of vegetation, and low moisture content in air and fuel. These conditions, especially when combined with high winds and years of drought, increase the potential for wildfire to occur. The wildfire risk is predominantly associated with wildland-urban interface areas, areas where development is interspersed or adjacent to landscapes that support wildfire. A fire along this wildland-urban interface can result in major losses of property and structures.

Generally, there are three major factors that sustain wildfires and predict a given area's potential to burn. These factors are fuel, topography, and weather.

- **Fuel**—Fuel is the material that feeds a fire and is a key factor in wildfire behavior. Fuel is generally classified by type and by volume. Fuel sources are diverse and include everything from dead tree needles and leaves, twigs, and branches to dead standing trees, live trees, brush, and cured grasses. Also to be considered as a fuel source are manmade structures, such as homes and associated combustibles. The type of prevalent fuel directly influences the behavior of wildfire. Light fuels such as grasses burn quickly and serve as a catalyst for fire spread. In addition, “ladder fuels” can spread a ground fire up through brush and into trees, leading to a devastating crown fire that burns in the upper canopy and cannot be controlled. The volume of available fuel is described in terms of fuel loading.
- **Topography**—An area's terrain and land slopes affect its susceptibility to wildfire spread. Both fire intensity and rate of spread increase as slope increases due to the tendency of heat from a fire to rise via convection. The arrangement of vegetation throughout a hillside can also contribute to increased fire activity on slopes.
- **Weather**—Weather components such as temperature, relative humidity, wind, and lightning also affect the potential for wildfire. High temperatures and low relative humidity dry out the fuels that feed the wildfire creating a situation where fuel will more readily ignite and burn more intensely. Wind is the most treacherous weather factor. The greater the wind, the faster a fire will spread and the more intense it will be. In addition to wind speed, wind shifts can occur suddenly due to temperature changes or the interaction of wind with topographical features such as slopes or steep hillsides. Lightning also ignites wildfires, which are often

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terrain that is difficult for firefighters to reach. Drought conditions contribute to concerns about wildfire vulnerability. During periods of drought, the threat of wildfire increases.

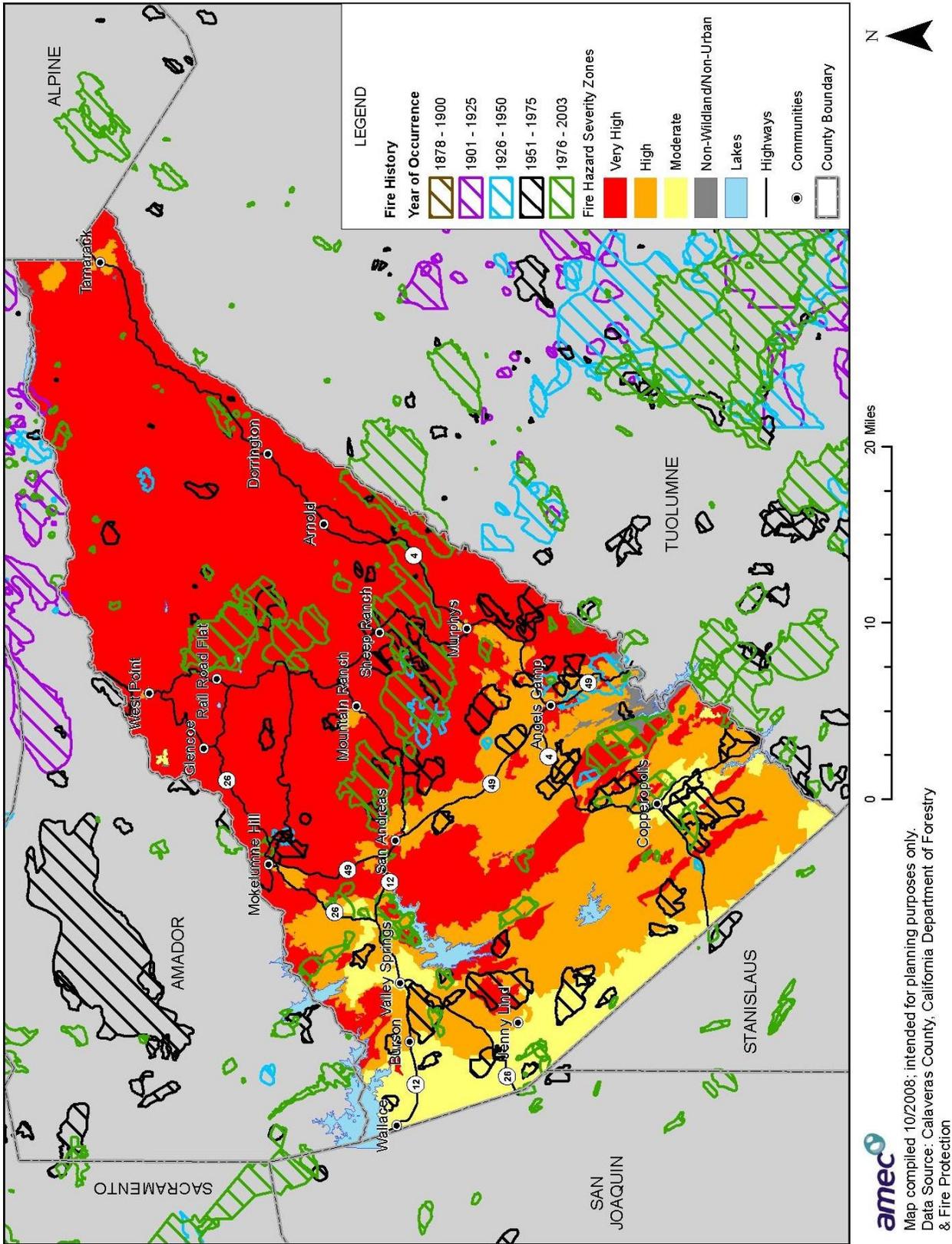
Warning times are usually adequate to ensure public safety, provided that evacuation recommendations and orders are heeded in a timely manner. While in most cases wildfires are contained within a week or two of outbreak, in certain cases, they have been known to burn for months, or until they are completely extinguished by fall rains.

### **Geographic Location**

The geographic extent of this hazard in Calaveras County is **large**. More than 50 percent of the planning area is affected.

Generally, wildfire risk is highest across a broad section of the central and eastern sections of the planning area. Areas of very high or high wildfire threat constitute at least 85 percent of the county (see Figure 3.11).

Figure 3.11 Calaveras County Historic Fires and Wildfire Hazard Areas



**amec**  
 Map compiled 10/2008; intended for planning purposes only.  
 Data Source: Calaveras County, California Department of Forestry & Fire Protection

According to the Tuolumne-Calaveras Unit Pre-Fire Management Plan completed in 2005 by the Tuolumne-Calaveras Unit of the California Department of Forestry and Fire Protection, the environment in Calaveras County is conducive to large, damaging fires. All fuel types in the county are ranked as moderate to very high fire hazard. Table 3.7 shows the location and fire hazard rating of fuel models in Calaveras County.

**Table 3.7 Location and Hazard Ranking of Fuel Models in Calaveras County**

Fuel Model	Fire Hazard Ranking	Location in Calaveras County
Grass	Moderate to High	West of Highway 49 in the lower foothills. Moderate to high fuel hazard ranking depends on slope.
Woodland	High to Very High	Scattered between 800 to 4,000 feet in elevation; fuel hazard ranking depends on slope.
Brush	Very High	Larger blocks in the 800 to 4,000-foot elevation in less inhabited areas of the county. Areas near New Hogan, Bear Mountain, and New Melones have large concentrations of brush as well as areas north of San Andreas.
Brush/Hardwood	High	Areas with a mixture of live oak, black oak, manzanita, and chamise between 1,000 to 4,000 feet in elevation. Large blocks occur east of Highway 49.
Heavy Timber	Very High	Consists of larger, denser dead fuels on the ground. Primarily found above 3,500 feet and in scattered blocks between Arnold and West Point.

Source: California Department of Forestry; Tuolumne-Calaveras Unit Pre-Fire Management Plan, 2005

Rugged topography occurs through much of the area, and severe fire weather occurs on 35 percent of the days during the fire season across much of the county. Fire weather is sampled daily during the wildfire season at stations throughout California to create critical fire weather frequency, which is classified in three categories. Calaveras County is rated in the highest frequency class.

### Previous Occurrences

Wildfires of varying scales occur on an annual basis in Calaveras County (see Figure 3.11). Calaveras County has received state disaster declarations for wildfires in 1988 and 2001 and a federal declaration (DR-958) in 1992.

The following summarizes major wildfires in Calaveras County since 1992:

- **2004 fire season**—7,796 acres burned in 380 separate fires, totaling over \$10 million in damage. 26 homes were destroyed. The majority of acreage burned and property damage were due to three fires, the Copperopolis fire (3,844 acres burned, 1 home destroyed), the Armstrong Complex (963 acres burned, 3 homes destroyed), and the Pattison fire (2,676 acres burned, 17 homes destroyed). These occurrences were mostly human-caused, including fires started by vehicle/equipment misuse and arson.
- **2003 fire season**—884 acres burned in the Tuolumne-Calaveras Unit (TCU).

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- **2002 fire season**—884 acres burned in the TCU.
  - **2001 fire season**—30,137 acres burned in the TCU. State fire disaster declaration.
  - **September 1999 Winton Incident fire**—120 acres burned near West Point. Two homes, two outbuildings, and two vehicles were destroyed. Total costs, including firefighting, totaled \$740,000.
  - **August 1996 Keystone fire**—7,000 acres burned within the California Department of Forestry Tuolumne-Calaveras Unit (TCU). 20 homes were destroyed and 7 damaged by this lightning-caused fire.
  - **August 1992 Old Gulch fire/Shasta fires (DR-958)**—Damage was estimated at \$54 million across Calaveras and Shasta Counties. Eight people were injured.

### **Probability of Future Occurrence**

**Highly Likely**—Near 100 percent chance of occurrence in next year or has a recurrence interval of 10 years or less

The season when wildfire is most likely to occur generally runs from late June through October. This is due to hot, dry conditions during this time of year and an increase in population throughout the county in the summer months as vacation homes are visited and seasonal workers converge on the area. According to the TCU Pre-Fire Management Plan (2005), daily severe fire weather conditions are present for approximately 35 percent of the fire season. The 4th of July and Labor Day holiday weekends are specific times when probability is higher than average.

According to the California Department of Forestry and Fire protection, the five-year average number of fires in the TCU is 386, which indicates the probability of wildfire is **highly likely**, with a 100 percent chance of a wildfire in any given year.

### **Magnitude/Severity**

**Catastrophic**—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths

Potential losses from wildfire include human life; structures and other improvements; natural and cultural resources; the quality and quantity of the water supply; assets such as timber, range and crop land, and recreational opportunities; and economic losses. Smoke and air pollution from wildfires can be a severe health hazard. In addition, catastrophic wildfire can lead to secondary impacts or losses such as future flooding and landslides and erosion during heavy rains.

## **3.2.10 Windstorm**

### **Description**

In Calaveras County, high winds and winter storms represent the two most frequent severe weather events. High winds, often accompanying severe thunderstorms, can cause significant

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property and crop damage, threaten public safety, and have adverse economic impacts from business closures and power loss. Windstorms in Calaveras County are typically straight-line winds. Straight-line winds are generally any thunderstorm wind that is not associated with rotation (i.e., is not a tornado). It is these winds, which can exceed 100 mph, that represent the most common type of severe weather and are responsible for most wind damage related to thunderstorms.

While not as common in Calaveras County, other types of winds include funnel clouds, tornadoes, and dust devils. A funnel cloud is made up of condensed water droplets associated with a rotating column of air that extends from the base of a cloud but does not reach the ground. Like straight-line winds, they are usually associated with thunderstorms. If a funnel cloud touches the ground it becomes a tornado. Tornadoes can reach speeds of up to 300 mph and are the most powerful storms that exist. Unlike funnel clouds and tornadoes, dust devils are not associated with thunderstorms. They form under clear skies in which the sun has strongly heated the ground and are usually harmless, but at times they can be large enough to threaten people and property.

Severe windstorms are usually forecast 8-24 hours in advance and sometimes longer. The typical duration of windstorms is approximately 8-36 hours and peak winds are usually sustained for less than 8-12 hours.

### **Geographic Location**

The geographic extent of this hazard in Calaveras County is **large**.

High winds can occur throughout Calaveras County.

### **Previous Occurrences**

Table 3.8 lists windstorm events recorded in the SHELDUS database.

**Table 3.8 Windstorm Events, Calaveras County 1960-2000**

<b>Date</b>	<b>Hazard Type</b>	<b>Property Damage* (2005\$)</b>	<b>Crop Damage* (2005\$)</b>
2/1/1960	Thunderstorm, Wind	9,675	0
2/7/1960	Thunderstorm, Wind	68,531	69
10/16/1960	Wind	7,476	0
3/16/1961	Wind	5,635	0
4/22/1961	Lightning, Wind, Winter Weather	96	96,117
10/7/1961	Wind	5,634	0
2/7/1962	Thunderstorm, Wind	556,174	0
9/16/1965	Wind	91,341	9,134
12/28/1965	Thunderstorm, Wind	5,354	0
1/15/1966	Wind	68,456	685
3/12/1967	Thunderstorm, Wind, Winter Weather	5,041	0
12/12/1967	Thunderstorm, Wind, Winter Weather	50,413	50,413
1/8/1970	Thunderstorm, Wind	52,345	0
12/23/1979	Thunderstorm, Wind, Winter Weather	38,402	0
1/9/1980	Thunderstorm, Wind	2,468	2,468
12/22/1982	Wind	2,108,637	211
2/26/1983	Thunderstorm, Wind	20,425	204
1/26/1984	Wind	6,266	627
10/15/1984	Wind	10,443	0
2/17/1988	Wind	14,226	0
12/8/1992	Wind, Winter Weather	3,665	0
12/10/1992	Flooding, Wind, Winter Weather	1,833	0
3/1/1995	Flooding, Thunderstorm, Wind	0	14,412,025
2/7/1998	Wind	21,134	0
6/16/1998	Wind	1,198	0
10/16/1998	Wind	10,887	0
11/7/1998	Wind	49,313	0
4/3/1999	Wind	1,563	3,048
4/22/1999	Wind	1,804	0
2/11/2000	Wind	630	2,520
10/21/2000	Wind	1,972	0
12/2002	Wind	0	28,340
<b>Totals</b>		<b>3,221,036</b>	<b>14,605,860</b>

Source: Hazards Vulnerability Research Institute (SHELDUS), [www.cas.sc.edu/geog/hri/SHELDUS.html](http://www.cas.sc.edu/geog/hri/SHELDUS.html)

\*Loss estimates for Calaveras County are total damage for multi-county event divided by number of counties affected, expressed in 2005 dollars

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## Probability of Future Occurrence

**Likely**—10-100 percent chance of occurrence in next year or has a recurrence interval of 10 years or less.

There were 20 recorded significant high wind events (excluding those accompanying thunderstorm and winter weather events) in the past 48 years in Calaveras County, which equals one high wind event every 2.4 years on average, or a 42 percent chance of occurrence in any given year.

## Magnitude/Severity

**Limited**—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability

Wind storms in Calaveras County are rarely life threatening, but do disrupt daily activities, cause damage to buildings and roofs, and increase the potential for other hazards, such as wildfire. Data on the cost of past damages in Calaveras County is not available.

### 3.2.11 Winter Storm

#### Description

Winter storm includes snow, ice, blizzard conditions, and extreme cold. Heavy snow can immobilize a region, stranding commuters, stopping the flow of supplies, and disrupting emergency and medical services. Accumulations of snow can collapse roofs and knock down trees and power lines. The cost of snow removal, damage repair, and business losses can have a tremendous impact on cities and towns.

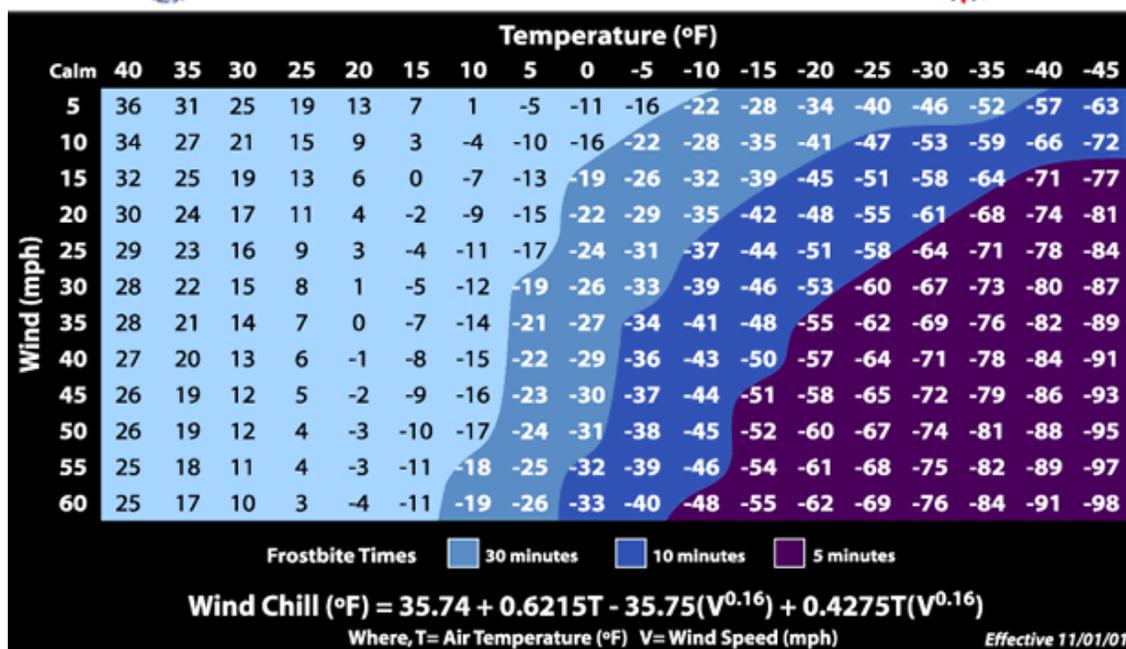
Heavy accumulations of ice can bring down trees, electrical wires, telephone poles and lines, and communication towers. Communications and power can be disrupted for days until damage can be repaired. Even small accumulations of ice may cause extreme hazards to motorists and pedestrians.

Some winter storms are accompanied by strong winds, creating blizzard conditions with blinding wind-driven snow, severe drifting, and dangerous wind chills. Strong winds with these intense storms and cold fronts can knock down trees, utility poles, and power lines. Blowing snow can reduce visibilities to only a few feet in areas where there are no trees or buildings. Serious vehicle accidents can result with injuries and deaths.

Extreme cold often accompanies a winter storm or is left in its wake. Prolonged exposure to the cold can cause frostbite or hypothermia and can become life-threatening. Infants and the elderly are most susceptible. Pipes may freeze and burst in homes or buildings that are poorly insulated or without heat.

Nationally, winter storms cause more deaths per year than any other natural hazard. Wind can greatly amplify the impact of cold ambient air temperatures and thus the severity of winter storms. In 2001, the National Weather Service (NWS) implemented an updated Wind Chill Temperature index to describe the relative discomfort/danger resulting from the combination of wind and temperature. Wind chill is based on the rate of heat loss from exposed skin caused by wind and cold. As the wind increases, it draws heat from the body, driving down skin temperature and eventually the internal body temperature. Figure 3.12 below shows the relationship of wind speed to apparent temperature and typical time periods for the onset of frostbite.

**Figure 3.12 National Weather Service Wind Chill Chart**



Source: NOAA, National Weather Service, <http://www.weather.gov/om/windchill/>

Weather forecasts are generally able to predict the most severe winter storms at least 24 hours in advance leaving adequate time to get warnings out to the public. Actual temperature extremes and amount of snowfall are harder to accurately predict. The duration of winter storms is usually measured in days in the western part of the county. However, in the higher elevations in the eastern section of the county, it is not unusual to have 10 feet of snow on the ground for extended periods.

### Geographic Location

The geographic extent of this hazard in Calaveras County is **large**.

All locations in the county can be affected by winter storms. The eastern part of the County is much more frequently impacted due to the higher elevations, as evidenced by record and average

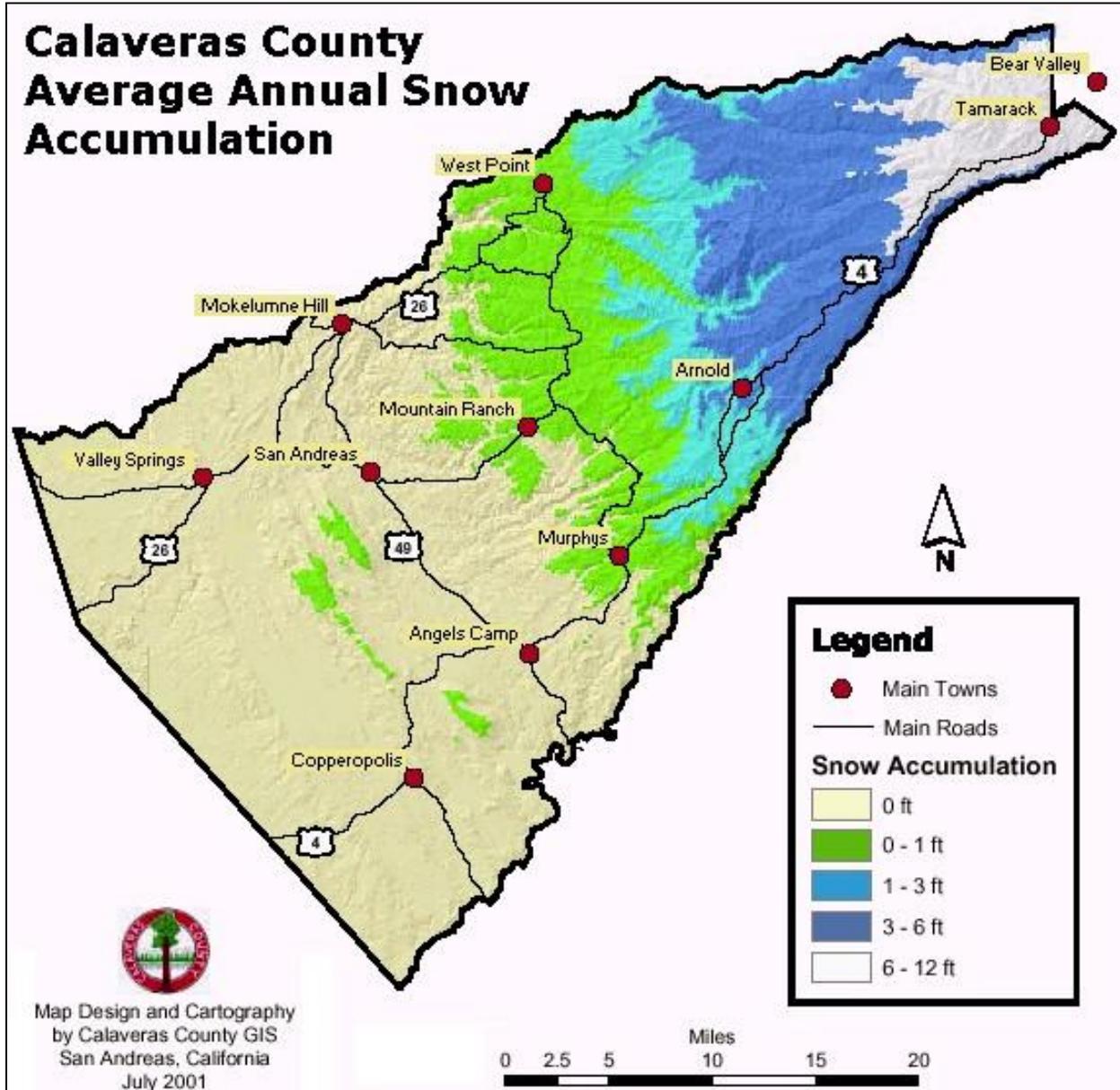
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temperatures. At the Calaveras Big Trees weather station in eastern Calaveras County, the lowest temperature on record is 0°F on December 12, 1972. On average, the daily high temperature is less than 32°F 136 days per year. The average annual snowfall at Calaveras Big Trees is 128.9 inches; the highest annual amount was 275.4 in 1967. On average, the month of January receives the most snow.

At the Camp Pardee weather station in western Calaveras County, the lowest temperature on record is 13°F on December 9, 1972. On average, there are 12 days per year when temperatures reach below 32°F (primarily in December and January). There is no record of snowfall at Camp Pardee.

San Andreas, the Calaveras County seat, averages one-half inch of snow per year, with the highest annual amount recorded at three inches in 1975. Average snow accumulation follows a geographic tendency of greater extremes to the east. Figure 3.13 is a map compiled by the Calaveras County GIS Department in 2001 showing average annual snow accumulation for the planning area.

Figure 3.13 Average Annual Snow Accumulation in Calaveras County



Source: Calaveras County GIS, [www.co.calaveras.ca.us/comaps.asp](http://www.co.calaveras.ca.us/comaps.asp)

### Previous Occurrences

Winter storms are the most common severe weather event on record in Calaveras County. SHELUDS lists the following winter weather events in Calaveras County.

**Table 3.9 Winter Storms in Calaveras County, 1961-2007**

<b>Date</b>	<b>Hazard Type</b>	<b>Property Damage* (2005 \$)</b>	<b>Crop Damage* (2005 \$)</b>
4/22/1961	Lightning, Wind, Winter Weather	96	96,117
1/20/1962	Winter Weather	55,617	0
3/12/1967	Severe Storm, Thunderstorm, Wind, Winter Weather	5,041	0
12/12/1967	Severe Storm, Thunderstorm, Wind, Winter Weather	50,413	50,413
1/29/1968	Severe Storm, Thunderstorm, Winter Weather	8,262	0
4/27/1970	Winter Weather	0	58,432
12/23/1979	Severe Storm, Thunderstorm, Wind, Winter Weather	38,402	0
1/27/1981	Winter Weather	2,240	0
12/22/1982	Winter Weather	5,954	0
1/26/1983	Winter Weather	8,913	0
2/5/1989	Winter Weather	0	201,898
2/15/1990	Winter Weather	3,934	4,983
12/20/1990	Winter Weather	128,859	12,885,934
2/5/1992	Winter Weather	1,200,653	0
2/9/1992	Winter Weather	1,244	0
2/11/1992	Flooding, Winter Weather	16,195	0
2/14/1992	Flooding, Winter Weather	12,661	0
12/6/1992	Winter Weather	2,176	0
12/8/1992	Wind, Winter Weather	3,665	0
12/10/1992	Flooding, Wind, Winter Weather	1,833	0
12/17/1992	Winter Weather	5,357	0
12/28/1992	Landslide, Winter Weather	3,869	0
12/31/1992	Winter Weather	38,688	0
12/11/1993	Winter Weather	4,660	0
1/23/1994	Winter Weather	2,440	0
2/6/1994	Winter Weather	4,392	0
2/16/1994	Winter Weather	1,689	0
12/20/1996	Winter Weather	0	0
12/5/1998	Winter Weather	23,952	0
12/19/1998	Winter Weather	0	169,074
4/8/2005	Winter Weather	3,077	0
1/2007	Freeze/Drought	0	4,000,000
<b>Totals</b>		<b>1,634,282</b>	<b>17,466,850</b>

Source: Hazards Vulnerability Research Institute (SHELDUS), [www.cas.sc.edu/geog/hrl/SHELDUS.html](http://www.cas.sc.edu/geog/hrl/SHELDUS.html); Calaveras County  
\*Loss estimates for Calaveras County are total damage for multi-county event divided by number of counties affected, expressed in 2005 dollars

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## **Probability of Future Occurrence**

**Likely**—10-100 percent chance of occurrence in next year or has a recurrence interval of 10 years or less

The SHELDUS database identifies 21 significant winter storm events in Calaveras County in the last 48 years, which averages to one event every 2.3 years, or a 43 percent chance in any given year.

## **Magnitude/Severity**

**Limited**—Minor injuries and illnesses; minimal property damage that does not threaten structural stability; and/or interruption of essential facilities and services for less than 24 hours

Winter storms in Calaveras County, including strong winds and blizzard conditions, can result in property damage, localized power and phone outages, and closures of streets, highways, schools, businesses, and nonessential government operations. People can also become isolated from essential services in their homes and vehicles. A winter storm can escalate, creating life threatening situations when emergency response is limited by severe winter conditions. Extreme cold may cause pipes to break or leak. In Calaveras County, winter storm conditions are mostly likely to occur in the very eastern part of the County where the population and development is low. Therefore, the impacts are limited.

### 3.2.12 Hazard Profiles Summary

Table 3.11 summarizes the results of the hazard profiles and assigns a level of overall planning significance to each hazard of low, moderate, or high. Significance was determined based on the hazard profile, focusing on key criteria such as frequency and resulting damage, including deaths/injuries and property, crop, and economic damage. This assessment was used by the HMPC to prioritize those hazards of greatest significance to the planning area; thus enabling the County to focus resources where they are most needed. Those hazards that occur infrequently or have little or no impact on the planning area were determined to be of low significance. Those hazards determined to be of high significance were characterized as priority hazards that required further evaluation in Section 3.3 Vulnerability Assessment.

**Table 3.10 Summary of Hazard Profiles**

Hazard Type	Geographic Location*	Probability*	Magnitude*	Planning Significance
Wildfire	Large	Highly Likely	Catastrophic	High
Flood	Small	Likely	Critical	High
Drought	Large	Likely	Critical	High
Winter Storm	Large	Likely	Limited	Moderate
Extreme Heat	Large	Highly Likely	Critical	Moderate
Dam Failure	Small	Occasional	Catastrophic	Moderate
Landslide/Erosion	Isolated	Likely	Limited	Low
Earthquake	Large	Occasional	Limited	Low
Windstorm	Large	Likely	Limited	Low
Expansive Soils	Small	Likely	Negligible	Low
Volcano	Large	Unlikely	Negligible	Low

\*See Section 3.2 for definitions of these factors

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## 3.3 Vulnerability Assessment

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**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.

**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.

**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 use decisions.

### Methodology

The vulnerability assessment further defines and quantifies populations, buildings, critical facilities and infrastructure, and other community assets at risk to natural hazards. The vulnerability assessment for this plan followed the methodology described in the FEMA publication *Understanding Your Risks—Identifying Hazards and Estimating Losses* (2002).

The vulnerability assessment was conducted on hazards determined to be of moderate or high planning significance using the best available data. Data to support the vulnerability assessment was collected from the same sources identified in Section 3.1 Hazard Identification and Section 3.2 Hazard Profiles and from FEMA’s HAZUS-MH MR3 loss estimation software.

The vulnerability assessment includes three sections:

- **3.3.1 Community Asset Inventory**—This section inventories assets exposed to hazards in Calaveras County, including the total exposure of people and property; critical facilities and infrastructure; natural, cultural, and historic resources; and economic assets. The inventory also includes an assessment of social vulnerability to hazards, including characteristics of gender, age, race/ethnicity, and wealth and poverty.
- **3.3.2 Vulnerability by Hazard**—This section describes the County’s overall vulnerability to each hazard; identifies existing and future structures, critical facilities, and infrastructure in identified hazard areas; and estimates potential losses to vulnerable structures, where data is available. Only hazards of moderate or high planning significance, or that have identified hazard areas are addressed in the vulnerability assessment.
- **3.3.3 Development and Land Use Trends**—The final section analyzes trends in population growth, housing demand, and land use patterns.

### 3.3.1 Community Asset Inventory

This section assesses the physical assets including structures, critical facilities and infrastructure, and other important assets in Calaveras County at risk to natural hazards.

## Total Exposure to Hazards

Table 3.11 shows the total population, number of structures, and assessed value of improvements to parcels by community planning area in Calaveras County. Land values have been purposely excluded from this table because land remains following disasters, and subsequent market devaluations are frequently short-term and difficult to quantify. Additionally, state and federal disaster assistance programs generally do not address loss of land or its associated value.

Aside from the incorporated City of Angels Camp, communities listed in this table correspond to unincorporated community planning areas designated by Calaveras County. Population figures for the City of Angels Camp and Calaveras County were provided by the California Department of Finance.

Population estimates used for purposes of analysis were developed by multiplying total residential and agricultural/ranch parcel types with improvement values by the average household size for the county. Total value of improvements reflects the assessed value of improvements for parcels within each of the six community planning areas from the county assessor's 2006 parcel database.

**Table 3.11 Maximum Population and Building Exposure by Community**

Community	Population January 2008	Population Used for Purposes of Analysis	# of Parcels with Improvements (2006)	Total Value of Improvements (2006\$)
Angels Camp	3,593	3,627	1,550	310,695,294
Arnold	Not available	12,534	5,137	813,878,631
Avery-Hathaway Pines	Not available	1,183	485	749,424,568
Mokelumne Hill	Not available	966	396	40,795,106
Murphys-Douglas Flat	Not available	2,821	1,156	210,855,412
San Andreas	Not available	2,389	979	135,007,268
Valley Springs	Not available	688	282	50,492,987
Calaveras County	42,534	38,023	15,583	2,544,881,932
<b>Totals</b>	<b>46,127</b>	<b>61,048</b>	<b>25,083</b>	<b>4,106,606,630</b>

Sources: California Department of Finance, [www.dof.ca.gov/research/demographic/reports/estimates/e-1\\_2006-07/documents/e-1press.pdf](http://www.dof.ca.gov/research/demographic/reports/estimates/e-1_2006-07/documents/e-1press.pdf); Calaveras County Assessors Data

In general, properties with higher improvement values tend to be concentrated in the central and western part of the County and generally closer to community and employment centers.

## Critical Facilities and Infrastructure

A critical facility is defined as one that is essential in providing utility or direction either during the response to an emergency or during the recovery operation. These facilities provide public health and safety services and protection for public and private physical assets throughout the

planning area. Table 3.12 lists the primary critical facilities for Calaveras County. Other critical facilities that also serve as evacuation sites are listed in Table 3.12.

**Table 3.12 Calaveras County Critical Facilities**

Facility Type/Name	Address	City/Town
<b>Sheriff Offices</b>		
Sheriff Station	891 Mountain Ranch Road	San Andreas
Mountain Ranch Substation	8146 Garabaldi Street	Mountain Ranch
Arnold Substation	2182 Highway 4, Meadow Mont Shopping Center	Arnold
Copperopolis Substation	3505 Spangler Lane, Suite 105, Lake Tulloch Plaza	Copperopolis
Valley Springs Substation	55 Highway 26, Suite 7, Valley Oaks Shopping Center	Valley Springs
West Point Substation	300 Cemetery Lane	West Point
<b>Fire Stations</b>		
Hermit Springs-FFS	07N09	West Point
West Point-FFS	22670 Highway 26	West Point
Blue Mountain-L.O.	06N04	Arnold
Esperanza-FFS	9740 Mountain Ranch Road	Mountain Ranch
Arnold-FFS	2517 Highway 4	Arnold
Sierra Vista-L.O.	W. Murray Creek Road	San Andreas
Tuolumne/Calaveras-RUHQ	785 Mountain Ranch Road	San Andreas
Valley Springs-FFS	1855 New Hogan Parkway	Valley Springs
Murphys-FFS	33 Apple Blossom Drive	Murphys
Vallecito-CC	3235 Six Mile Road	Murphys
Altaville-FFS	125 N. Main Street	Angels Camp
Fowler Peak-L.O.	Fowler Peak-L.O.	Angels Camp
Copperopolis-FFS	433 Main Street	Copperopolis
Ebbetts Pass Fire Protection District	5510 Meko Drive	Camp Connell
Ebbetts Pass Fire Protection District	1028 Manuel Road	Arnold
Ebbetts Pass Fire Protection District	2038 Moran Road	Arnold
Ebbetts Pass Fire Protection District	40 Canyon View Drive	Hathaway Pines
Murphys Fire Protection District	37 Jones Street	Murphys
Murphys Fire Protection District	3408 Main Street	Valaceto
Angels City Fire Department Station	1404 Highway 4	Angels Camp
Angels City Fire Department Station	200 Monte Verda Street	Angels Camp
Copperopolis Fire Protection District	9164 Pool Station Road	Copperopolis
Copperopolis Fire Protection District	370 Main Street	Copperopolis
Copperopolis Fire Protection District	1927 Quiver Street	Copperopolis
West Point Fire and Rescue District	195 Spink Road	West Point

<b>Facility Type/Name</b>	<b>Address</b>	<b>City/Town</b>
West Point Fire and Rescue District	3910 N. Railroad Flat Road	Railroad Flat
Central Fire and Rescue District	15815 Highway 26	Glencoe
Mokelumne Hill Fire District	8295 N. Main Street	Mokelumne Hill
Mokelumne Hill Fire District	8160 Church Street	Mokelumne Hill
Foothill Fire Protection District	129 Highway 12	Valley Springs
Foothill Fire Protection District	Highway 12, Burson	Burson
Jenny Lind Fire Protection District	2232 Danaher Road	Valley Springs
Jenny Lind Fire Protection District	6501 Jenny Lind Road	Valley Springs
San Andreas Fire District Station 1	San Andreas Fire District Station 1	San Andreas
Central Fire and Rescue District	8019 Washington Street	Mountain Ranch
Central Fire and Rescue District	11309 Sheep Ranch Road	Mountain Ranch
Central Fire and Rescue District	19927 Jesus Maria Road	Mountain Ranch
Central Fire and Rescue District	6338 Swiss Ranch Road	Mountain Ranch
California Department of Forestry	Riata Way	Angels Camp
Stanislaus National Forest Dorrington Fire	5200 Highway 4	Camp Connell
Stanislaus National Forest Calaveras District	5519 Highway 4	Hathaway Pines
Jenny Lind Fire Protection District	11823 Main Street	Jenny Lind
Altaville-Melones Fire Protection District	143 Monte Verda Street	Angels Camp
<b>Medical Facilities</b>		
M.T.S.J. Hospital	768 Mountain Ranch Road	San Andreas
Allergy Immunology & Asthma	700 Mountain Ranch Road	San Andreas
Angels Camp Family Medical	445 South Main Street	Angels Camp
San Andreas Family Practice	265 E. St Charles	San Andreas
Silver Oak Medical	556 Mountain Ranch Road	San Andreas
Stockton Cardiology Medical Group	1300 Kurt Drive	Angels Camp
Arnold Family Medical Center	2037 Highway 4	Arnold
<b>Airport</b>		
Maury Rasmussen Field	Four miles southeast of San Andreas	San Andreas

Source: Calaveras County

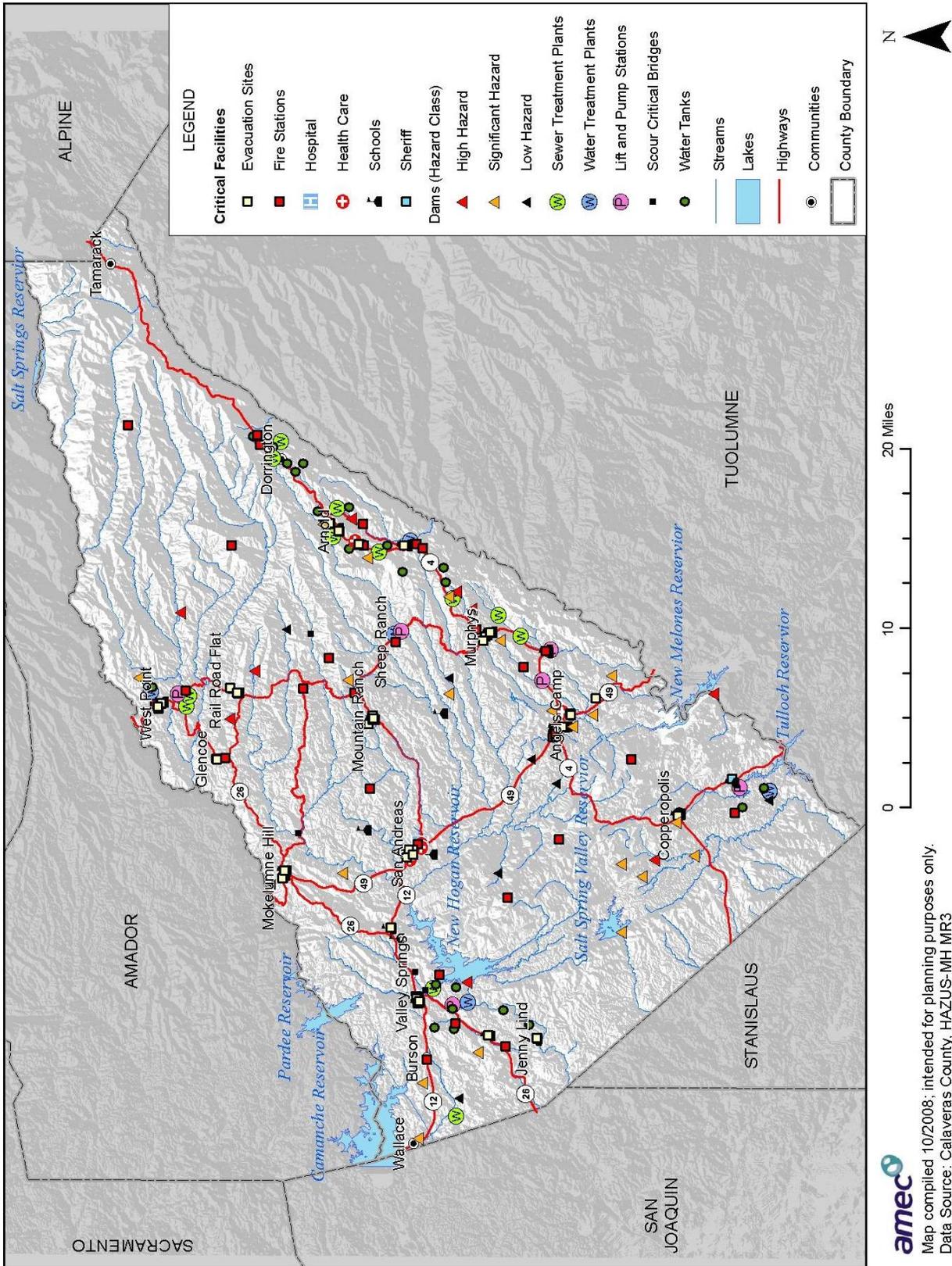
**Table 3.13 Critical Facilities—Evacuation Sites**

Site Name	Address	City/Town	Facility Type
Bret Harte High	364 Murphys Grade Road	Angels Camp	School
Frog Town	Highway 49	Angels Camp	Fairground
Mark Twain Elementary	646 Stanislaus Avenue	Angels Camp	School
Chapel in the Pines	2286 Cedar Lane	Arnold	Church
Hazel Fischer Elementary	1605 Blagen Road	Arnold	School
Avery Middle School	4545 Moran Road	Arnold	School
Independence Hall	1445 Blagen Road	Arnold	Hall
Copperopolis Elementary	217 School Street	Copperopolis	School
American Legion Hall	2769 Upper Dorrway Road	Glencoe	Hall
Jenny Lind Elementary	5100 Driver Road	Jenny Lind	School
Community Town Hall	Main Street	Mokelumne Hill	Hall
Mokelumne Hill Elementary	8350 Highway 26	Mokelumne Hill	School
Community Church	8403 E. Murray Creek	Mountain Ranch	Church
Mountain Ranch Community School	7869 Whiskey Slide Road	Mountain Ranch	School
Community Hall	Washington & Blacksom	Mountain Ranch	Hall
Albert Michelson Elementary	196 Pennsylvania Gulch	Murphys	School
Masonic Temple	384 Church Street	Murphys	Hall
Rail Road Flat Community Hall	250 Rail Road Flat Road	Rail Road Flat	Hall
Rail Road Flat Elementary	298 Rail Road Flat Road	Rail Road Flat	School
San Andreas Community Covenant Church	261 Treat Street	San Andreas	Church
San Andreas Elementary	255 Lewis Avenue	San Andreas	School
Calaveras High	350 High School Street	San Andreas	School
Toyon Middle School	3412 Double Springs	San Andreas	School
Town Hall	Main Street	San Andreas	Hall
Valley Springs Elementary	237 Pine Street	Valley Springs	School
Veterans Hall	198 Pine Street	Valley Springs	Hall
W.P. Community Covenant Church	22268 Highway 26	West Point	Church
West Point Elementary	Bald Mountain Road	West Point	School
FWV Hall	202 Spink Road	West Point	Hall

Source: Calaveras County

Critical facilities are defined as physical assets that provide services that are critical to public health and safety. Disaster recovery and response would be severely limited in the event of damage to these facilities and assets. Critical infrastructure is also located throughout the planning area including utilities and transportation infrastructure, such as water storage and treatment facilities and bridges and highways. Figures 3.14. on the following page show critical facilities, respectively, in Calaveras County.

Figure 3.14 Calaveras County Critical Facilities and Infrastructure



## Economic Assets

Economic assets at risk include major employers or primary economic sectors, such as, agriculture, whose losses or inoperability would have severe impacts on the community and its ability to recover from disaster. After a disaster, economic vitality is the engine that drives recovery. Every community has a specific set of economic drivers, which are important to understand when planning ahead to reduce disaster impacts to the economy. When major employers are unable to return to normal operations, impacts ripple throughout the community. Table 3.14 lists the major employers in Calaveras County.

**Table 3.14 Calaveras County Major Employers**

Employer Name	Location	Industry	Employer Size Class
Bear Valley Ski Area Main Office	Bear Valley	Skiing Centers and Resorts	250-499
Forestry and Fire Protection	San Andreas	Government-Forestry Services	250-499
Mark Twain St. Joseph's Hospital	San Andreas	Hospitals	250-499
Mountain Machining	Angels Camp	Machine Shops	250-499
Ironstone Vineyards	Murphys	Wineries	100-249
Jenny Lind High School	Valley Springs	Schools	100-249
Rite of Passage ATCS	San Andreas	Schools	100-249
Mark Twain Convalescent Hospital	San Andreas	Hospitals	100-249
Foot Hill Village Lodge and Inn	Angels Camp	Retirement Communities and Homes	50-99
Jenny Lind Elementary School	Valley Springs	Schools	50-99
Mark Twain Elementary School	Angels Camp	Schools	50-99
Mar-Val Food Stores Inc	Valley Springs	Grocers-Retail	50-99
Resort at Greenhorn Creek	Angels Camp	Resorts	50-99
Saddle Creek Lodge Resort	Copperopolis	Hotels and Motels	50-99
Sequoia Woods Country Club	Arnold	Golf Courses-Private	50-99
Big Trees Market	Arnold	Grocers-Retail	50-99
Bret Harte High School	Altaville	Schools	50-99
Calaveras County Human Services	San Andreas	County Government-Social/Human Resources	50-99
Calaveras County Road Department	San Andreas	Grading Contractors	50-99
Calaveras County Sheriff	San Andreas	Sheriff	50-99
Calaveras Public Works Department	San Andreas	Grading Contractors	50-99
Calaveras Special Education	San Andreas	Schools	50-99
Country Mercantile	San Andreas	Department Stores	Not Available

Source: Calaveras County

Timber, agriculture, and mining are important economic sectors in Calaveras County. There are significant timber resources in the central and eastern sections of the County, with timber

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production focused on Ponderosa Pine. Twelve percent of the County is designated as a Timber Protection Zone and a roughly equivalent portion (77,901 acres) is federal land managed by the Stanislaus National Forest. Christmas tree production in recent years has been a significant agricultural commodity. The value of timber production in the county decreased from nearly \$20 million in 2000 to \$8.8 million in 2006. Forest fires in 2005 significantly reduced the amount of timber produced.

The three highest producing agricultural sectors are cattle, poultry, and vineyards. The value of agricultural production for 2007 was \$20,313,900. This figure represents a 20 percent decrease from the 2006 gross production value of \$25,251,300. The most notable change was a decrease of approximately \$4,000,000 in the timber harvest due to the downturn in the housing industry.

There is a long history of mining in the county, and as of 2005, seven mines were classified as active. Economically viable mineral deposits in the planning area include asbestos, chromite, gold, limestone, sand, and gravel.

### **Natural, Historic, and Cultural Assets**

Assessing the vulnerability of Calaveras County to disaster also involves inventorying the natural, historic, and cultural assets of the area. This step is important for the following reasons:

- The community may decide that these types of resources warrant a greater degree of protection due to their unique and irreplaceable nature and contribution to the overall economy.
- If these resources are impacted by a disaster, knowing so ahead of time allows for more prudent care in the immediate aftermath, when the potential for additional impacts are higher.
- The rules for reconstruction, restoration, rehabilitation, and/or replacement are often different for these types of designated resources.
- Natural resources can have beneficial functions that reduce the impacts of natural hazards, such as wetlands and riparian habitat, which help absorb and attenuate floodwaters.

### **Natural Resources**

Calaveras County has a variety of natural resource assets that to a large extent serve as the basis for the county's economy and quality of life. These assets include water, critical species, and wildlife and plant habitat.

Natural resource assets are important to include in benefit-cost analyses for future projects and may be used to leverage additional funding for mitigation projects that also contribute to community goals for protecting sensitive natural resources. Awareness of natural assets can lead to opportunities for meeting multiple objectives. For instance, protecting wetlands areas protects sensitive habitat as well as attenuates and stores floodwaters.

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## Critical Species

To further understand natural resources that may be particularly vulnerable to a hazard event, as well as those that need consideration when implementing mitigation activities, it is important to identify at-risk species (i.e., endangered species) in the planning area. An endangered species is any species of fish, plant life, or wildlife that is in danger of extinction throughout all or most of its range. A threatened species is a species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. Both endangered and threatened species are protected by law and any future hazard mitigation projects are subject to these laws. Candidate species are plants and animals that have been proposed as endangered or threatened but are not currently listed.

There are 15 federal endangered, threatened, or candidate species in Calaveras County. These species are listed in Table 3.15.

**Table 3.15 Calaveras County Critical Species**

Latin Name	Common Name	Status
<b>Listed Endangered or Threatened Species and/or Habitat</b>		
Branchinecta lynchi	vernal pool fairy shrimp	T
Desmocerus californicus dimorphus	valley elderberry longhorn beetle	T
Lepidurus packardii	vernal pool tadpole shrimp	E
Oncorhynchus mykiss	Central Valley steelhead	T
	Critical habitat, Central Valley steelhead	X
Oncorhynchus tshawytscha	winter-run chinook salmon, Sacramento River	E
Ambystoma californiense	California tiger salamander, central population	T
	Critical habitat, CA tiger salamander, central population	X
Rana aurora draytonii	California red-legged frog	T
Thamnophis gigas	giant garter snake	T
Arctostaphylos myrtifolia	lone manzanita	T
Brodiaea pallida	Chinese Camp brodiaea	T
<b>Candidate Species for Endangered or Threatened Listing</b>		
Bufo canorus	Yosemite toad	C
Rana muscosa	Mountain yellow-legged frog	C
Martes pennanti	fisher	C

Source: US Fish and Wildlife Service, [http://www.fws.gov/sacramento/es/spp\\_lists/auto\\_list.cfm](http://www.fws.gov/sacramento/es/spp_lists/auto_list.cfm)

Key:

(E) Endangered - Listed as being in danger of extinction.

(T) Threatened - Listed as likely to become endangered within the foreseeable future.

(C) Candidate - Candidate to become a proposed species.

(X) Critical Habitat designated for this species

### **Wildlife and Plant Habitat**

The majority of Calaveras County is undeveloped and natural habitat areas for a variety of species unique to the eastern San Joaquin Valley and foothills of the Sierra Nevada. Critical habitat areas for the Central Valley steelhead and California tiger salamander are located in the western section of the county. There are several locations throughout the county where species with special or protected status have been identified. Ione chaparral and big tree forest are two vegetation communities with particular importance for biodiversity and the habitat of sensitive species. Annual grassland covers 22 percent of the county’s area and 15 percent is montane hardwood forest.

### **Historic and Cultural Assets**

Table 3.16 lists sites and buildings from the National Register of Historic Places for Calaveras County. The National Register of Historic Places is the nation’s official list of cultural resources worthy of preservation. Properties listed include districts, sites, buildings, structures, and objects

that are significant in American history, architecture, archeology, engineering, and culture. The National Register is administered by the National Park Service.

**Table 3.16 Calaveras County Properties on the National Register of Historic Places**

Site/Building	Address	Town
Altaville Grammar School	125 N. Main Street	Altaville
Angels Hotel	Main Street at Birds Way	Angels Camp
Calaveras County Bank aka Calaveras Meat Market	1239 Main Street	Angels Camp
Calaveras County Courthouse	Main Street	San Andreas
Choy, Sam, Brick Store (Angels Camp Jail)	Bird Way	Angels Camp
Copperopolis Armory	695 Main Street	Copperopolis
Copperopolis Congregational Church aka Copperopolis Community Center	411 Main Street	Copperopolis
Douglas Flat School	Northeast of Vallecito on SR 4	Douglas Flat
Honigsberger Store aka Calaveras Copper Mining Company Warehouse	665 Main Street	Copperopolis
I.O.O.F. Hall	Center Street	Mokelumne Hill
Leger Hotel	Main Street	Mokelumne Hill
Murphys Grammar School	Jones Street	Murphys
Murphys Historic District	Sheep Ranch Road, Main, Church, Jones, Algiers Streets, Big Trees Road, and Angels Creek	Murphys
Murphys Hotel aka Mitchler Hotel	Main and Algiers Streets	Murphys
New Melones Archeological District	Address Restricted	Angels Camp
Reed's Store aka Copperopolis Copper Mining Company Office	679 Main Street	Copperopolis
Synder, John J., House aka.Snyder House	247 W. St. Charles Street	San Andreas
Utica Mansion aka Charles D. Lane Mansion	1103 Bush Street	Angels Camp
Thorn House	87 E. St. Charles Street	San Andreas

It should be noted that as defined by the National Environmental Policy Act (NEPA), any property over 50 years of age is considered a historic resource and is potentially eligible for the National Register. Thus, in the event that the property is to be altered, or has been altered, as the result of a major federal action, the property must be evaluated under the guidelines set forth by NEPA. Structural mitigation projects are considered alterations for the purpose of this regulation.

### Social Vulnerability

Certain demographic and housing characteristics may amplify or reduce overall vulnerability to hazards. These characteristics, such as age, race/ethnicity, income levels, gender, building quality, public infrastructure, all contribute to social vulnerability.

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A Social Vulnerability Index compiled by the Hazards and Vulnerability Research Institute in the Department of Geography at the University of South Carolina measures the social vulnerability of U.S. counties to environmental hazards for the purpose of examining the differences in social vulnerability among counties. Based on national data sources, primarily the 2000 census, it synthesizes 42 socioeconomic and built environment variables that research literature suggests contribute to reduction in a community's ability to prepare for, respond to, and recover from hazards (i.e., social vulnerability). Eleven composite factors were identified that differentiate counties according to their relative level of social vulnerability: personal wealth, age, density of the built environment, single-sector economic dependence, housing stock and tenancy, race (African American and Asian), ethnicity (Hispanic and Native American), occupation, and infrastructure dependence.

The SOVI national percentile for Calaveras County is 64.7, meaning that the planning area has a social vulnerability index that is higher than 64.7 percent of the U.S. counties. Out of 58 counties in the state of California, 36 are more socially vulnerable than Calaveras County. To better understand the characteristics behind this ranking, the HMPC researched information from the 2000 census on five factors of social vulnerability: gender, age, disability, language spoken in the home, and poverty/unemployment. One characteristic of social vulnerability is differential access to resources and greater susceptibility to hazards. All factors considered here are related to this characteristic. These factors of social vulnerability hold many implications for disaster response and recovery and are important considerations when identifying and prioritizing mitigation actions and overall goals and objectives of the plan.

### ***Gender***

Women may have a more difficult time recovering from disaster than men because of sector-specific employment, lower wages, and family care responsibilities. Calaveras County is 50.4 percent female, which is consistent with the United States (50.9) and state (50.2) percentages. Angels Camp has a somewhat higher percentage of females at 52.0 percent.

### ***Age***

Age can affect the ability of individuals to move out of harm's way. The HMPC analyzed two variables for age, percentage of population over 65 and percentage under age 5. At 4.4 percent, the percentage of Calaveras County's population under 5 years of age is significantly lower than the U.S. (6.8) and California (7.3) percentages. The percentage of the population over 65 (18.2) for both Calaveras County and Angels Camp is higher than both the United States (12.4) and state (10.6) percentages.

### ***Disability***

Persons with physical and mental limitations are identified as special needs populations with specific vulnerability to natural hazards. Disability is defined as a long-lasting physical impairment that limits the ability to conduct everyday tasks such as seeing, speaking, walking,

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lifting, concentrating, or working a job or business. Percentages of persons older than age five with some type of disability are somewhat higher for the City of Angels Camp and Calaveras County than the U.S. and state averages.

### ***Language Spoken in Home***

The language spoken in the home can signify language and cultural barriers that affect communication of warning information and access to post-disaster information. In Calaveras County, 6.7 percent of the population speaks a language other than English in the home. This is significantly lower than both the U.S. (17.9) and state (39.5) percentages. While this does not mean these populations do not speak English, these figures are indicative of cultural differences that may affect receipt of and response to disaster information.

### ***Poverty/Unemployment***

Wealth and poverty also are indicators of social vulnerability. Low income and impoverished populations have fewer resources available for recovery and are more likely to live in structures of greater physical vulnerability. Individuals and communities with greater wealth have more ability to absorb losses and be resilient in the face of disaster due to factors such as insurance and social safety nets. They also have greater capabilities to mitigate hazards and greater access to funds for recovery.

To compare wealth and poverty, the HMPC analyzed the percentage of individuals below the poverty level and the percentage unemployed. Overall, Calaveras County's percentage of individuals living below the poverty level (11.8) is lower than that of the United States (12.4) and the state (14.2). Unemployment in Angels Camp (5.1) is somewhat higher than that in the County (4.2), state (4.3), and the United States overall (3.7).

The social vulnerability analysis indicates that relative to California and the United States, Calaveras County is slightly more vulnerable in the factors of age and disability. The elderly and disabled are important special needs populations to address in emergency management planning.

## **3.3.2 Vulnerability by Hazard**

This section describes overall vulnerability and identifies structures and estimates potential losses to buildings, infrastructure, and critical facilities located in identified hazard areas, where data permits. This assessment was limited to the hazards that were considered moderate or high in planning significance, based on HMPC input and the hazard profiles. Hazards ranked of low significance due to a lack of notable past damage or very low probabilities are not included in the vulnerability assessment. These include landslide, earthquake, windstorm, expansive soils, and volcano. Vulnerability for these hazards is discussed in qualitative terms in Section 3.2 Hazard Profiles.

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This assessment is also limited by the data available for the high or moderate ranked hazards. The methods of analysis vary by hazard type and data available. Many of the identified hazards, particularly weather related hazards, affect the entire planning area, and specific hazard areas cannot be mapped geographically. For these hazards, which include drought, extreme heat, and severe winter weather, vulnerability is mainly discussed in qualitative terms because data on potential losses to structures is not available. The hazards are discussed in alphabetical order for easy reference.

## **Dam Failure**

### ***Existing Development***

Although there is no specific evidence to indicate the likelihood of dam failure within the County, there are several high hazard dams located in the County and a history of dam failure. A dam failure could result in impacts greater than the 100-year flood event and could be catastrophic. Structures immediately downstream of dams are vulnerable to flooding if there is a failure. Areas considered most vulnerable to inundation due to dam failure are downstream of the larger reservoirs, particularly New Melones, New Hogan, Tulloch, Pardee, Camanche, Hunter, Spicer, and McKays.

Inundation maps were unavailable for this project; therefore, structures and potential loss estimates in these areas could not be identified. The high hazard dams have emergency action plans in place. These plans are on file at the Calaveras County Office of Emergency Services.

### ***Future Development***

Flooding due to a dam failure event is likely to exceed the special flood hazard areas regulated through local floodplain ordinances. The County should consider the dam failure hazard when permitting development downstream of high and significant hazard dams in the County. Low hazard dams could become significant or high hazard dams if development occurs below them.

## **Drought**

### ***Existing Development***

Drought affects the water supply of communities and water districts in the County, as well as agricultural irrigation on a more widespread scale, affecting the economy. It normally does not impact structures and can be difficult to identify specific hazard areas. Data is not available to estimate potential losses to structures in identified hazard areas.

The most significant impacts are to water intensive activities such as agriculture, wildfire protection, municipal usage, commerce, and tourism and recreation. Water quality deterioration can also occur during droughts. Long-term climate change and the potential for less rain and reduced snow pack in the future is another factor in gauging overall vulnerability with implications for agricultural operations and recreation.

The value of agricultural production for 2007 was \$20,313,900. The County’s two leading farm commodity industries—cattle and wine grapes —are both vulnerable to drought. A future drought that causes a 20 percent loss of the total production value would result in potential losses of about \$4,062,780 million.

Policies to allow for mandatory water conservation during emergency events are in place in the County.

**Future Development**

The Calaveras County Water District conducted projections of future water use for the Copper Cove, West Point, Ebbetts Pass, and Jenny Lind service areas. These forecasts indicated nearly a four-fold increase from 2005 to 2025 in water connections for the Copper Cove service area and a doubling of connections in the Jenny Lind service area. The West Point and Ebbetts Pass service areas are forecast to see only small increases in the number of connections. Tables 3.17 and 3.18 detail the increase in connections and population forecasted by water service area between 2005 and 2025.

**Table 3.17 Calaveras County Water Connections Forecast by Service Area**

System	2005	2010	2015	2020	2025
Copper Cove	2,517	3,808	5,994	7,992	9,642
West Point	550	575	600	625	650
Ebbetts Pass	5,635	6,197	6,841	7,147	7,481
Jenny Lind	3,810	4,590	5,190	5,790	6,390

Source: Calaveras County Water District

**Table 3.18 Calaveras County Forecast for Population Served by Water Service Area**

System	2005	2010	2015	2020	2025
Copper Cove	5,739	10,060	16,071	21,566	26,928
West Point	1,363	1,425	1,488	1,550	1,613
Ebbetts Pass	13,813	15,218	16,825	17,593	18,428
Jenny Lind	9,900	12,045	13,695	15,345	16,995

Source: Calaveras County Water District

As population grows, so do the water needs for household, commercial, industrial, recreation, and agricultural uses. Future land use and development trends suggest increasing demands on water supply infrastructure, particularly for residential and commercial uses. Vulnerability to drought will increase with these growing demands on existing water supplies. Future water use planning in California is complex and has to account for increasing population size as well as the potential impacts of climate change. Urbanized areas of the County and the agriculture industry are most likely to experience hardships associated with reduced water supply.

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## **Extreme Heat**

### ***Existing Development***

Extreme heat normally does not impact structures and it is difficult to identify specific hazard areas. Data is not available to estimate potential losses to structures in identified hazard areas. Vulnerability is primarily to agriculture and livestock and to human health and safety. The elderly, small children, people who are overweight, people on medications or drugs, invalids, and people with alcohol problems are at significantly higher vulnerability to heat stress than the County's overall population. The social vulnerability assessment in the previous section indicated that the elderly and disabled are two special needs populations that may be particularly important to address in emergency management planning in Calaveras County.

### ***Future Development***

Vulnerability to extreme heat events increases as the population exposed grows. Population growth is highest in the communities in the western parts of the County, where the hazard is more frequent and severe.

## **Flood**

### ***Potential Impact to Existing Development***

Overall vulnerability to flooding is high. The most significant vulnerability is along the Mokelumme and Stanislaus rivers and Cosgrove, Murphys, Angels, and Moran creeks during extended heavy rains accompanied by warm temperatures and rapidly melting snowpack. When these conditions combine with other factors, including saturated soils and full pool reservoir levels, controlled releases of water from reservoirs can cause downstream waterways to overflow their banks. In these types of floods, houses and structures are most vulnerable, but water utilities and other infrastructure, such as bridges, can also be negatively impacted. The U.S. Army Corps of Engineers coordinates joint releases from four main upstream reservoirs to prevent flooding.

### **Estimating Potential Losses**

Calaveras County's 2006 assessor's data was used as a basis to inventory developed parcels located in flood hazard zones. Seven property types were identified and sorted out of 245 unique property categories provided by the county assessor.

A preliminary FEMA digital flood insurance rate map (DFIRM) for Calaveras County was the source of flood hazard data. In cases where parcels are located in multiple flood zones, geographic data transformation techniques were used to create a centroid, or point, representing the center of each parcel polygon, which was then overlaid on the floodplain layer. For the purposes of this analysis, a flood zone that intersected the centroid was assigned as the flood zone for the entire parcel. Another assumption with this model is that every parcel with an improved value greater than zero was assumed to be developed in some way. Only improved

parcels, and the value of those improvements, were analyzed and aggregated by property type and flood zone.

The parcels were segregated and analyzed for Calaveras County as a whole, the incorporated City of Angels Camp, and the six community planning areas of Arnold, Avery-Hathaway Pines, Mokelumne Hill, Murphys-Douglas Flat, San Andreas, and Valley Springs. The results of these analyses are summarized in Tables 3.19-3.24.

These tables show the count and improved value of parcels that fall in zones A or AE on the County’s preliminary DFIRM. These zones are special flood hazard areas representing the one percent annual flood, or base flood, also known as the 100-year flood. There is no 500-year flood zone indicated on the map. Improvement value is taken directly from county assessor data. Value of contents is estimated at 50 percent of the improvement value. Total value is the sum of the improved value and estimated contents values. Loss estimate is calculated at 20 percent of total value.

**Table 3.19 Community Planning Area Parcels with Improvements in Special Flood Hazard Areas**

Location	Improved Parcels in Flood Zone (#)	Total Improved Value (\$)	Estimated Contents Value (\$)	Total Value (\$)	Loss Estimate (\$)
Angels Camp	12	1,426,373	713,187	2,139,560	427,912
Arnold	4	2,061,446	1,030,723	3,092,169	618,434
Avery-Hathaway Pines	-	-	-	-	-
Mokelumne Hill	-	-	-	-	-
Murphys-Douglas Flat	15	2,963,424	1,481,712	4,445,136	889,027
San Andreas	-	-	-	-	-
Valley Springs	9	2,063,539	1,031,770	3,095,309	619,062
Calaveras County	315	85,848,304	42,924,152	128,772,456	25,754,491
<b>Total</b>	<b>355</b>	<b>94,363,086</b>	<b>47,181,543</b>	<b>141,544,629</b>	<b>28,308,926</b>

Source: Calaveras County

Note: Avery-Hathaway Pines, Mokelumne Hill and San Andreas have no parcels with improved values in the base floodplain

**Table 3.20 Calaveras County Parcels with Improvements in Special Flood Hazard Areas**

Property Type	Improved Parcels in Flood Zone (#)	Total Improved Value (\$)	Estimated Contents Value (\$)	Total Value (\$)	Loss Estimate (\$)
Agriculture	2	31,482	15,741	47,223	9,445
Agriculture Ranch	17	5,541,329	2,770,665	8,311,994	1,662,399
Commercial	5	1,544,503	772,252	2,316,755	463,351
Exempt	5	2,786,997	1,393,499	4,180,496	836,099

Property Type	Improved Parcels in Flood Zone (#)	Total Improved Value (\$)	Estimated Contents Value (\$)	Total Value (\$)	Loss Estimate (\$)
Other	83	15,228,498	7,614,249	22,842,747	4,568,549
Residential	231	67,528,020	33,764,010	101,292,030	20,258,406
Vacant	12	1,702,257	851,129	2,553,386	510,677
<b>Total</b>	<b>355</b>	<b>94,363,086</b>	<b>47,181,543</b>	<b>141,544,629</b>	<b>28,308,926</b>

Source: Calaveras County

**Table 3.21 Angels Camp Parcels with Improvements in Special Flood Hazard Areas**

Property Type	Improved Parcels in Flood Zone (#)	Total Improved Value (\$)	Estimated Contents Value (\$)	Total Value (\$)	Loss Estimate (\$)
Agriculture-Ranch	1	152,000	76,000	228,000	45,600
Other	10	1,076,549	538,275	1,614,824	322,965
Residential	1	197,824	98,912	296,736	59,347
<b>Totals</b>	<b>12</b>	<b>1,426,373</b>	<b>713,187</b>	<b>2,139,560</b>	<b>427,912</b>

Source: Calaveras County

**Table 3.22 Arnold Parcels with Improvements in Special Flood Hazard Areas**

Property Type	Improved Parcels in Flood Zone (#)	Total Improved Value (\$)	Estimated Contents Value (\$)	Total Value (\$)	Loss Estimate (\$)
Commercial	2	1,114,951	557,476	1,672,427	334,485
Exempt	1	105,889	52,945	158,834	31,767
Other	1	840,606	420,303	1,260,909	252,182
<b>Totals</b>	<b>4</b>	<b>2,061,446</b>	<b>1,030,723</b>	<b>3,092,169</b>	<b>618,434</b>

Source: Calaveras County

**Table 3.23 Murphys-Douglas Flat Parcels with Improvements in Special Flood Hazard Areas**

Property Type	Improved Parcels in Flood Zone (#)	Total Improved Value (\$)	Estimated Contents Value (\$)	Total Value (\$)	Loss Estimate (\$)
Commercial	1	161,262	80,631	241,893	48,379
Other	5	846,665	423,333	1,269,998	254,000
Residential	9	1,955,497	977,749	2,933,246	586,649
<b>Totals</b>	<b>15</b>	<b>2,963,424</b>	<b>1,481,712</b>	<b>4,445,136</b>	<b>889,027</b>

Source: Calaveras County

**Table 3.24 Valley Springs Parcels with Improvements Special Flood Hazard Areas**

	Improved Parcels in Flood Zone (#)	Total Improved Value (\$)	Estimated Contents Value (\$)	Total Value (\$)	Loss Estimate (\$)
Agriculture- Ranch	1	150,858	75,429	226,287	45,257
Other	2	179,713	89,857	269,570	53,914
Residential	5	1,490,568	745,284	2,235,852	447,170
Vacant	1	242,400	121,200	363,600	72,720
<b>Totals</b>	<b>9</b>	<b>2,063,539</b>	<b>1,031,770</b>	<b>3,095,309</b>	<b>619,062</b>

Source: Calaveras County

Based on this analysis, the Calaveras County planning area has significant assets at risk to the one percent annual flood (base flood). 355 improved parcels are within the base floodplain with a total value of more than \$94 million and estimated losses of more than \$28 million. The total value of improved parcels outside of the special flood hazard areas exceeds \$4 billion.

### Critical Facilities in Flood Hazard Zones

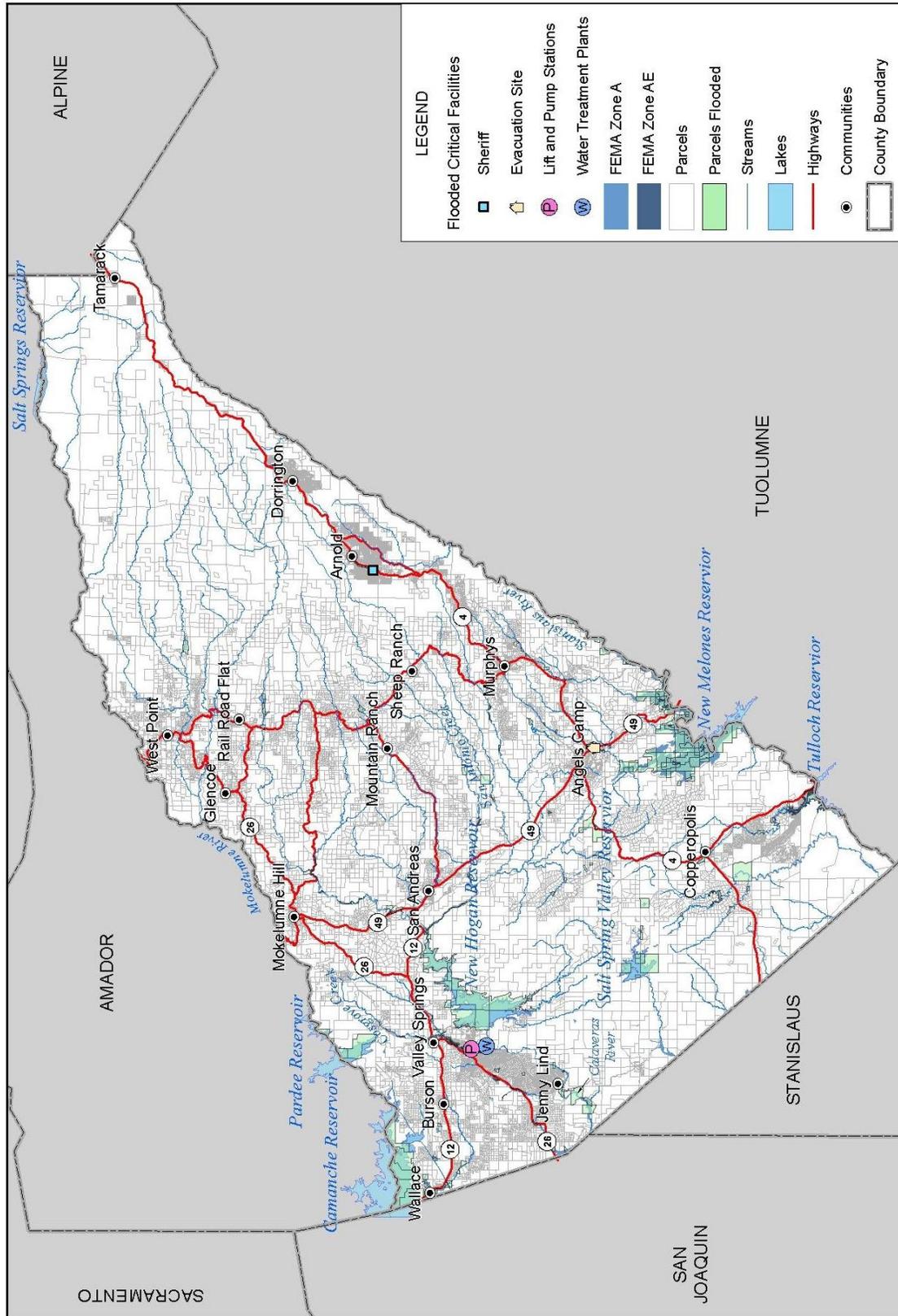
Table 3.25 and Figure 3.15 identify critical facilities in the special flood hazard areas.

**Table 3.25 Critical Facilities and Infrastructure in Special Flood Hazard Areas**

Facility Type	Name	Owner	Location
Bridge	State Route 49	State Highway Agency	Calaveras County
Bridge	Rock Creek Road	County Highway Agency	Calaveras County
Bridge (scour critical)	Hogan Dam Road	County Highway Agency	Valley Springs
Bridge	Lime Creek Road	County Highway Agency	Valley Springs
Bridge	Hogan Dam Road	County Highway Agency	Valley Springs
Bridge	Algiers Street	County Highway Agency	Murphys-Douglas Flat
Bridge	Warren Road	County Highway Agency	Calaveras County
Bridge	Main Street	County Highway Agency	Calaveras County
Bridge	Copper Cove Dr D	County Highway Agency	Calaveras County
Bridge	Booster Way	City Highway Agency	Angels Camp
Sheriff	Arnold Substation	Calaveras County	2182 Hwy 4 Arnold
Water Treatment Plant	Jenny Lind	Calaveras County Water District	Calaveras County
Lift/Pump Stations	Huckleberry Lift Station	Calaveras County Water District	-

Source: Calaveras County, HAZUS-MH MR3

Figure 3.15 Calaveras County Critical Facilities Located in Flood Hazard Areas



Undermining of bridge supports below the water surface, also known as bridge scour, can occur at high water volumes and velocities typical at flood stage. HAZUS-MH, FEMA’s GIS-based loss estimation software includes information on the scour index for bridges in Calaveras County. Bridges with a scour index between 1 and 3 are considered “scour critical,” or a bridge with a foundation element determined to be unstable for the observed or evaluated scour condition. Table 3.26 lists scour critical bridges in Calaveras County. The analysis indicates that Hogan Dam Road is the most critical bridge based on its scour index and daily traffic.

**Table 3.26 Calaveras County Scour Critical Bridges**

Name	Year Built	Scour Index	Average Daily Traffic	Comment
Hogan Dam Road	1941	2	500	Valley Springs
Main Street	1922	2	400	Vallecito
Lime Creek Road	1917	2	100	Valley Springs
Double Springs Road	1917	2	50	Unincorporated
Swiss Ranch Road	1952	2	39	Rail Road Flat
Jesus Maria Road	1989	3	300	Unincorporated

Source: Calaveras County, HAZUS-MH MR3

### Department of Water Resources Floodplain Analysis

Also to be considered when evaluating the flood risks in Calaveras County are the advisory floodplain maps developed by the California Department of Water Resources (DWR) for Sacramento-San Joaquin Valley cities and counties.

These maps were developed by DWR to better reflect the most accurate information about the flooding potential in a community. The new DWR floodplain maps were designed to provide a better understanding of the true risk of flooding to public safety and property.

The new maps, compiled using information from state, local and federal agencies, have no regulatory status for floodplain development and are for information only. They do not replace existing FEMA regulatory floodplain maps (i.e., FIRMs and DFIRMs) and therefore do not make any changes in federal flood insurance requirements for homes and businesses. However, city and county governments will be able to use the maps to identify areas that warrant further study and to help make informed land use decisions.

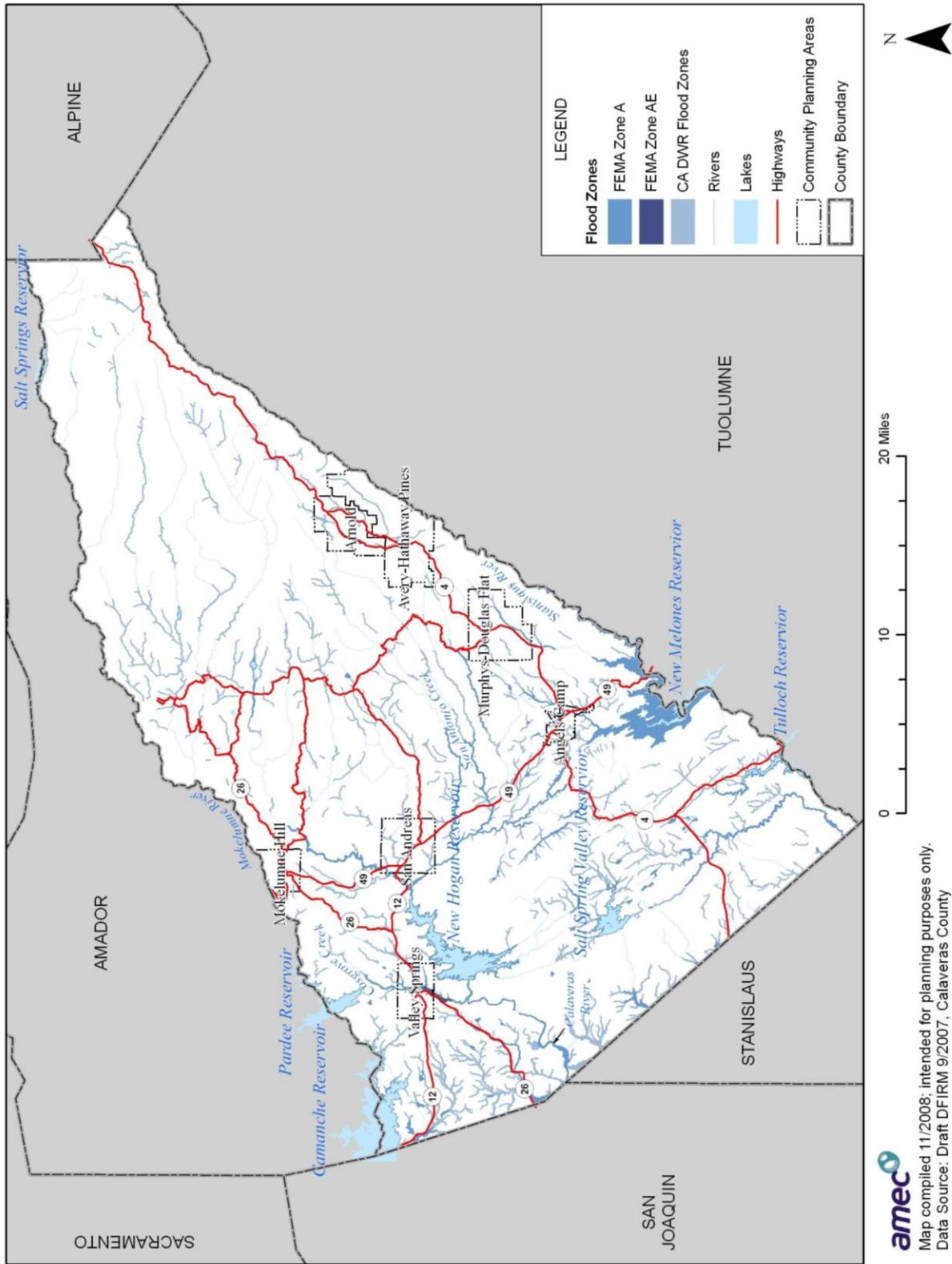
These advisory maps will also help communities begin early planning activities to meet SB 5 requirements calling for a minimum of 200-year protection for new development in urban and urbanizing areas. DWR is conducting a number of studies that may lead to further revisions of the floodplain maps over the next two to four years.

Figure 3.16 provides a comparison of the floodplains included in the preliminary DFIRMS with the flooding potential detailed in DWR flood awareness maps. Tables 3.27 – 3.29 provide a

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count and value of both improved and unimproved parcels located in the FEMA and DWR floodplains. Table 3.27 provides the parcel count and values for the DFIRMs within the Calaveras County planning area. Table 3.28 provides the count of parcels and values associated with DWRs flood awareness maps for the same area. Table 3.29 combines both the DFIRM and DWR floodplains to illustrate total count of improved and unimproved parcels with a potential to flood within the planning area. Understanding the location of unimproved parcels in addition to the improved parcels will assist the communities in identifying future areas for development and determining methods for managing the flood risk in these areas.

Figure 3.16 Calaveras County Preliminary FEMA DFIRM and DWR Flood Awareness Map



**Table 3.27 Calaveras County DFIRM Parcel Analysis**

Planning Area	Improved and Unimproved Parcels in the Flood Plain	Land Value	Structure Value	Net Value
Angels Camp	32	\$521,747	\$1,445,145	\$1,914,879
Arnold	7	\$497,236	\$2,061,446	\$2,584,099
Avery-Hathaway Pines	-	-	-	-
Mokelumne Hill	2	\$94,510	\$0	\$94,510
Murphys-Douglas Flat	27	\$2,601,198	\$3,070,615	\$5,882,642
San Andreas	6	\$99,631	\$0	\$99,631
Unincorporated	737	\$53,920,579	\$83,025,235	\$136,332,430
Valley Springs	22	\$1,290,827	\$2,063,539	\$3,310,490
<b>Total</b>	<b>833</b>	<b>\$59,025,728</b>	<b>\$91,665,980</b>	<b>\$150,218,681</b>

**Table 3.28 Calaveras County DWR Parcel Analysis**

Planning Area	Improved and Unimproved Parcels in the Flood Plain	Land Value	Structure Value	Net Value
Angels Camp	52	\$3,367,430	\$6,452,263	\$9,853,081
Arnold	73	\$4,175,743	\$7,728,371	\$12,052,099
Avery-Hathaway Pines	17	\$482,888	\$1,271,141	\$1,738,684
Mokelumne Hill	4	\$62,469	\$146,688	\$194,536
Murphys-Douglas Flat	11	\$212,003	\$1,012,208	\$1,194,571
San Andreas	71	\$2,924,832	\$5,655,427	\$8,491,874
Unincorporated	750	\$38,381,302	\$59,048,462	\$96,910,708
Valley Springs	11	\$352,876	\$285,122	\$615,180
<b>Total</b>	<b>989</b>	<b>\$49,959,543</b>	<b>\$81,599,682</b>	<b>\$131,050,733</b>

**Table 3.29 Calaveras County Total Flood Parcel Analysis DFIRM and DWR**

Planning Area	Improved and Unimproved Parcels in the Flood Plain	Land Value	Structure Value	Net Value
Angels Camp	84	\$3,889,177	\$7,897,408	\$11,767,960
Arnold	80	\$4,672,979	\$9,789,817	\$14,636,198
Avery-Hathaway Pines	17	\$482,888	\$1,271,141	\$1,738,684
Mokelumne Hill	6	\$156,979	\$146,688	\$289,046
Murphys-Douglas Flat	38	\$2,813,201	\$4,082,823	\$7,077,213
San Andreas	77	\$3,024,463	\$5,655,427	\$8,591,505

Planning Area	Improved and Unimproved Parcels in the Flood Plain	Land Value	Structure Value	Net Value
Unincorporated	1,487	\$92,301,881	\$142,073,697	\$233,243,138
Valley Springs	33	\$1,643,703	\$2,348,661	\$3,925,670
<b>Total</b>	<b>1,822</b>	<b>\$108,985,271</b>	<b>\$173,265,662</b>	<b>\$281,269,414</b>

## National Flood Insurance Program and Repetitive Flood Loss Properties

**Requirement §201.6(c)(2)(ii): [The risk assessment] must also address National Flood Insurance Program (NFIP) insured structures that have been repetitively damaged floods.**

Table 3.30 provides detailed information on National Flood Insurance Program (NFIP) policies in Calaveras County. Both the City of Angels Camp and Calaveras County participate in the NFIP, but neither participates in the Community Rating System (CRS).

**Table 3.30 Community Participation in the NFIP**

Jurisdiction	Date Joined	Effective FIRM Date	Policies in Force	Insurance in Force (\$)	Number of Claims	Claims Totals (\$)	Community Rating System Participant
Calaveras County	09/15/90	09/15/90	161	45,074,200	26	748,269	No
City of Angels Camp	09/24/84	5/19/1997	10	2,634,100	3	13,701	No

Source: National Flood Insurance Program, February 29, 2008

Calaveras County joined the NFIP through the regular program on September 5, 1990. NFIP data indicates that as of April 11, 2008, there were 161 flood insurance policies in force in the County with \$45,074,200 of coverage. Of the 161 policies, 157 were residential and 7 were nonresidential. 63 of the policies were in special flood hazard areas (A or AE Zones) and the remaining were in B, C, or X Zones. There have been 26 historical claims for flood losses totaling \$748,269; 24 were for residential properties; 20 were in A or AE Zones.

There are four repetitive loss buildings in the Calaveras County. Two are located in special flood hazards areas (A or AE Zones) and two are located outside of these areas (B, C, or X Zones). One of these buildings is post-FIRM. Two have more than four losses, and these are target repetitive loss structures. None of the structures have two to three losses greater than the building's value. Table 3.31 provides information on repetitive loss payments.

**Table 3.31 Repetitive Losses in Calaveras County**

Calaveras County	A, AE Zones	B, C, X Zones	Total
Repetitive Loss Structures	2	2	4
Repetitive Losses	8	6	14

Repetitive Loss Payments (Building)	489,937	279,201	469,138
Repetitive Loss Payments (Contents)	0	28,280	28,280
Repetitive Loss Payments Total	189,937	307,481	497,418

Source: FEMA, April 2008

There are no repetitive losses in the City of Angels Camp. More detailed information for Angels Camp can be found in their plan annex.

### ***Future Development***

The risk of flooding to future development should be minimized by the floodplain management programs of the County, if properly enforced. Risk could be further reduced by strengthening floodplain ordinances and floodplain management programs beyond minimum NFIP requirements, such as adding freeboard to base flood elevation requirements. If the County does pursue strengthening its flood hazard prevention ordinance beyond minimum NFIP requirements, it may consider participating in the Community Rating System to lower flood insurance premiums for policy holders in the County. The DWR flood awareness maps should also be utilized to make informed land use decisions as the planning area continues to grow.

### **Wildfire**

#### ***Planning Significance: High***

#### **Potential Impact to Existing Development**

Overall vulnerability to wildfire in Calaveras County is high. Certain areas in and surrounding Calaveras County are extremely vulnerable to fires as a result of dense vegetation combined with a growing number of structures being built near and within rural lands. The National Fire Plan developed a “Communities at Risk” list to identify communities that were at risk from the threat of wildfires; this includes 34 communities in Calaveras County.

Calaveras County’s 2006 assessor’s data was used as a basis to inventory developed parcels located in fire hazard zones. Eight property types were identified and sorted out of 245 unique property categories provided by the county assessor.

Wildfire location data was provided by the California Department of Forestry and Fire Protection, Fire and Resource Assessment Program as a GIS layer (Fire Hazard Severity Zones DRAFT, 9-2007, Very High zones in LRA). This data’s criteria for the fire severity classifications are conditions such as fuels, terrain, weather, and other relevant factors. GIS was used to create a centroid, or point, representing the center of each parcel polygon, which was overlaid on the wildfire layer. For the purposes of this analysis, the fire severity zone that intersected the centroid was assigned as the fire severity zone for the entire parcel.

Another assumption with this model is that every parcel with an improved value greater than zero was assumed to be developed in some way. Only improved parcels, and the value of those

improvements, were analyzed and aggregated by property type and fire severity zone. The parcels were segregated and analyzed for Calaveras County as a whole, the incorporated City of Angels Camp, and the six community planning areas of Arnold, Avery-Hathaway Pines, Mokelumne Hill, Murphys-Douglas Flat, San Andreas, and Valley Springs. The results of these analyses are summarized in Tables 3.29-3.37.

Based on this analysis, Calaveras County has substantial assets at risk to high and very high fire severity. Of 25,083 improved parcels within Calaveras County, 22,853 are located within high or very high fire severity zones. 7,556 improved parcels are within the high fire severity zone with a total value of \$1.4 billion. Over 15,000 improved parcels are within the very high fire severity zone with a total value of \$2.2 billion. The most structures and values are risk in unincorporated areas of the County outside of the community planning areas, followed by the community of Arnold.

**Table 3.32 Calaveras County Planning Area: Improved Parcels in Wildfire Hazard Areas by Community**

Location	High Fire Severity		Very High Fire Severity		Total Fire Severity	
	Total # of Structures	Improved Value (\$)	Total # of Structures	Improved Value (\$)	Total Structures	Total Value (\$)
Angels Camp	600	132,578,173	927	169,271,429	1,527	301,849,602
Arnold	-	-	4,652	749,424,568	4,652	749,424,568
Avery-Hathaway Pines	-	-	485	64,454,063	485	64,454,063
Mokelumne Hill	18	2,811,723	378	37,983,383	396	40,795,106
Murphys-Douglas Flat	259	46,108,602	897	164,746,810	1,156	210,855,412
San Andreas	529	80,633,502	422	47,856,721	951	128,490,223
Valley Springs	32	6,838,832	-	-	32	6,838,832
Calaveras County	6,118	1,134,083,883	7,427	1,012,328,559	13,545	2,146,412,442
<b>Totals</b>	<b>7,556</b>	<b>1,403,054,715</b>	<b>15,188</b>	<b>2,246,065,533</b>	<b>22,744</b>	<b>3,649,120,248</b>

Source: Calaveras County

**Table 3.33 Calaveras County Planning Area: Improved Parcels in Wildfire Hazard Areas by Land Use**

Property Type	High Fire Severity		Very High Fire Severity		Total Fire Severity	
	Total # of Structures	Improved Value (\$)	Total # of Structures	Improved Value (\$)	Total Structures	Total Value (\$)
Agriculture	47	8,061,031	64	16,977,153	111	25,038,184
Ranch	505	112,637,419	1,271	212,470,686	1,776	325,108,105
Commercial	120	45,196,071	191	53,684,248	311	98,880,319
Exempt	31	24,438,158	76	23,824,580	107	48,262,738
Industrial	16	2,631,624	8	1,764,261	24	4,395,885
Other	2,037	234,760,398	4,613	459,671,228	6,650	694,431,626

Residential	4,684	953,311,705	8,823	1,462,107,010	13,507	2,415,418,715
Vacant	116	22,018,309	142	15,566,367	258	37,584,676
<b>Totals</b>	<b>7,556</b>	<b>1,403,054,715</b>	<b>15,188</b>	<b>2,246,065,533</b>	<b>22,744</b>	<b>3,649,120,248</b>

Source: Calaveras County

**Table 3.34 Angels Camp: Improved Parcels in Wildfire Hazard Areas**

Property Type	High Fire Severity		Very High Fire Severity		Total Fire Severity	
	Total # of Structures	Improved Value (\$)	Total # of Structures	Improved Value (\$)	Total Structures	Total Value (\$)
Agriculture/Ranch	5	688,113	4	979,749	9	1,667,862
Commercial	21	11,750,799	35	11,472,344	56	23,223,143
Exempt	5	10,070,312	11	7,090,176	16	17,160,488
Industrial	1	197,880	-	-	1	197,880
Other	267	34,821,010	475	53,336,230	742	88,157,240
Residential	293	73,828,160	394	94,674,938	687	168,503,098
Vacant	8	1,221,899	8	1,717,992	16	2,939,891
<b>Totals</b>	<b>600</b>	<b>132,578,173</b>	<b>927</b>	<b>169,271,429</b>	<b>1,527</b>	<b>301,849,602</b>

Source: Calaveras County

**Table 3.35 Arnold: Improved Parcels in Wildfire Hazard Areas**

Property Type	High Fire Severity		Very High Fire Severity		Total Fire Severity	
	Total # of Structures	Improved Value (\$)	Total # of Structures	Improved Value (\$)	Total Structures	Total Value (\$)
Agriculture/Ranch	-	-	16	4,105,946	16	4,105,946
Commercial	-	-	78	21,398,314	78	21,398,314
Exempt	-	-	9	3,370,554	9	3,370,554
Industrial	-	-	2	236,286	2	236,286
Other	-	-	321	36,980,267	321	36,980,267
Residential	-	-	4,201	679,341,101	4,201	679,341,101
Vacant	-	-	25	3,992,100	25	3,992,100
<b>Totals</b>	<b>0</b>	<b>0</b>	<b>4,652</b>	<b>749,424,568</b>	<b>4,652</b>	<b>749,424,568</b>

Source: Calaveras County

**Table 3.36 Avery-Hathaway Pines: Improved Parcels in Wildfire Hazard Areas**

Property Type	High Fire Severity		Very High Fire Severity		Total Fire Severity	
	Total # of Structures	Improved Value (\$)	Total # of Structures	Improved Value (\$)	Total Structures	Total Value (\$)
Agriculture	-	-	4	1,150,895	4	1,150,895
Ranch	-	-	23	3,908,851	23	3,908,851
Commercial	-	-	14	2,880,520	14	2,880,520
Exempt	-	-	8	739,303	8	739,303

	High Fire Severity		Very High Fire Severity		Total Fire Severity	
Industrial	-	-	1	277,822	1	277,822
Other	-	-	65	6,947,222	65	6,947,222
Residential	-	-	363	48,043,945	363	48,043,945
Vacant	-	-	7	505,505	7	505,505
<b>Totals</b>	<b>0</b>	<b>0</b>	<b>485</b>	<b>64,454,063</b>	<b>481</b>	<b>63,303,168</b>

Source: Calaveras County

**Table 3.37 Mokelumne Hill: Improved Parcels in Wildfire Hazard Areas**

Property Type	High Fire Severity		Very High Fire Severity		Total Fire Severity	
	Total # of Structures	Improved Value (\$)	Total # of Structures	Improved Value (\$)	Total Structures	Total Value (\$)
Agriculture	-	-	1	38544	1	38,544
Ranch	-	-	12	1983232	12	1,983,232
Commercial	1	62,698	7	1590104	8	1,652,802
Exempt	-	-	2	123466	2	123,466
Other	11	1,687,010	261	21344568	272	23,031,578
Residential	-	-	92	12650188	92	12,650,188
Vacant	-	-	3	253281	3	253,281
<b>Totals</b>	<b>12</b>	<b>1,749,708</b>	<b>377</b>	<b>37,944,839</b>	<b>389</b>	<b>39,694,547</b>

Source: Calaveras County

**Table 3.38 Murphys-Douglas Flat: Improved Parcels in Wildfire Hazard Areas**

Property Type	High Fire Severity		Very High Fire Severity		Total Fire Severity	
	Total # of Structures	Improved Value (\$)	Total # of Structures	Improved Value (\$)	Total Structures	Total Value (\$)
Agriculture	2	374,891	6	1,284,072	8	1,658,963
Ranch	1	132,677	50	15,567,996	51	15,700,673
Commercial	8	2,859,952	21	8,126,253	29	10,986,205
Exempt	1	33,578	7	1,196,326	8	1,229,904
Industrial	1	203,240	2	364,112	3	567,352
Other	122	13,761,662	510	75,333,168	632	89,094,830
Residential	119	27,394,469	299	62,445,271	418	89,839,740
Vacant	5	1,348,133	2	429,612	7	1,777,745
<b>Totals</b>	<b>257</b>	<b>45,733,711</b>	<b>891</b>	<b>163,462,738</b>	<b>1,148</b>	<b>209,196,449</b>

Source: Calaveras County

**Table 3.39 San Andreas: Improved Parcels in Wildfire Hazard Areas**

Property Type	High Fire Severity		Very High Fire Severity		Total Fire Severity	
	Total # of Structures	Improved Value (\$)	Total # of Structures	Improved Value (\$)	Total Structures	Total Value (\$)
Agriculture	3	558,837	2	822,404	5	1,381,241
Ranch	23	5,522,139	27	3,262,588	50	8,784,727
Commercial	41	11,478,793	12	3,927,662	53	15,406,455
Exempt	5	1,173,629	5	1,491,647	10	2,665,276
Industrial	6	833,945	1	300,469	7	1,134,414
Other	273	31,667,993	237	19,360,747	510	51,028,740
Residential	166	27,893,728	132	18,092,396	298	45,986,124
Vacant	12	1,504,438	6	598,808	18	2,103,246
<b>Totals</b>	<b>526</b>	<b>80,074,665</b>	<b>420</b>	<b>47,034,317</b>	<b>946</b>	<b>127,108,982</b>

Source: Calaveras County

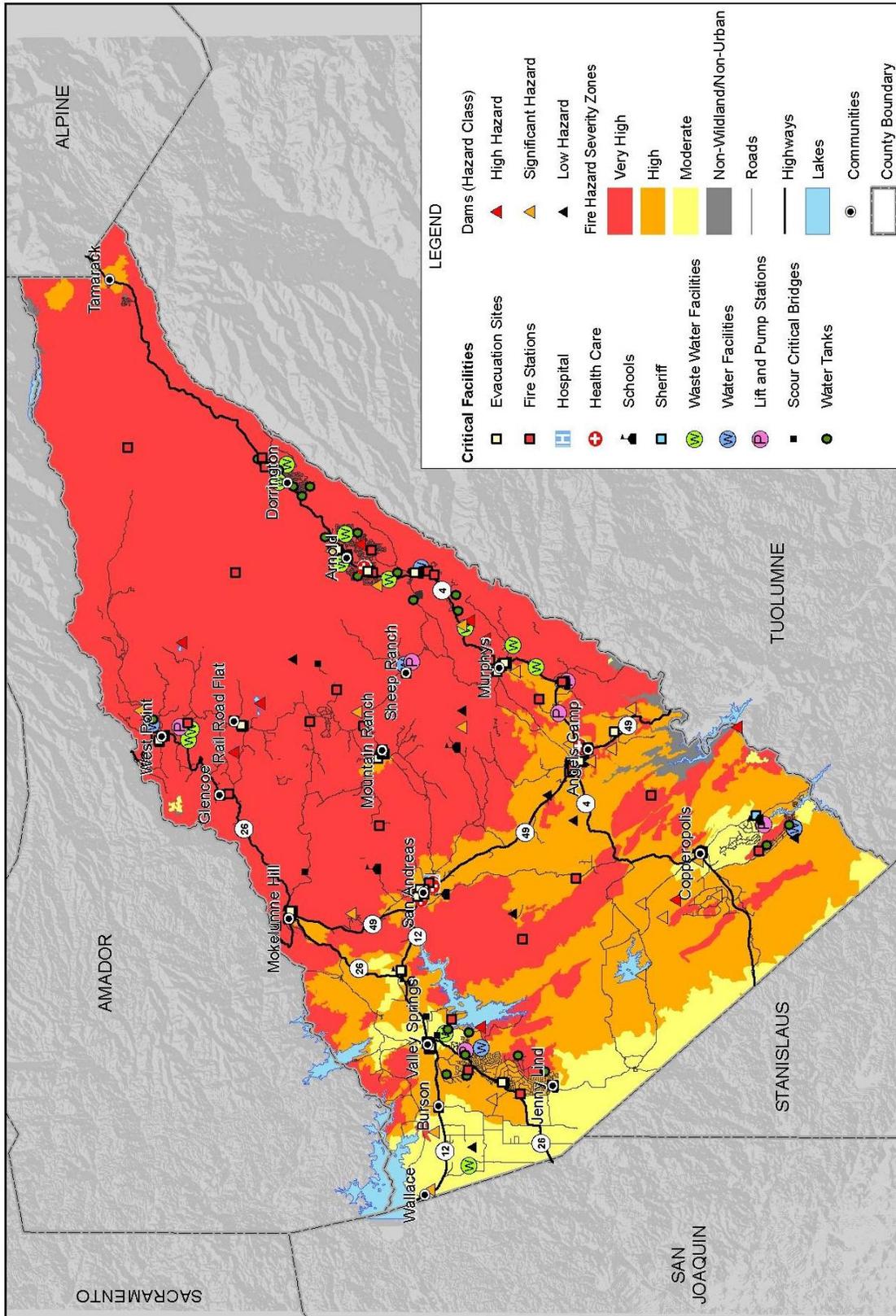
**Table 3.40 Valley Springs: Improved Parcels in Wildfire Hazard Areas**

Property Type	High Fire Severity		Very High Fire Severity		Total Fire Severity	
	Total # of Structures	Improved Value (\$)	Total # of Structures	Improved Value (\$)	Total Structures	Total Value (\$)
Agriculture	1	204,000	-	-	1	204,000
Ranch	12	3,205,266	-	-	12	3,205,266
Other	18	3,249,420	-	-	18	3,249,420
Residential	1	180,146	-	-	1	180,146
<b>Totals</b>	<b>31</b>	<b>6,634,832</b>	<b>0</b>	<b>0</b>	<b>31</b>	<b>6,634,832</b>

Source: Calaveras County

Table 3.41 and Figure 3.19 show the critical facilities in very high wildfire hazard areas. In addition, 52 bridges and 22 dams are located in very high fire hazard areas.

Figure 3.17 Calaveras County Wildfire Hazard and Critical Facilities



amec  
 Map compiled 10/2008; intended for planning purposes only.  
 Data Source: Calaveras County, HAZUS-MH MR3.  
 California Department of Forestry & Fire Protection

**Table 3.41 Critical Facilities and Infrastructure in Very High Fire Hazard Areas**

<b>Facility</b>	<b>Address</b>	<b>Location</b>
<b>Schools</b>		
Avery Middle School	4545 Moran Rd	Avery-Hathaway Pines
Community Day School	1605 Blagen Rd	Arnold
Calaveras High	350 High School St	San Andreas
Mokelumne Hill Elementary	8350 Highway 26	Mokelumne Hill
Albert Michelson Elementary	196 Pennsylvania Gulch Rd	Murphys-Douglas Flat
Rail Road Flat Elementary	298 Rail Road Flat Rd	Calaveras County
Angels Creek Community Day School	1219 Raspberry Ln	Angels Camp
Arnold High School	874 Henry Rd #4	Arnold
San Andreas Elementary	255 Lewis Av	San Andreas
Vallecito High School	3670 Church St	Calaveras County
Vallecito Union School District	4545 Moran Rd	Avery-Hathaway Pines
Hazel Fisher Elementary	1605 Blagen Rd	Arnold
Mark Twain Union Elementary	981 Tuolumne Av	Angels Camp
Oakendell Court School	3585 Hawver Road	Calaveras County
Home School Academy	196 Pennsylvania Gulch Rd	Murphys-Douglas Flat
Rite Of Passage-Atcs	10400 Fricot City Rd	Calaveras County
Transition Program	255 Lewis Av	San Andreas
<b>Fire Stations</b>		
Hermit Springs-Ffs	07n09	Calaveras County
Blue Mtn.-L.O.	06n04	Calaveras County
Esperanza-Ffs	9740 Mountain Ranch Rd	Calaveras County
Arnold-Ffs	2517 Hwy 4	Arnold
Sierra Vista-L.O.	W. Murray Creek Rd	Calaveras County
Tuolumne-Calveras\Ruhq	785 Mountain Ranch Rd	San Andreas
Murphys-Ffs	33 Apple Blossom Dr.	Murphys-Douglas Flat
Fowler Peak-L.O.	Fowler Peak-L.O.	Calaveras County
Ebbetts Pass Fire Protection District	5510 Meko Dr	Calaveras County
Ebbetts Pass Fire Protection District	1028 Manuel Rd	Arnold
Ebbetts Pass Fire Protection District	2038 Moran Rd	Arnold
Ebbetts Pass Fire Protection District	40 Canyon View Dr.	Avery-Hathaway Pines
Murphys Fire Protection District	37 Jones St	Murphys-Douglas Flat
Murphys Fire Protection District	3408 Main St	Calaveras County
Angels City Fire Department	1404 Hwy 4	Angels Camp
West Point Fire and Rescue District	3910 N. Railroad Flat Rd	Calaveras County
Central Fire and Rescue District	15815 Hwy 26	Calaveras County
Mokelumne Hill Fire District	8295 N. Main St	Mokelumne Hill

<b>Facility</b>	<b>Address</b>	<b>Location</b>
Mokelumne Hill Fire District	8160 Church St	Mokelumne Hill
Central Fire and Rescue District	11309 Sheep Ranch Rd	Calaveras County
Central Fire and Rescue District	19927 Jesus Maria Rd.	Calaveras County
Central Fire and Rescue District	6338 Swiss Ranch Rd	Calaveras County
CDF Tcurpt 2	Riata Wy	Calaveras County
Stanislaus Nf Dorrington Fire	5200 Hwy 4	Calaveras County
Stanislaus Nf Calaveras District	5519 Hwy 4	Avery-Hathaway Pines
<b>Evacuation Sites</b>		
Chapel in the Pines	2286 Cedar Lane	Arnold
Hazel Fischer Elementary	1605 Blagen Rd	Arnold
Avery Middle School	4545 Moran Rd	Avery-Hathaway Pines
Independence Hall	1445 Blagen Road	Arnold
American Legion Hall	2769 Upper Dorrday Rd	Calaveras County
Community Town Hall	Main St.	Mokelumne Hill
Mokelumne Hill Elementary	8350 Hwy 26	Mokelumne Hill
Albert Michelson Elementary	196 Pennsylvania Gulch	Murphys-Douglas Flat
Masonic Temple	384 Church Street	Murphys-Douglas Flat
Rail Road Flat Community Hall	250 Rail Road Flat R	Calaveras County
Rail Road Flat Elementary	298 Rail Road Flat R	Calaveras County
S. A. Community Covenant Church	261 Treat St	San Andreas
San Andreas Elementary	255 Lewis Ave	San Andreas
Calaveras High School	350 High School Street	San Andreas
<b>Lift/Pump Stations</b>		
Middle Fork Pump Station		Calaveras County
Sheep Ranch Pump Station		Calaveras County
Six Mile Village Sewer Lift Station		Calaveras County
Vallecito Sewer Main Lift Station		Calaveras County
<b>Redwood Water Tanks</b>		
Redwood Tank		Calaveras County
Redwood Tank		Calaveras County
Redwood Tank		Avery-Hathaway Pines
Redwood Tank		Arnold
Redwood Tank		Calaveras County
<b>Water/Sewer Treatment Plants</b>		

Facility	Address	Location
4ab47		Calaveras County
4ab4a		Calaveras County
4ab4b		Calaveras County
4ab4c		Arnold
4ab4d		Arnold
4ab4e		Calaveras County
4ab4f		Calaveras County
4ab50		Avery-Hathaway Pines
4ab51		Calaveras County
4ab52		Arnold
4dfef		Calaveras County
4dff0		Murphys-Douglas Flat
4dff1		Murphys-Douglas Flat
4dff2		Calaveras County
<b>Medical Facilities</b>		
Angels Camp Family Medical	445 South Main Street	Angels Camp
Arnold Family Medical Center	2037 Hwy 4	Arnold
<b>Sheriff's Offices</b>		
Arnold Substation	2182 Hwy 4	Arnold

Source: Calaveras County; HAZUS-MH-MR3

### ***Future Development***

Growth continues to occur in wildland-urban interface areas in Calaveras County, increasing the vulnerability of people, property, and infrastructure to wildfires. Policies addressing wildfire mitigation for future development in wildfire hazard areas can be found in the Calaveras County Comprehensive Plan, as well as the community plans.

### **Winter Storm**

***Planning Significance: Moderate***

#### ***Potential Impact on Existing Development***

Overall vulnerability to winter storms relative to other hazards is considered **moderate**, with moderate potential impact to the general population and/or built environment and moderate exposure of assets. Winter storms typically involve snow and ice, occasionally accompanied by high winds, which can cause downed trees and power lines, power outages, accidents, and road closures. Transportation networks, communications, and utilities infrastructure are the most vulnerable physical assets in the planning area.

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During heavy snow and ice events, the threat to public safety is typically the greatest concern. Lower income and elderly populations may be more at risk in cases of power outages during winter storms. These storms also impact the local economy by disrupting transportation and commercial activities. Travelers on highways in Calaveras County, particularly along remote stretches of road, can become stranded, requiring search and rescue assistance and shelter provisions. Agriculture and livestock are also vulnerable to extreme cold temperatures and heavy snow.

### ***Future Development***

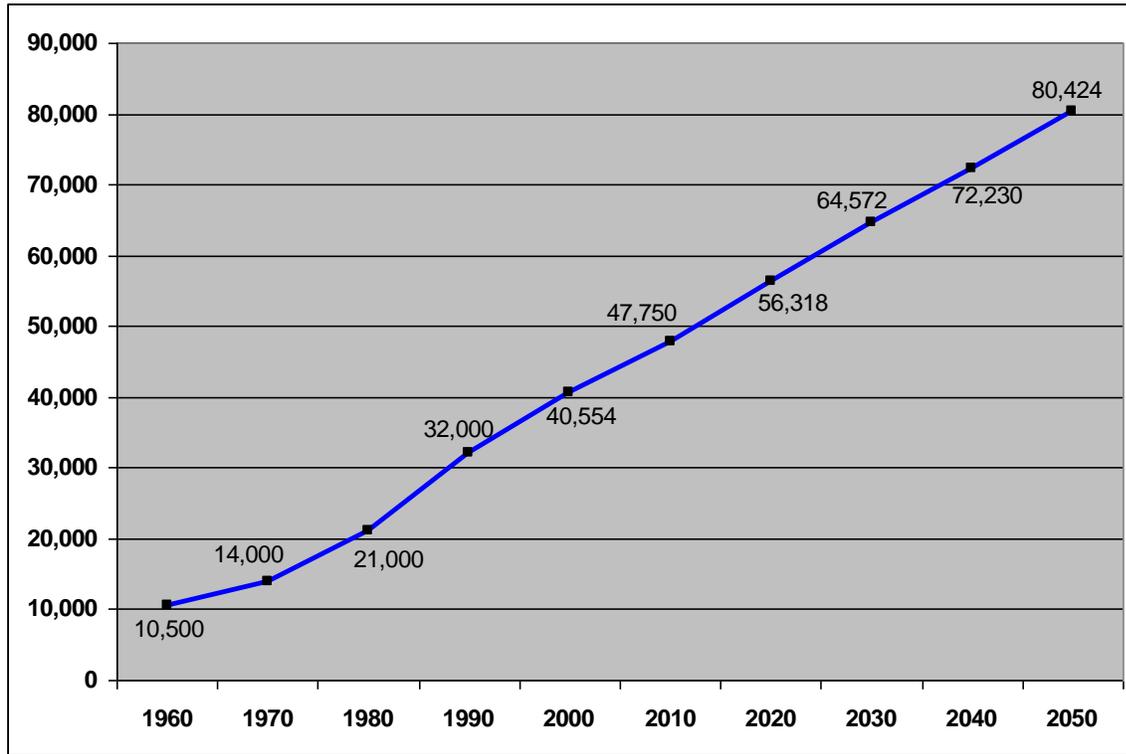
Future residential or commercial buildings built to code should be able to withstand snow loads from severe winter storms. Population growth in the County will increase problems with road, business, and school closures and increase need for snow removal and emergency services related to severe winter weather events.

## **3.3.3 Land Use and Development Trends**

### **Population**

Based on projections from the California Department of Finance (DOF), the steady population growth that Calaveras County has experienced over the previous four decades is expected to continue. From 2000-2004, 87.7 percent of this population growth was inflow from other parts of California: 23 percent was from San Joaquin County. Figure 3.20 represents past and future population trends based on projections from the DOF.

**Figure 3.18 Calaveras County Historic Population and Future Growth Projections**



Source: Calaveras County (historic); California Department of Finance, [www.dof.ca.gov/html/DEMOGRAP/](http://www.dof.ca.gov/html/DEMOGRAP/)

### Housing/Land Use

The rate of increase in number of households is outpacing overall population growth, indicating a trend toward fewer persons per household. For the period 2000-2007, the planning area added 5,474 people and 3,178 individual households, an average of 1.7 persons per new residential unit. The average household size for these newly added residential units is significantly lower than the county’s average household size in 2000 (2.44 persons).

The number of individual households added represents approximately a 20 percent overall increase in the number of households in the county over the 2000-2007 period based on a 2.6 percent average annual growth rate. The most common type of growth occurring in Calaveras County is rural residential (low density development), which typically involves single family dwellings on 5-20 acre land parcels. As of 2007, 28.8 percent of the total land area was designated for future low density residential land uses in the county’s general plan. But, to date, only 2.3 percent of the total land area is currently developed for residential use. This proportion indicates that a significant amount of future development may be oriented toward residential uses. Also, the DOF projects that the largest increases in percentage of overall employment will come from the construction sector, which is typically tied to strong housing markets. Tables 3.42 and 3.43 below describe current land uses by type and designated use by general plan category.

**Table 3.42 Calaveras County Existing Land Use (2007)**

Property Use	Parcels	Acres	Percent of Total Area (%)
Very Low Residential	1,784	11,531	1.7
Low Density Residential	5,318	3,380	0.5
Medium Density Residential	39	214	0.0
High Density Residential	185	182	0.0
<b>Residential Subtotal</b>	<b>7,326</b>	<b>15,307</b>	<b>2.3</b>
Commercial/Mixed Use	1,766	7,803	1.2
Industrial	53	1,351	0.2
<b>Commercial/Industrial Subtotal</b>	<b>1,819</b>	<b>9,154</b>	<b>1.4</b>
Public	996	140,861	21.3
Quasi Public	38	487	0.1
Unimproved Private Land	24,231	436,478	65.9
Unclassified	8,099	60,504	9.1
<b>Other Subtotal</b>	<b>33,364</b>	<b>638,330</b>	<b>96.3</b>
<b>Total</b>	<b>42,509</b>	<b>662,791</b>	<b>100.0</b>

Source: Calaveras County Public Review Draft Baseline Report (2008),  
<http://ccwstor.co.calaveras.ca.us/>

**Table 3.43 Calaveras County Land Use Designations**

Land Use Designation	Acres	Percent of Total Area (%)
Community Plan Area/Special Plan Area	47,645	7.2
Specific Plan Area	4,134	0.6
Community Center	11,032	1.7
Residential Center	24,341	3.7
Residential Center 2	3,353	0.5
Future Single Family Residential (5 acre minimum lot size)	179,405	27.1
Future Single Family Residential (20 acre minimum lot size)	11,160	1.7
City of Angels Sphere of Influence	9,107	1.4
<b>Community Development Lands Subtotal</b>	<b>290,176</b>	<b>43.8</b>
Agricultural Preserve	116,414	17.6
Timberlands/Mineral Resource 2A/Dam Inundation	146,209	22.1
Mineral Resource Area 2B	20,782	3.1
Wildlife Habitat/Botanical Areas	80,118	12.1
Lake	9,091	1.4
<b>Natural Resource Land Subtotal</b>	<b>372,615</b>	<b>56.2</b>
<b>Totals</b>	<b>662,791</b>	<b>100.0</b>

Source: Calaveras County Public Review Draft Baseline Report (2008), <http://ccwstor.co.calaveras.ca.us/>

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## Future and Proposed Development

Significant water treatment and supply infrastructure expansions are noted in the Calaveras County Water District Hazard Mitigation Plan for the areas of Copper Cove, Jenny Lind, and Ebbetts Pass. Other proposed development projects on file with the county planning department as of May 2008 include a 27-acre mixed-use development in Copperopolis (Copper Mill), a 59-acre 117 unit subdivision (Sanguinetti Estates), a 155-acre 124 unit subdivision (Wallace Lake Estates II), and a golf course on 280 acres (Ridge at Trinitas).

Development trends and expected growth areas with noted significant hazard issues include the following:

- Valley Springs (development in floodplains)
- Copperopolis (general growth)
- Murphys (creek overflows, wildfire)
- Mt. Vernon/Sequoia Woods (creek overflows, wildfire)
- Lynn Park Acres/Mokelumme Hill (creek overflows, wildfire)

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## 3.4 Mitigation Capabilities Assessment

The purpose of this section is to identify and assess the regulatory mechanisms currently in place that support the mitigation goals for Calaveras County. This assessment of mitigation capabilities, when weighed against the probability of occurrence and severity of hazards in the planning area, creates a fairly accurate picture of overall risk and vulnerability.

The mitigation capabilities assessment begins with an overall summary of existing codes, plans, draft reports, etc. to give an overall summary of the current policies with the capacity to be integrated into the natural hazards mitigation strategies. This overview is then followed by a more detailed outline of mitigation and enforcement capabilities as these are structured in their source planning documents. Following this, administrative, technical and financial resources and capabilities are outlined.

### 3.4.1 Regulatory Capabilities

The following table summarizes the status of existing regulatory constructs for the planning area and points out their location and status in the adopted policy for the County.

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**Table 3.44 Calaveras County Regulatory Mitigation Capabilities Summary**

Regulatory Tool (ordinances, codes, plans)	Y/N	Comments
General plan	Y	Original 1996; Update of plan in progress (5-2008)
Zoning ordinance	Y	Title 17 Calaveras County Code

<b>Regulatory Tool (ordinances, codes, plans)</b>	<b>Y/N</b>	<b>Comments</b>
Subdivision ordinance	Y	Title 16 Calaveras County Code
Site plan review requirements?	Y	
Growth management ordinance	N	Managed under General Plan
Floodplain ordinance	Y	Title 15 Calaveras County Code (Buildings and Construction) Chapter 15.06 FLOOD DAMAGE PREVENTION
Other special purpose ordinance (e.g., stormwater, steep slope, wildfire)	Y	Calaveras County Stormwater Management Plan (under development)
Building code	Y	2001 California Building Code
Fire Protection District ISO rating	Y	Angels Camp Fire- ISO 5
		Alt/Mel FPD- ISO 5,8
		Central FPD- ISO 8
		Copper FPD- ISO 7,8,9
		Ebbetts Pass FPD- ISO 4, 8
		Foothill FPD- ISO 8
		Jenny Lind FPD- ISO 6, 9
		Mokelumme Hill FPD
		Murphys FPD- ISO 5, 8
		San Andreas FPD- ISO 5, 8
		West Point FPD- ISO 5, 8
Erosion or sediment control program	Y	Calaveras County Stormwater Management Plan (under development)
Stormwater management program	Y	Calaveras County Stormwater Management Plan (under development)
Capital improvements plan	Y	
Economic development plan	N	
Local emergency operations plan	Y	Calaveras County Emergency Operations Plan (2006)
Other special plans	Y	Title 8 County Code (Health and Safety) –Chapter 8.08 Hazardous Fire Areas
Flood insurance study or other engineering study for streams	Y	Flood Insurance Study (FIS) dated September 5, 1990
Elevation certificates	Y	County Building Department
Community Wildfire Protection Plan (CWPP)	Y	Tuolumne-Calaveras County Pre-Fire Management Plan

Source: HMPC

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## Codes, Ordinances, Policies and Plans

The following adopted plans, codes, ordinances and policies include regulatory capabilities that either generally or specifically addresses hazard mitigation.

### ***Calaveras County General Plan, 1996***

The Calaveras County General Plan is a document that provides guidance and a vision for the future development of the planning area on the most general scale and over the long term. It is intended to be used by decision makers to coordinate land use and infrastructure decisions. The Plan contains seven elements: Land Use, Circulation, Housing, Conservation, Open Space, Noise and Safety.

With regard to hazard mitigation, the Safety Element, in accordance with the State General Plan Guidelines, includes maps of known hazard areas. It addresses the following potential hazards: ground failure and other geologic hazards; seismic activity; fire; flooding; hazardous materials; and airport operations. The General Plan makes recommendations in the form of general goals, more specific policies, and detailed implementation measures. Outlined below are the implementation measures from the Safety Element recommendations that relate to hazard mitigation, organized by hazard type:

### **Seismic/Geologic Hazards**

- **Implementation Measure VII-1A-1:** Future single-family residential subdivisions having parcel sizes of less than 20 acres shall not be permitted in areas of 50 percent or greater slope. Large developments may contain areas with 50 percent slopes, provided the areas have the appropriate density zoning designation.
- **Implementation Measure VII-1A-2:** Amend the Zoning and Subdivision Ordinances to include procedures for reviewing slope stability.
- **Implementation Measure VII-1B-1:** Incorporate conditions into building permits that will prevent or minimize damage to structures to be located in areas of potential slope instability.
- **Implementation Measure VII-1B-2:** Enforce the Uniform Building Code regarding seismic safety and slope stability.
- **Implementation Measure VII-1C-1:** Require site-specific safety studies of all proposed dams and other major facilities.

### **Fire Hazards**

- **Implementation Measure VII-2A-1:** Protect structures from wildland fires by requiring minimum fire breaks around all structures as part of final building inspection.
- **Implementation Measure VII-2A-2:** Work with state and federal agencies for joint enforcement of adopted wildland prevention codes.
- **Implementation Measure VII-2B-1:** Encourage new development to attain the following ISO ratings:

**Table 3.45. Recommended ISO Ratings, Calaveras County General Plan, 1996**

Land Use and Parcel Size	Fire Protection Level
Single Family Residential parcel size <20 acres	ISO 8
Single Family Residential parcel size 20+ acres	ISO 9
Multiple Family Residential	ISO 7
Commercial Development and Recreation-oriented Commercial Development	ISO 7
Industrial Development	

Source: Calaveras County General Plan; Chapter VII. Safety Element, General Plan Recommendations

- **Implementation Measure VII-2B-2:** Require adequate access for emergency fire equipment to new development by applying standards contained in the County Road Ordinance.
- **Implementation Measure VII-2B-3:** Update the County Fire Ordinance addressing model fire codes, ISO ratings, and other fire safety regulations.
- **Implementation Measure VII-2B-4:** Apply the Fire and Life Safety Regulations of the County Code to all new construction.
- **Implementation Measure VII-3A-1:** Support the tanker truck system to serve areas without district water systems.
- **Implementation Measure VII-3A-2:** Create and adopt a fire protection master plan, and implement its recommendations.
- **Implementation Measure VII-3B-1:** Investigate the use of fees to assist in the financing of fire protection facilities and services.
- **Implementation Measure VII-3B-2:** Investigate and pursue additional funding mechanisms available to fund County fire protection.

### Flood Hazards

- **Implementation Measure VII-4A-1:** Require that any 100 year flood plains be shown on all building plot plans.
- **Implementation Measure VII-4A-2:** Require that all future buildings within slow surface drainage areas be placed above such areas or on properly designed foundation systems.
- **Implementation Measure VII-4A-3:** Enforce the Uniform Building Code regarding flood protection.
- **Implementation Measure VII-4B-1:** Utilize the Environmental Protection combining zone to regulate areas subject to inundation and other flood hazards.
- **Implementation Measure VII-4B-2:** Allow density transfer to areas of a site not located within inundation areas.

- 
- **Implementation Measure VII-4B-3:** When reviewing project proposals, precise delineation of the inundation areas of the dam sites will be accepted as the limiting boundary for the subdivision without requiring a General Plan Amendment, when substantial credible evidence is submitted as to the delineation of the inundation area.

### **Hazardous Materials**

- **Implementation Measure VII-5A-1:** Require compliance with federal, state and local safety provisions in the use of hazardous materials in the County.
- **Implementation Measure VII-5B-1:** Enforce all statutes and regulations governing surface mining and reclamation.
- **Implementation Measure VII-5C-1:** Identify known hazardous waste disposal sites and potentially hazardous or toxic mine waste disposal sites and deny development of residential and commercial uses near those sites.
- **Implementation Measure VII-6A-1:** Assign responsibility to a person or persons within local government for coordination of all emergency and disaster situations.

### **Calaveras County Code**

The Calaveras County Code serves as the specific legal framework for the planning area. Enforcement authority is established for the various ordinances contained within. The ordinances are organized under 17 primary titles and various chapters and subsections.

Outlined and discussed below are the Calaveras County Code ordinances related to hazard mitigation:

#### **Title 2 Administration and Personnel; Chapter 2.72 Disaster Council**

This chapter establishes a County Disaster Council, which has three primary purposes. The first is to provide for the preparation and carrying out of plans that will protect County residents and property in the event of an emergency. The second function of the Disaster Council is to provide direction for the County's emergency organization. The third purpose is to coordinate the emergency functions of the county with all other public agencies, corporations, organizations, and affected private persons. The ordinance establishes the authority of the Disaster Council director and assistant director, and the responsibility of the Council for the development of the County emergency plan.

#### **Title 8 Health and Safety; Chapter 8.08 Hazardous Fire Areas**

The intent of this chapter is to provide some of the necessary safeguards to prevent the occurrence of fires which might be caused by recreational, residential, commercial, industrial or other activities conducted in any hazardous fire area. The unrestricted use of grass, grain, brush or forest-covered land in hazardous fire areas is a potential menace to life and property from fire and resulting erosion.

This code ordinance establishes a definition for ‘Hazardous fire area’ and the requirement that a map of hazardous fire areas shall be maintained by the county fire warden. The county fire warden has the authority under this code to restrict entry into properties deemed unsafe due to wildfire hazard. Smoking prohibitions, open flame device restrictions, outdoor fires, disposal of ashes, illegal use of fire roads or firebreaks, and use of motor vehicles in hazardous fire areas are all regulated under this county code section and penalties for violations are also established.

**Title 15 Buildings and Construction; Chapter 15.04 Uniform Codes**

This code is applied as the exclusive source of regulations for all new construction and any alterations, repairs, relocations, or reconstruction of any building or any portion of any building within the jurisdictional purview of the County. It dictates that in the event that the building code conflicts with a law or regulation of the state of California, whichever requirement establishes the higher standard of safety shall govern.

This code chapter includes findings relating to potentially hazardous conditions endemic to the planning area, including considerations for snow load (winter storms), seismic activity (earthquake), liquefaction (land subsidence/earthquake), slope instability (landslide), expansive soils and flood hazards.

**Title 15 Buildings and Construction; Chapter 15.05.090 Engineered Grading**

This code chapter outlines the allowable grading activities in the County. Through this chapter, the code sets forth the regulatory authority to mitigate potential hazards including landslide, erosion, rockfall, and flooding; as indicated in the following table which outlines the code structure.

**Table 3.46 Chapter 15.05.090 Engineered Grading, Stipulations and Conditions**

Stipulation	Condition
A. A nonexempt grading project is subject to the requirements specified in the manual for “engineered grading” if it includes any of the following:	1. Grading in excess of one thousand cubic yards; 2. Finished grades that are steeper than two units horizontal for one unit vertical; 3. Fill of greater than five feet in height on natural ground with a slope greater than three units horizontal for one unit vertical; 4. Cut or fills of more than ten feet; 5. Earthwork within the public right-of-way; 6. Grading for construction of a public or private road; 7. Fills that are intended to support structures for which a building permit is required; 8. Extensive storm drain collection system with inlet structures; or 9. Earthwork within a flood plain as shown on the most recent FEMA flood plan maps.
B. Engineered grading requirements shall also apply	1. Endanger public health, safety or welfare;

Stipulation	Condition
if the proposed work, as determined by the director, has the potential to:	2. Obstruct or alter any water course or adversely impact existing drainage facilities;
	3. Threaten the stability of a public or private road or adjacent structures or property;
	4. Exacerbate existing downstream flood conditions; or
	5. Degrade receiving water without implementation of engineered controls.
C. For engineered grading projects, a professional engineer shall be responsible for project design and shall provide all required professional services as described in the manual including the preparation of a construction quality assurance plan and, upon work completion, certification that all work has been done in substantial conformance to the approved engineered grading plan and all associated grading permit requirements.	

Source: Calaveras County Code, Title 15 Buildings and Construction; Chapter 15.05.090 Engineered Grading; (Ord. 2929 § 1(part), 2007)

### Title 15 Buildings and Construction; Chapter 15.06 Flood Damage Prevention

The purpose of this chapter is to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed to:

- Protect human life and health;
- Minimize expenditure of public money for costly flood control projects;
- Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- Minimize prolonged business interruptions;
- Minimize damage to public facilities and utilities such as water and gas mains; electric, telephone and sewer lines; and streets and bridges located in areas of special flood hazard;
- Help maintain a stable tax base by providing for the sound use and development of areas of special flood hazard so as to minimize future blighted areas caused by flood damage;
- Ensure that potential buyers are notified that property is in an area of special flood hazard; and
- Ensure that those who occupy the areas of special flood hazard assume responsibility for their actions. (Ord. 2294 (part), 1992).

Methods for reducing flood losses under this chapter include the requirement that land uses that are vulnerable to floods must be protected against flood damage at the time of initial construction, to avoid the need to retrofit substandard construction in the future and to control filling, grading, dredging and other development that may increase flood damage elsewhere. The chapter provides definitions and describes the basis for establishing areas of special flood hazard (those identified by FEMA on a Flood Insurance Study or Flood Insurance Rate Maps. Duties and responsibilities of the floodplain administrator and standards for construction of structures,

utilities, subdivisions and manufactured homes are detailed. Special rules regarding floodways are also outlined that prohibit most uncertified encroachments.

**Calaveras County Stormwater Management Plan (Draft)**

This general purpose of this plan is to provide the framework for development and implementation of various storm water management activities necessary to control the discharge of pollutants into local storm drain systems. Certain components of this plan support hazard mitigation, specifically landslide/erosion and flooding.

From Appendix C. Summary of Minimum Control Measures, Table 4 (Construction Site Storm Water Runoff Control) and Table 5 (Post-Construction Storm Water Management in New Developments and Redevelopment) contain the following activities that support erosion prevention and mitigation.

**Table 3.47 Hazard Mitigation Related Minimum Control Measures; Construction Site Storm Water Runoff Control**

MCM #	Activity / BMP	Targeted Outcome	Responsible Entity	Date
4.3	Assemble/Review Existing Information about Grading, Erosion, and Sediment Control Ordinances	Information to enable the County to draw on the experiences and resources of USEPA, other local jurisdictions, watershed groups, etc.	Public Works	2007
4.6	Finalize Grading, Erosion, and Sediment Control Ordinance and Develop Implementation Procedures	Final grading, erosion, and sediment control ordinance ready for consideration by the County Board of Supervisors, including noticed public hearing	Public Works, Community Development	2007

Source: Calaveras County Stormwater Management Plan (Draft); Appendix C. Minimum Control Measures, Table 4

**Table 3.48 Hazard Mitigation Related Minimum Control Measures; Post-Construction Storm Water Management in New Developments and Redevelopment**

MCM #	Activity / BMP	Targeted Outcome	Responsible Entity	Date
5.4	Protect Slopes and Channels from Erosion	Require developers to install and maintain slope protection as required in the local Grading Ordinance and maximize use of natural drainage channels	Public Works, Community Development	2008

Source: Calaveras County Stormwater Management Plan (Draft); Appendix C. Minimum Control Measures, Table 5

In Appendix F: Land Use and Development Guidelines, the following design standard supports erosion mitigation:

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## **Protect Slopes and Channels**

Project plans must include BMPs consistent with local codes, ordinances, or other regulatory mechanism and the Design Standards to decrease the potential of slopes and/or channels from eroding and impacting storm water runoff:

- 1) Convey runoff safely from the tops of slopes and stabilize disturbed slopes.
- 2) Utilize natural drainage systems to the maximum extent practicable.
- 3) Stabilize permanent channel crossings.
- 4) Vegetate slopes with native or drought tolerant vegetation, as appropriate.
- 5) Install energy dissipaters, such as riprap, at the outlets of new storm drains, culverts, conduits, or channels that enter unlined channels in accordance with applicable specifications to minimize erosion, with the approval of all agencies with jurisdiction, e.g., the U.S. Army Corps of Engineers and the California Department of Fish and Game.

Also in Appendix F, there is a provision applicable to individual project categories regarding parking lot design supports flood mitigation indirectly with the requirement to reduce impervious land coverage of parking areas.

## **Parking Lots**

### **Properly Design Parking Area**

Parking lots contain pollutants such as heavy metals, oil and grease, and polycyclic aromatic hydrocarbons that are deposited on parking lot surfaces by motor-vehicles. These pollutants are directly transported to surface waters. To minimize the offsite transport of pollutants, the following design criteria are required:

- Reduce impervious land coverage of parking areas.
- Infiltrate or treat runoff

## ***Calaveras County Community Plans***

The Calaveras County General Plan encourages local areas within the County to develop special community plans which reflect more specific policies and direction based upon local values and goals. The policies contained within these plans address issues either not addressed by the General Plan or special issues of local concern. Communities in Calaveras County have developed the following locally specific community development plans:

- Arnold Community Plan, 1998
- Avery/Hathaway Pines Community Plan, 1998
- Copperopolis Community Plan
- Mokelumne Hill Community Plan, 1988
- Murphys-Douglas Flat Community Plan, 1998

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- San Andreas Community Plan, 1988
  - Valley Springs Community Plan, 1994

The following outline describes policies and implementation measures that support hazard mitigation either generally or specifically, organized by community plan. Certain community plans did not include policies or implementation measures that directly supported hazard mitigation.

### **Arnold Community Plan, 1998; Safety Element, Community Plan Recommendations**

- **Implementation Measure 18A-1:** Encourage property owners to comply with the current Ebbetts Pass Fire Ordinance calling for fuel reduction on unimproved parcels within and adjacent to subdivisions.
- **Implementation Measure 18A-2:** Encourage all homeowners to comply with the California Department of Forestry and the Public Resources Code 4291 calling for the clearance of flammable vegetation from within 30 feet of structures. (It is also noted, that the CDF may require more than 30 feet of clearance for some structures depending on their location, i.e. % of slope, type of construction, etc.)
- **Implementation Measure 18B-1:** Encourage county government and/or private enterprise to develop a policy regarding the disposal of yard debris to support local fire ordinances.
- **Implementation Measure 18B-2:** Encourage existing homeowners to widen narrow driveway openings for easier emergency access and accomplish sufficient fuel reduction along driveways for the safe ingress/egress of fire apparatus.
- **Implementation Measure 18B-3:** Encourage the development of secondary egress routes throughout the area, particularly in those areas that have only one existing ingress/egress route or have substandard ingress/egress routes in place.
- **Implementation Measure 18B-4:** Encourage all existing and future subdivisions/developments to incorporate any current EPFD Fire Ordinance and Public Resources Code 4291, pertaining to fuel management, within their CC&R's.
- **Implementation Measure 18B-5:** Support the County Office of Emergency Services regarding the Emergency/Disaster Evacuation Plan for the area. Also, encourage individual Homeowners Associations/Subdivisions to plan, create and make known to their property owners, an evacuation plan from within their respective areas to Hwy4.
- **Implementation Measure 18B-6:** Encourage the County Public Works Department and/or Homeowners Associations to plan for and accomplish fuel reduction efforts adjacent to roadways throughout the area.
- **Implementation Measure 18B-7:** Encourage property owners to comply with recommendations of the California Department of Forestry on measures to reduce wildland fuel loading when asked for special clearance in certain areas, i.e., fuel breaks around the Arnold community.
- **Implementation Measure 18B-8:** EPFD shall work with the water service agencies to develop specific proposals to upgrade the water delivery systems.

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- **Implementation Measure 19A-1:** All future development and buildings shall comply with the requirements of the current Ebbetts Pass Fire Ordinance and the County Fire and Life Safety Ordinance. The most stringent code and/or ordinance shall take precedence.
  - **Implementation Measure 19A-2:** New subdivisions shall provide fuel breaks to help protect structures in the event of wildland fire.

### **Avery/Hathaway Pines Community Plan, 1998; Safety Element, Community Plan Recommendations**

- **Implementation Measure 11A-1:** The County shall cooperate with the efforts of the responsible wildland fire agency conducting prescribed burns for fire hazard reduction within the community plan or outlying areas.
- **Implementation Measure 11A-2:** Encourage the development of additional fire defense systems such as fuel breaks and wildland fuel modification zones near the community.
- **Implementation Measure 11A-3:** Support strategic measures for wildland fire protection including but not limited to fuel breaks, fuel modification and prescribed burning.
- **Implementation Measure 11B-1:** Utilize the provisions of the County General Plan and improvement standards of the Fire and Life Safety Ordinance and the current Ebbetts Pass Fire District Ordinance to set County requirements for all development, including but not limited to Tentative Parcel Maps, Tentative Subdivision Tract Maps, Conditional Use Permits, and Planned Development Permits reviewed by the Planning Commission in addition to Building Permits reviewed by the Development Review Committee.
- **Implementation Measure 11B-2:** Divisions of land of five parcels or more shall require a Wildland Fire Vulnerability Analysis (refer to text and charts beginning page 39) be completed by the applicant. Should a given project area have an analysis indicating a Very High or High wildland fire vulnerability rating, a Fire Management Plan shall be required in accordance with the Fire and Life Safety Ordinance. In addition, the Fire Management Plan must address planned fuel modification and design, and the relationship of improvements to the non-modified wildland area.
- **Implementation Measure 11B-3:** Notify the Ebbetts Pass Fire District and California Department of Forestry of all proposed development in the community plan area and incorporate their comments into the project conditions of development.
- **Implementation Measure 11BA:** Review proposed residential development adjacent to Forest Service lands for an appropriate open space buffer or alternate mitigation measures.
- **Policy 11C:** Review development proposals for any unreasonable risks associated with seismic and other geologic hazards, flooding, hazardous materials and general public protection.

### **Mokelumne Community Plan, 1998; Safety Element, Community Plan Policies**

- **Policy:** To insure that all new developments incorporate sufficient fire protection measures.

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- **Policy:** Development of residential, commercial or industrial structures will not be permitted in areas prone to seismic rupture.
  - **Policy:** To permit development only where the geology and soil of an area will permit the intended development.

### **San Andreas Community Plan, 1998; Hazards Goals and Policies**

- **Map:** Flood Potential Map
- **Map:** Fire Hazard Map
- **Goal:** To protect the community from hazards
- **Policy:** New Construction and land development will not be located in flood prone areas unless adequate measures are taken to eliminate the potential flood hazard.
- **Policy:** When hazardous areas are identified, measures shall be taken to protect public safety, adjacent lands and buildings already constructed.
- **Policy:** Design of land uses shall provide proper fire suppression measures.
- **Policy:** Cuts and fills shall be kept to a minimum, and, where employed, current technological soil stabilization methods as established by the Uniform Building Code and/or the Soil Conservation Service, will be used.

### **Calaveras County Emergency Operations Plan (EOP)**

The Calaveras County Emergency Operations Plan (EOP) is an operational plan that addresses the planned response to extraordinary emergency situations associated with natural disasters, technological incidents, and national security emergencies in or affecting the County of Calaveras. The plan has three main functions. One, to establish the emergency management organization required to mitigate any significant emergency or disaster affecting Calaveras County. Two, to identify the policies, responsibilities, and procedures required to protect the health and safety of Calaveras County communities, public and private property and the environmental effects of natural and technological emergencies and disasters. Three, the EOP establishes the operational concepts and procedures associated with Initial Response Operations (field response) to emergencies, the Extended Response Operations (County Emergency Operation Center (EOC) activities and the recovery process.

As an operational plan, the EOP sets forth detailed emergency response procedures to the following identified hazards and threats:

- Earthquakes
- Floods
- Dam Failure
- Wildland Fires
- Landslides
- Extreme Weather Emergencies
- Hazardous Materials

- Transportation Emergencies
- Civil Disturbance
- Terrorism

### 3.4.2 Administrative Capabilities

**Table 3.49 Calaveras County Administrative Personnel**

Personnel Resources	Y/N	Department	Comments
Planner / Engineer	Y	Planning	7 members
Engineer / infrastructure	Y	Planning	1 contract emp, others non-engineer
Scientist - hazards	?	Planning	7 members
GIS Personnel	Y	Tech Svcs	
Full time Bldg Official	Y	Building	1
Floodplain Mgr		Planning	1 - not titled
Emergency Manager	Y	OES	
Grant Writer	N		
GIS Personnel - Hazard	Y	Planning	
GIS Personnel - Critical Facilities	Y	Planning	
GIS Personnel - Bldg Footprints	N	Not in planning yet	
GIS Personnel - Land Use	Y		
GIS Personnel - Linked - Assessor	Y		

Source: Calaveras County

### 3.4.3 Technical Capabilities

The technical capabilities for Calaveras County include a reverse 911 system administered by the Technical Services Division, an Emergency Alert System administered by California Office of Emergency Services (OES), and highway warning signs administered by the California Department of Transportation (Cal-Trans).

### 3.4.4 Financial Resources/Capabilities

**Table 3.50 Calaveras County Fiscal Resources Summary**

Financial Resources	Accessible	Department	Comments
C.D.B.G.	--	Planning Dept.	Eligible but not available except by application
Capital Improvements funding	Y	Planning Dept.	New soon - Public Facilities Fee (CAO)
Auth to levy taxes	N	N	
Fees - Water, elec, sewer	N	PGE, Private companies	
Impact fees - new develop	Y	Planning Dept	
Incur debt general bonds	Y		(Jail etc.)

Financial Resources	Accessible	Department	Comments
Incur debt special bonds	Y		
Incur debt private	N		
Withhold spending hazard areas	Y		

Source: Calaveras County

### 3.5 Risk Assessment Summary

The Calaveras County Risk Assessment revealed a number of problem areas to be addressed in the mitigation strategy. These key findings are summarized in the following list:

- Past major disaster declarations have been for flood, wildfire, and drought
- Eighty-five percent of the acreage in the planning area are in high or very high wildfire hazard areas
- Over 15,000 improved parcels and \$2.2 billion in improved values are located in very high wildfire hazard areas
- Of the community planning areas, the highest number of structures and values in very high wildfire hazard areas are in Arnold
- Multiple critical facilities are located in very high wildfire hazard areas, including schools, medical centers, water/wastewater facilities, fire and police, and evacuation sites
- Approximately \$94 million in improved property value is located in special flood hazard areas. The community planning area with the most value at risk is Murphys-Douglas Flat (\$3 million)
- Facilities identified in floodplain include a water treatment facility, Sheriff's substation, evacuation site, and scour critical bridge
- Four repetitive loss properties account for \$497,413 of \$748,269 in paid losses in the National Flood Insurance Program
- Multi-year droughts are likely to increase in the future, and vulnerability to drought will increase with population growth and development
- Over 2 percent of the planning area has soils classified as highly susceptible to erosion and landslide
- The social vulnerability analysis indicates that relative to California and the United States, Calaveras County is slightly more vulnerable in the factors of age and disability.
- Vulnerability to hazard events is greater during tourist seasons



# 4 MITIGATION STRATEGY

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

This section presents the mitigation strategy developed by the Hazard Mitigation Planning Committee (HMPC) based on the risk assessment. The mitigation strategy was developed through a collaborative group process and consists of goals, objectives, and mitigation actions. The HMPC used the following definitions, which are based upon those found in FEMA publication 386-3, *Developing the Mitigation Plan* (2002):

- **Goals** are general guidelines that explain what you want to achieve. Goals are defined before considering how to accomplish them so that they are not dependent on the means of achievement. They are usually long-term, broad, policy-type statements.
- **Objectives** define strategies or implementation steps to attain the identified goals and are specific and measurable.
- **Mitigation Actions** are specific actions that help achieve goals and objectives.

## 4.1 Goals and Objectives

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The HMPC developed goals and objectives to provide direction for reducing hazard-related losses in Calaveras County. These were based upon the results of the risk assessment and a review of goals and objectives from other state and local plans, specifically, the California State Multi-Hazard Mitigation Plan, 2007, the Calaveras County General Plan, 1996, the Tuolumne-Calaveras Unit County Pre-Fire Management Plan, 2005, and the Calaveras County Water District Multi-Hazard Mitigation Plan, 2007. This review was to ensure that this plan's mitigation strategy was integrated with existing plans and policies.

Through a brainstorming process at their third meeting, the HMPC identified a variety of possible goals and then came to a consensus on four main ones. Following the development of goals, the HMPC identified specific objectives to achieve each goal. Goals and objectives are listed below, but are not prioritized:

### **Goal 1: Reduce risk to the people, property, economy, and environment in Calaveras County from the impacts of natural hazards**

- Maintain flood protection program to 100-year level of protection
- Identify significant environmental features to protect
- Maintain channels and levees
- Provide additional services to special needs populations

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## **Goal 2: Reduce the vulnerability of future development to natural hazards**

- Enforce appropriate building standards in accordance with existing codes, including floodplain ordinances

## **Goal 3: Improve education and awareness of hazards and risk**

- Educate public, property owners, and officials about flood hazards
- Educate property owners about defensible space
- Increase risk awareness of public, governments, and businesses

## **Goal 4: Enhance partnerships for communication and coordination in the region**

- Improve partnerships and communication with school districts and crisis response/emergency responders
- Improve coordination between Calaveras County and Angels Camp
- Provide cross-training between jurisdictions to improve capabilities

## **Goal 5: Implement identified mitigation activities**

- Assign Calaveras County Multi-Agency Committee (MAC) Group responsibility as an ongoing advisory group to address mitigation issues
- Integrate mitigation activities into existing and new community plans and policies

### **4.1.1 Continued Compliance with the NFIP**

In addition to the goals and objectives identified for this plan, as part of its mitigation strategy, Calaveras County places an emphasis on continued compliance with the NFIP. Calaveras County has participated in the regular phase of the NFIP since 1990. Since then, the County has administered floodplain management regulations that meet the minimum requirements of the NFIP. Specific activities that the City will undertake to ensure continued compliance include the following:

- Work with FEMA and the State in the map modernizations program and adopt new DFIRMs when effective
- Evaluate the current status of the County's floodplain management program and identify areas for improvement
- Evaluate participation in the Community Rating System and identify opportunities to obtain points, such as through this planning process
- Evaluate the DWR flood awareness maps for the planning area and identify floodplain management activities to best manage existing and future development in flood-prone areas

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## 4.2 Identification and Analysis of Mitigation Actions

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**44 CFR 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.**

To identify and analyze potential mitigation actions to achieve the mitigation goals, the HMPC discussed the key issues that emerged in the Risk Assessment Summary in Section 3.4. Each hazard identified in Section 3.1 was evaluated. Only those hazards with planning significance rating of moderate or high were determined to be a priority hazard and were considered further in the development of hazard-specific mitigation measures. The following are Calaveras County's priority hazards:

- Dam Failure
- Drought
- Extreme Heat
- Flood
- Winter Storm
- Wildfire

The HMPC eliminated other hazards from further consideration in the development of mitigation actions because the risk of a hazard event in the County is unlikely, the vulnerability of the County to the hazard is low, or capabilities are already in place to mitigate its negative impacts. It is important to note that several of the final mitigation actions are multi-hazard actions designed to reduce potential losses from all types of hazard events.

To identify and analyze potential mitigation actions to achieve the mitigation goals, AMEC provided the HMPC with a packet of materials at its third meeting with information on types of mitigation actions, key issues from Chapter 3 Risk Assessment, and a worksheet of the plan's goals and objectives.

The group discussed different types of mitigation actions. They were provided with the following list of categories of mitigation actions, which originated from the National Flood Insurance Program's Community Rating System, as well as definitions and examples for each category:

- **Prevention:** Administrative or regulatory actions or processes that influence the way land and buildings are developed and built.
- **Property protection:** Actions that involve the modification of existing buildings or structures to protect them from a hazard or remove them from the hazard area.
- **Structural:** Actions that involve the construction of structures to reduce the impact of a hazard.

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- **Natural resource protection:** Actions that, in addition to minimizing hazard losses, also preserve or restore the functions of natural systems.
  - **Emergency services:** Actions that protect people and property during and immediately after a disaster or hazard event.
  - **Public education and awareness:** Actions to inform and educate citizens, elected officials, and property owners about the hazards and potential ways to mitigate them.

Next, the HMPC discussed the key issues for each priority hazard that emerged from the Risk Assessment. To facilitate the brainstorming process, the HMPC used a worksheet with the plan's previously identified goals and objectives. For each of the five goals, each HMPC member identified at least three mitigation actions that would work toward achieving the mitigation goals. Each action was written on one index card, posted on the wall of the meeting room, and organized by the goal it represents.

Next, the HMPC re-sorted these index cards by the six priority hazards and a multi-hazard category. They discussed a list of potential mitigation alternatives for each of these hazards, which had been prepared by AMEC. This list is included in Appendix C. Based upon the key issues identified in the risk assessment, including the existing capabilities of jurisdictions, and the overall political, technical, and financial feasibility of the potential actions, the HMPC came to consensus on mitigation actions for each hazard. New actions were written on index cards and added to those already on the wall organized by hazard. Certain hazards were best addressed through multi-hazard actions.

### 4.3 Implementation of Mitigation Actions

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**44 CFR Requirement §201.6(c)(3)(ii): The mitigation strategy shall include an action strategy describing how the actions identified in paragraph (c)(2)(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 benefits review of the proposed projects and their associated costs.**

To prioritize the mitigation actions, the HMPC discussed the STAPLEE prioritization criteria recommended by FEMA. STAPLEE is a tool used to assess the costs and benefits and overall feasibility of mitigation actions. STAPLEE stands for the following:

- **Social:** Will the action be acceptable to the community? Could it have an unfair effect on a particular segment of the population?
- **Technical:** Is the action technically feasible? Are there secondary impacts? Does it offer a long-term solution?
- **Administrative:** Are there adequate staffing, funding, and maintenance capabilities to implement the project?
- **Political:** Will there be adequate political and public support for the project?
- **Legal:** Does the jurisdiction have the legal authority to implement the action?

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- **Economic:** Is the action cost-beneficial? Is there funding available? Will the action contribute to the local economy?
  - **Environmental:** Will there be negative environmental consequences from the action? Does it comply with environmental regulations? Is it consistent with community environmental goals?

At its third meeting, the HMPC used STAPLEE to determine which of the identified actions were most likely to be implemented and effective. Each member used STAPLEE to identify his or her top four mitigation actions and then voted for these actions by sticking a colored dot on the index card on which the action was written. The number of dots next to each action was totaled. See Appendix C for the votes given to each identified mitigation action.

This process of identification and analysis of mitigation alternatives allowed the HMPC to come to consensus and to prioritize recommended mitigation actions. Emphasis was placed on the importance of a benefit-cost analysis in determining project priority; however, this was not a quantitative analysis. The Disaster Mitigation Act regulations state that benefit-cost review is the primary method by which mitigation projects should be prioritized. Criteria used to assist in evaluating the benefit-cost of a mitigation action included:

- Does the action address hazards or areas with the highest risk?
- Does the action protect lives?
- Does the action protect infrastructure, community assets or critical facilities?
- Does the action meet multiple objectives (Multiple Objective Management)?
- What will the action cost?
- What is the timing of available funding?

Recognizing the federal regulatory requirement to prioritize by benefit-cost, and the need for any publicly funded project to be cost-effective, the HMPC decided to pursue implementation according to when and where damage occurs, available funding, political will, jurisdictional priority, and priorities identified in the California State Multi-Hazard Mitigation Plan. Cost-effectiveness will be considered in additional detail through a formal benefit cost analysis when seeking FEMA mitigation grant funding for eligible projects identified in this plan.

Appendix C, Table 1, contains a list of actions brainstormed during the mitigation action strategy meeting. Those actions identified during the meeting also include a score for the number of votes received during the prioritization process using the STAPLEE and benefit-cost criteria described above. Also included on this table are additional actions added by the HMPC that were identified after the meeting and initial prioritization took place. Thus, the actions on Table 1 include a complete list of all of the mitigation actions recommended by the HMPC for further consideration and development for inclusion in this LHMP. However, only a limited number of those actions identified in Table 1, Appendix C, made it into this mitigation action strategy as detailed in Table 4.1 of this Section. Although many good ideas were developed during the mitigation action brainstorming process, the reality of determining which priority actions to

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develop and include in this plan came down to actual priorities of individuals and departments based in part on department direction, staffing, and available funding. The value in Table 1, Appendix C remains in that it represents sound mitigation projects that can be consulted and included in this plan at a later date as priorities change during annual plan reviews and/or the formal 5-year update process.

The mitigation actions developed by the HMPC are summarized in Table 4.1. The HMPC came to consensus on which departments and persons are responsible for completing an implementation worksheet for the County for each identified mitigation action. The worksheets document background information, ideas for implementation, lead agency, partners, potential funding, cost estimates, benefits, and timeline for each identified action.

Table 4.1 and the mitigation action implementation worksheets that follow detail Calaveras County's action plan for achieving the goals and objectives of this LHMP. This table includes a range of mitigation actions designed to reduce the impacts of the priority hazards identified in this plan. There are actions to address loss reduction to existing buildings and infrastructure as well as actions for reducing losses to new development, buildings and infrastructure, per the requirements of DMA. While it is easy to see how these priority action items protect existing buildings and infrastructure, it takes more thought to see how these actions work towards reducing losses of future development.

For example, the loss reduction value to the existing built environment is readily apparent in both *Action #4 Implement Fuel Reduction Along County Right of Ways* and *Action #5 Identify Storm Water Flooding Projects*. But the value in loss reduction to the future built environment is also apparent upon further evaluation of these actions. With respect to the fuel reduction project, the project includes options for establishing regular maintenance of fire breaks along County right of ways. The benefits of establishing a regular/annual maintenance program will extend to both existing buildings and infrastructure as well as those built in the future. Likewise, identifying and implementing stormwater improvements clearly protects existing infrastructure, but also acts to prevent stormwater flooding in areas targeted for new development. In fact the implementation worksheet for this action identifies using the CAP Section 205 flood damage reduction study and resulting projects as part of this effort. Note that the study and potential projects are part of the **County's commitment to long term planning** for reducing flood damages in the planning area. Long term planning encompasses those areas yet to be developed.

Also in the spirit of long term planning, the general plans for both the County and the City of Angles Camp are documents that provide guidance and vision for the future development of the planning area, and as such, act as a blueprint to guide future development including new buildings and infrastructure. Mitigation Action #1 for the County and #1 for the City, *Integrate Local Hazard Mitigation Plan into Safety Element of General Plan*, are both designed to specifically address the future development of the communities and the Calaveras County planning area. Incorporating this LHMP into the general plan documents will provide the mechanism necessary to ensure natural hazards and associated risks and vulnerabilities are

addressed as the future build out of these communities are planned and executed. For example, the General Plan Safety Element implementation measures detailed in the capabilities section of this LHMP identify numerous policy level, growth constraints in identified hazard areas. Incorporating this LHMP into the general plans will assist the communities in meeting these hazard specific develop constraints for future development. Examples of these future development constraints that will be bolstered by the incorporation of this LHMP into the general plans include:

- **Seismic/Geologic Hazards**

- Future single-family residential subdivisions having parcel sizes of less than 20 acres shall not be permitted in areas of 50 percent or greater slope. Large developments may contain areas with 50 percent slopes, provided the areas have the appropriate density zoning designation.
- Incorporate conditions into building permits that will prevent or minimize damage to structures to be located in areas of potential slope instability
- Require site-specific safety studies of all proposed dams and other major facilities.

- **Fire Hazards**

- Protect structures from wildland fires by requiring minimum fire breaks around all structures as part of final building inspection.
- Work with state and federal agencies for joint enforcement of adopted wildland prevention codes.
- Encourage new development to attain the following ISO ratings:

Land Use and Parcel Size	Fire Protection Level
Single Family Residential parcel size <20 acres	ISO 8
Single Family Residential parcel size 20+ acres	ISO 9
Multiple Family Residential	ISO 7
Commercial Development and Recreation-oriented Commercial Development	ISO 7
Industrial Development	

Source: Calaveras County General Plan; Chapter VII. Safety Element, General Plan Recommendations

- **Flood Hazards**

- Require that any 100 year flood plains be shown on all building plot plans.
- Require that all future buildings within slow surface drainage areas be placed above such areas or on properly designed foundation systems.
- When reviewing project proposals, precise delineation of the inundation areas of the dam sites will be accepted as the limiting boundary for the subdivision without requiring a

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General Plan Amendment, when substantial credible evidence is submitted as to the delineation of the inundation area.

Table 4.1 summarizes all of the prioritized mitigation actions and indicates which jurisdictions plan to implement them; it also provides information on the hazards addressed. The mitigation action implementation worksheets for multi-jurisdictional actions and County actions follow the matrix. The implementation worksheets for Angels Camp are included in Annex A to the plan.

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**Table 4.1 Mitigation Action Matrix**

<b>Action</b>	<b>Jurisdiction</b>	<b>Priority</b>	<b>Hazards Addressed</b>
Integrate Local Hazard Mitigation Plan into Safety Element of General Plan*	Calaveras County OES	High	All
Develop and Conduct a Multi-Hazard Seasonal Public Awareness Program*	Calaveras County OES	High	All
Identify critical facilities/infrastructure needing backup power sources*	Calaveras County Public Works Department	Low	All
Improve channel maintenance and upkeep to prevent debris build-up at road bridges*	Calaveras County Public Works Department	High	Flood
Implement fuel reduction along County right of ways*	Calaveras County Public Works Department	Medium	Wildfire
Identify storm water flooding projects*	Calaveras County Public Works Department	Low	Flood
Integrate Local Hazard Mitigation Plan into Safety Element of General Plan*	City of Angels Camp	High	All

\*Indicates protection of both existing and new development, buildings, and infrastructure.

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## **1. Integrate Local Hazard Mitigation Plan into Safety Element of General Plan**

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**Issue/Background:** Local jurisdiction reimbursement for mitigation projects and cost recovery after a disaster is guided, in part, by AB 2140. Specifically, this bill requires that each jurisdiction adopt a local hazard mitigation plan (LHMP) in accordance with the federal Disaster Mitigation Act of 2000 as part of the safety element of its general plan. Adoption into the safety element of the general plan may be by reference or incorporation.

**Other Alternatives:** No action

**Responsible Office:** Calaveras County OES, Planning Departments for each incorporated jurisdiction

**Priority (High, Medium, Low):** High

**Cost Estimate:** Staff time

**Potential Funding:** County and jurisdictional budgets

**Benefits (avoided Losses):** Adoption and coordination of planning documents will help jurisdictions maximize potential for state reimbursement

**Schedule:** As soon as possible

## **2. Develop and Conduct a Multi-Hazard Seasonal Public Awareness Program**

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**Issue/Background:** Calaveras County is subject to several natural hazards. Each poses a different degree of risk and associated vulnerability. Some hazards have a combination of attributes, including a high likelihood of occurrence, a specific location that would likely be impacted, and proven approaches that could reduce the impact. For other hazards, where either the likelihood of occurrence is very low, the area of likely impact is not specifically known, or there is very little that can be done to reduce the impacts, the HMPC has determined that the best approach is public awareness. People should have information describing historical events and losses, the likelihood of future occurrences, the range of possible impacts, appropriate actions to save lives and minimize property damage, and where additional information can be found. Any information provided through this effort should be accurate, specific, timely, and consistent with current and accepted local emergency management procedures as promoted by the California Emergency Management Agency (CalEMA) and the American Red Cross. This public outreach effort should be conducted annually and should include:

- Using a variety of information outlets, including local news media;
- Creating and printing (where applicable) brochures, leaflets, water bill inserts, websites, and public service announcements;

- 
- Displaying current brochures and flyers in County and City office buildings, libraries, and other public places; and
  - Developing public-private partnerships and incentives to support public education activities.

**Other Alternatives:** Continue public information activities currently in place

**Responsible Office:** Calaveras County Office of Emergency Services, Planning Department, Calaveras County Public Information Office, Calaveras County Chamber of Commerce, American Red Cross, and Calaveras County Office of Economic Development.

**Priority (High, Medium, Low):** High

**Cost Estimate:** \$5,000-20,000 annually, depending on printing and mailing costs, level of volunteer participation, and scope and frequency of events

**Potential Funding:** FEMA's Hazard Mitigation Grant Program, Calaveras County funds, other available grants

**Benefits (Avoided Losses):** Life safety, reduction in property losses, relatively low cost

**Schedule:** Part of seasonal multi-hazard public awareness campaign

### ***3. Improve channel maintenance and upkeep to prevent debris build-up at road bridges***

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**Priority:** High

**Background/Issue:** Calaveras County Public Works department is not responsible for typical channel clearing. Most channels reside on non County property. The county only has the authority to clear 50' on either side of a bridge crossing.

**Ideas for Implementation:** Calaveras County Public Works department has in place a five year extendable to ten year Routine Maintenance Agreement with Department of Fish and Game which permit streambed vegetation removal within 50' of man made structures used as crossing. County would continue to use this process at bridge crossings for the purpose of vegetation and debris removal.

**Responsible Agency:** Bridge crossings on County Roads = Calaveras County Public Works

**Partners:** USFWS, USACE, CWRB, CFG

**Potential Funding:** Prop 1-B, Prop 42

**Cost Estimate:** Thirty-six bridges = \$87,000 if only cleaned once per year

**Benefits: (Losses Avoided)**

- Reliable water delivery down stream

- 
- Reduced risk of property damage
  - Protect public safety
  - Preserve community ingress and egress

**Timeline:** Each year prior to winter and spring rains

#### ***4. Implement fuel reduction along County right of ways***

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**Priority:** Medium

**Background/Issue:** Due to the density of the vegetation and the extreme hazard of fire ladder material which extends in many cases from the County right a ways into highly inhabited areas.

The fuel reduction project includes thinning and chipping areas along right a way of County property in and around the lower sub division, as well as thinning and clearing key transportation corridors in and around

Project work would involve thinning and chipping young trees and underbrush.

Fuel conditions (surface, ladder, and canopy) contribute to initiating or sustaining a crown fires.

The above actions require the involvement of all property owners as well as the County, State and Federal land managers.

**Ideas for Implementation:** Mitigation of fire risk involves further action that need to be addressed in the future. The actions identified in this list should be addressed in the next five years.

- Undertake fuel modification efforts along County right a ways and access roads to maximize effectiveness establishing and maintaining a cleared area the width of the road right-of-way along all common roads will provide safe ingress or egress for residents, visitors, and emergency personnel, as well as providing a fuel break.
- Removal of all encroaching shrubs and over hanging tree branches and maintaining a zero tolerance for vegetation growth during the growing season.
- If shrubs are to be retained as part of the landscape they should be isolated as individual plants or as small clumps.
- Remove all dead wood from both the mountain shrubs and trees that may be present to reduce their flammability. Dead woody material will be removed from County right a ways and properly disposed.
- All conifer trees should be pruned up to 1/3 rd of their height (i.e., remove ladder fuels 5-8 feet up from the ground). This should decrease the potential for surface fire to move into the tree crowns.
- Contract with CDF Crews for regular maintenance of fire break along County right of ways.
- Develop public programs that will reach the seasonal residents of the county subdivisions and parcel developers in order for a lot-by-lot fuel reduction program to be most effective.

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- Develop a schedule for vegetation clearing along County rights of ways to reduce fuel along roads each spring/summer.
  - Develop a plan for construction of fuel break along county/federal and state boundaries that will provide for lower fuel loadings in the grass and shrub stands.
  - Develop a fuel break maintenance schedule
  - Where desirable vegetation exists, it should be maintained through proper management practices

**Responsible Agency:** Calaveras County Public Works Department

**Partners:**

**Potential Funding:** Prop 42

**Cost Estimate:** Proposed work to be completed by CDF crews with minimum forced labor at an estimated cost of \$20,000

**Benefits (Losses Avoided):** Preservation of life and property

**Timeline:** Could be implemented within the next five years

## ***5. Identify storm water flooding projects***

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**Priority:** Low

**Background/Issue:** Flooding due to topography and soil saturation causes major threat to life and property. Flooding in 2006 resulted in community isolation for short periods of time. Most flooding is due to heavy rain fall resulting in soil saturation which leads to flash flooding

**Ideas for Implementation:** The Sacramento District, U.S. Army Corps of Engineers, Calaveras County and Calaveras County Water District have partnered, under CAP Section 205, to conduct a flood damage reduction study. This study and potential project is part of the County's ongoing commitment to long term planning to reduce flooding damages in the study area.

In addition, the County has in place its stormwater management plan which endeavors to contain work site runoff from entering local waterways.

**Responsible Agency:** Calaveras County Public Works

**Partners:** USACE, CCWD, RWCB

**Potential Funding:** Funding is through a USACE Grant with matching and in-kind funds

**Cost Estimate:** Staff time for identification of projects; \$15,000-\$20,000.

**Benefits (Losses Avoided):** Reduce flooding potential in northern Valley Springs area resulting in protection of life and property

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**Timeline:** Project completion over next five years

## ***6. Identify critical facilities/infrastructure needing backup power sources***

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**Priority:** Low

**Background/Issue:** Critical facilities provide public health and safety services for public and private physical assets throughout the planning area. As such, it is critical that their power sources remain uninterrupted, especially during critical response and recovery operations.

### **Ideas for Implementation:**

- Critical Facilities:
  - Facilities in which > 300 people congregate
  - Daycares, elementary schools and secondary schools with > 250 people
  - College and adult education facilities with > 50 people
  - Hospitals and Healthcare facilities with > 50 resident patients
  - Jails and detention facilities
  - Power, Wastewater and potable water treatment facilities
  - Fire, rescue and police facilities
  - Designated emergency shelters
  - Power generation and public utility facilities
  - Aviation facilities
  - Critical national defense facilities
  - Nursing and personal care facilities
  - Senior citizen assisted housing
  - Sites that produce, use or store hazardous substances or hazardous waste (not including sites that temporarily store household products intended of sale on the site)
- Critical infrastructure:
  - Energy and utilities (e.g. electrical power, natural gas and transmission systems)
  - Communications and information technology (e.g. telecommunications, broadcasting systems, software, hardware and networks including the Internet)
  - Finance (e.g. banking, securities and investment)
  - Health care (e.g. hospitals, health care and blood supply facilities, laboratories and pharmaceuticals)
  - Food (e.g. safety, distribution, agriculture and food industry)
  - Water (e.g. drinking water and wastewater facilities)
  - Safety (e.g. hazardous materials, search and rescue, emergency services and dams)
  - Government (e.g. services, information networks)
  - Manufacturing (e.g. industrial base, chemical industry)

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**Responsible Agency:** Calaveras County

**Partners:** PG&E, Caltel, CCWD, Wastewater treatment

**Potential Funding:** Local funding mechanisms.

**Cost Estimate:** Staff time, \$10,000-\$15,000.

**Benefits (Losses Avoided):**

- Protection of life and property
- Reliable communications

**Timeline:** Complete over next two years



# 5 PLAN IMPLEMENTATION AND MAINTENANCE

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This chapter provides an overview of the overall strategy for plan implementation and maintenance and outlines the method and schedule for monitoring, updating, and evaluating the plan. The chapter also discusses incorporating the plan into existing planning mechanisms and how to address continued public involvement.

## 5.1 Implementation

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Implementation and maintenance are critical to the mitigation plan's overall success. While this plan makes many important recommendations, the jurisdictions will need to decide which action(s) to undertake first. Two factors will help with making that decision: the priority assigned the actions in the planning process and funding availability. Low or no-cost actions most easily demonstrate progress toward successful plan implementation.

An important implementation mechanism that is highly effective and low-cost is incorporation of the hazard mitigation plan recommendations and their underlying principles into other plans and mechanisms, such as comprehensive planning, capital improvement budgeting, economic development goals and incentives, and other regional plans. Mitigation is most successful when it is incorporated in the day-to-day functions and priorities of government and in land use and development planning. This integration can be accomplished through identifying multi-objective, win-win programs and projects and through the routine actions of monitoring agendas, attending meetings, sending memos, and promoting safe, sustainable communities.

Simultaneous to these efforts, it is important to maintain a constant monitoring of funding opportunities that can be leveraged to implement some of the more costly recommended actions. This will include creating and maintaining a bank of ideas on how to meet local match or participation requirements. When funding does become available, the participating jurisdictions will be in a position to capitalize on the opportunity. Funding opportunities to be monitored include special pre- and post-disaster funds, special district budgeted funds, state and federal earmarked funds, and other grant programs, including those that can serve or support multi-objective applications. Additional mitigation strategies include consistent and ongoing enforcement of existing rules and regulations and vigilant review of countywide programs for opportunities for better coordination.

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## 5.2 Monitoring, Evaluating, and Updating the Plan

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**44 CFR Requirement 201.6(c)(4): 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.**

### 5.2.1 Multi-Agency Coordinating Group

With adoption of this plan, the Multi-Agency Coordinating (MAC) Group will be tasked with plan monitoring, evaluation, and maintenance. The MAC Group is an emergency management team composed of the major jurisdictional representatives in Calaveras County that are responsible for responding to and managing broad based emergency events. The participating jurisdictions and agencies, led by the Calaveras County Office of Emergency Services, agree to:

- Monitor and evaluate the implementation of the plan on an annual basis at a regularly scheduled meeting and after a disaster event;
- Act as a forum for hazard mitigation issues;
- Disseminate hazard mitigation ideas and activities to all participants;
- Pursue the implementation of high priority, low- or no-cost recommended actions;
- Maintain vigilant monitoring of multi-objective, cost-share, and other funding opportunities to help the community implement the plan's recommended actions for which no current funding exists;
- Monitor and assist in implementation and update of this plan;
- Keep the concept of mitigation in the forefront of community decision making by identifying plan recommendations when other community goals, plans, and activities overlap, influence, or directly affect increased community vulnerability to disasters;
- Report on plan progress and recommended changes to the Calaveras County Board of Supervisors and the Angels Camp City Council; and
- Inform and solicit input from the public.

The MAC is an advisory body and will not have any powers over County, City, Town, or District staff. Its primary duty is to see the plan successfully carried out and to report to the community governing boards and the public on the status of plan implementation and mitigation opportunities. Other duties include reviewing and promoting mitigation proposals, hearing stakeholder concerns about hazard mitigation, passing concerns on to appropriate entities, and posting relevant information on the County website.

The MAC agrees to meet annually to review the plan.

### 5.2.2 Plan Maintenance Schedule

The MAC Group agrees to meet annually and after a hazard event to monitor progress and update the mitigation strategy. The Calaveras County emergency manager is responsible for

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initiating these plan reviews. In conjunction with the other participating jurisdictions, a five-year written update of the plan will be submitted to the California Emergency Management Agency and FEMA Region IX, unless disaster or other circumstances (e.g., changing regulations) require a change to this schedule.

### **5.2.3 Plan Maintenance Process**

Evaluation of progress can be achieved by monitoring changes in vulnerabilities identified in the plan. Changes in vulnerability can be identified by noting:

- Decreased vulnerability as a result of implementing recommended actions,
- Increased vulnerability as a result of failed or ineffective mitigation actions, and/or
- Increased vulnerability as a result of new development (and/or annexation).

Updates to this plan will:

- Consider changes in vulnerability due to action implementation,
- Document success stories where mitigation efforts have proven effective,
- Document areas where mitigation actions were not effective,
- Document any new hazards that may arise or were previously overlooked,
- Incorporate new data or studies on hazards and risks,
- Incorporate new capabilities or changes in capabilities,
- Incorporate growth and development-related changes to inventories, and
- Incorporate new action recommendations or changes in action prioritization.

To best evaluate any changes in vulnerability as a result of plan implementation, the participating jurisdictions will follow the following process:

- A representative from the responsible office identified in each mitigation action will be responsible for tracking and reporting on an annual basis to the jurisdictional lead on action status and provide input on whether the action as implemented meets the defined objectives and is likely to be successful in reducing vulnerabilities.
- If the action does not meet identified objectives, the jurisdictional lead will determine what additional measures may be implemented, and an assigned individual will be responsible for defining action scope, implementing the action, monitoring success of the action, and making any required modifications to the plan.

Changes will be made to the plan to accommodate for actions that have failed or are not considered feasible after a review of their consistency with established criteria, timeframe, community priorities, and/or funding resources. Actions that were not ranked high but were identified as potential mitigation activities will be reviewed as well during the monitoring and update of this plan to determine feasibility of future implementation. Updating of the plan will be by written changes and submissions, as the Calaveras County Office of Emergency Services

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deems appropriate and necessary, and as approved by the Calaveras County Board of Supervisors and Angels Camp City Council.

## 5.3 Incorporation into Existing Planning Mechanisms

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**44 CFR 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.**

Local jurisdiction reimbursement for mitigation projects and cost recovery after a disaster is guided by Government Code Section 8685.9. Specifically, this section requires that the City must adopt a local hazard mitigation plan (LHMP) in accordance with the federal Disaster Mitigation Act of 2000 as part of the safety element of its general plan adopted pursuant to subdivision (g) of Section 65302. It is important to fold Calaveras County's LHMP annex into the safety element as part of the next general plan update.

Where possible, plan participants will use existing plans and/or programs to implement hazard mitigation actions. Based on the capability assessments of the participating jurisdictions, communities in Calaveras County continue to plan and implement programs to reduce losses to life and property from hazards. This plan builds upon the momentum developed through previous and related planning efforts and mitigation programs and recommends implementing actions, where possible, through the following plans:

- Calaveras County General Plan
- Calaveras County Emergency Operations Plan
- Calaveras-Tuolumne Unit Pre-Fire Management Plan
- General or master plans of participating jurisdictions
- Ordinances of participating jurisdictions
- Capital improvement plans and budgets
- Flood/Stormwater management/master plans
- Community Wildfire Protection Plans
- Drought Plans
- Other plans, regulations, and practices with a mitigation focus
- Other community plans within the County, such as water conservation plans, and parks and recreation plans

HMPC members involved in these other planning mechanisms will be responsible for intergrating the findings and recommendations of this plan with these other plans, programs, etc, as appropriate. Incorporation into existing planning mechanisms will be done through the routine actions of:

- Monitoring other planning/program agendas
- Attending other planning/program meetings

- 
- Participating in other planning processes
  - Monitoring community budget meetings for other community program opportunities

The successful implementation of this mitigation strategy will require constant and vigilant review of existing plans and programs for coordination and multi-objective opportunities that promote a safe, sustainable community.

Example of incorporation of the LHMP into existing planning mechanisms include:

1. As recommended by Assembly Bill 2140, each community should adopt (by reference or incorporation) this LHMP into the Safety Element of their General Plan(s). Evidence of such adoption (by formal, certified resolution) shall be provided to CalEMA and FEMA.
2. Implementation of flood project through the Calaveras County Stormwater Management Plan.

Continuous efforts should be made to monitor the progress of mitigation actions implemented through these other planning mechanisms and, where appropriate, their priority actions should be incorporated into updates of this hazard mitigation plan.

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## 5.4 Continued Public Involvement

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**44 CFR 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.**

The update process provides an opportunity to publicize success stories from the plan's implementation and seek additional public comment. Information will be posted in the *Calaveras Enterprise* and on the County website following the annual review of the mitigation plan. A public hearing(s) to receive public comment on plan maintenance and updating will be held during the update period. When the MAC reconvenes for the update, they will coordinate with all stakeholders participating in the planning process, including those who joined the HMPC after the initial effort, to update and revise the plan. Public notice will be posted and public participation will be invited, at a minimum, through available website postings and press releases to the local media outlets, primarily newspapers.

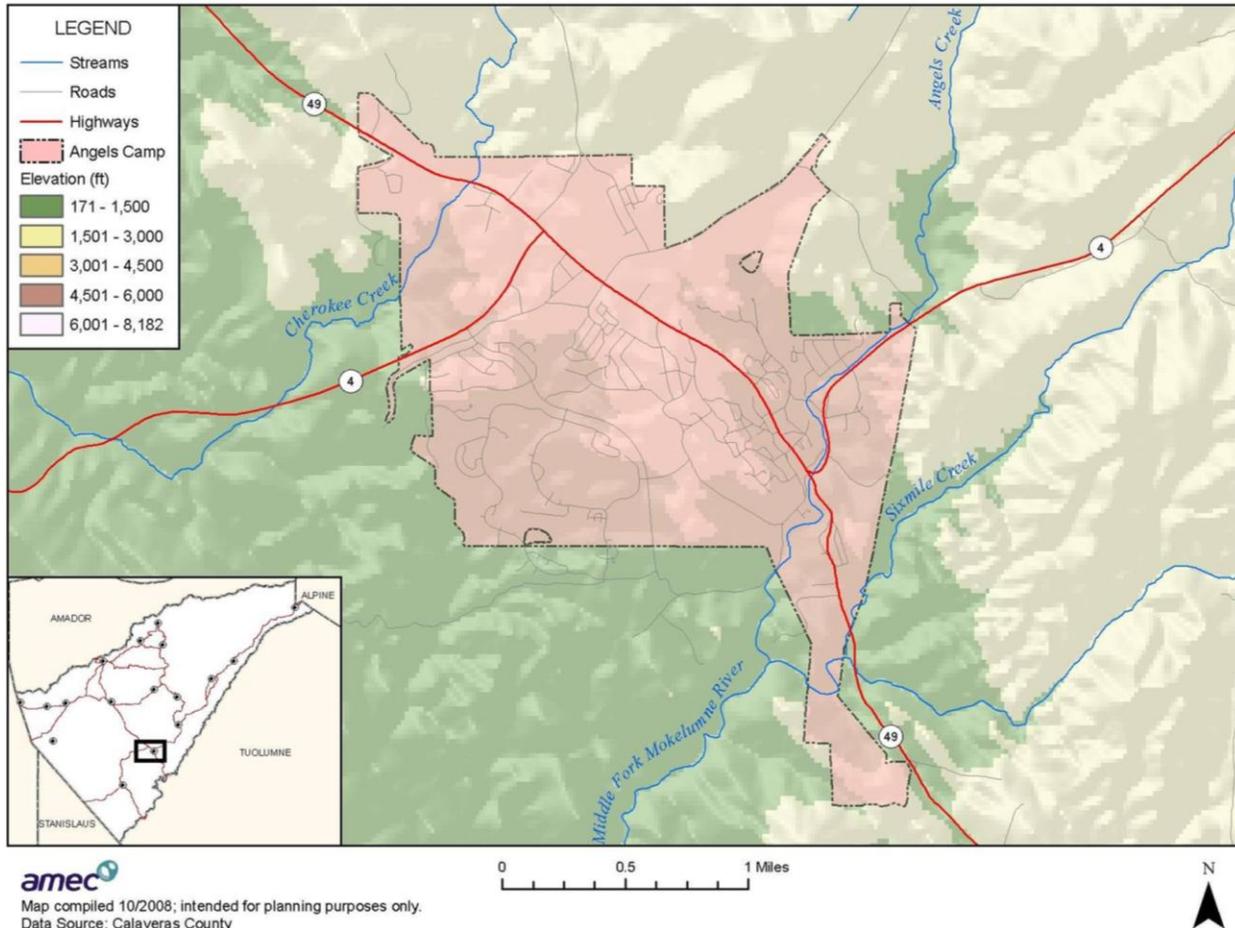
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## A.1 Community Profile

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Figure A.1 shows the City of Angels Camp and its location in Calaveras County.

**Figure A.1 Map of Angels Camp**

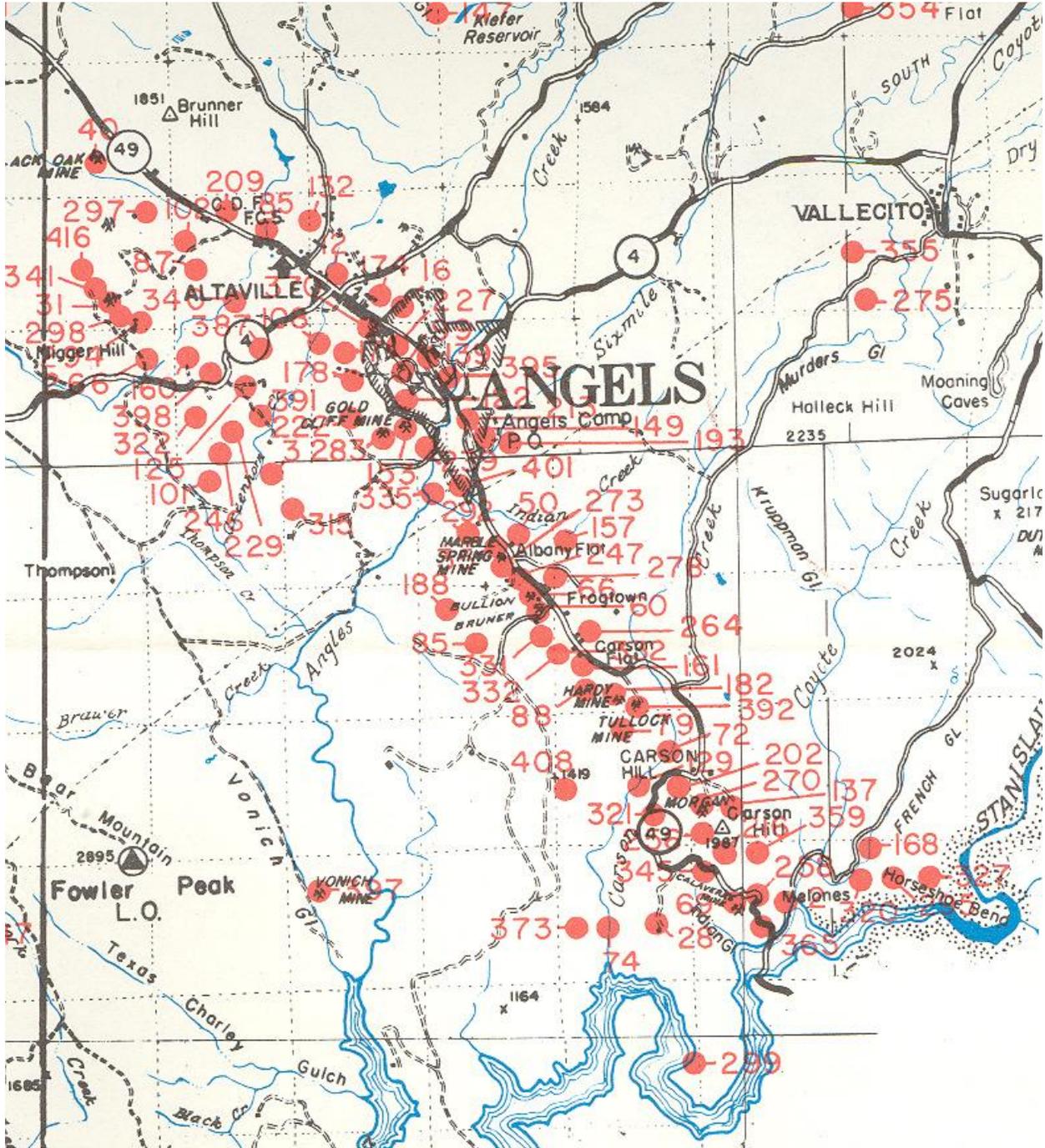


### Geography

Angels Camp is situated in the southern-central portion of Calaveras County at 1,379 feet above sea level. This location is generally on the eastern fringe of the San Joaquin Valley and in the western foothills of the Sierra Nevada Range, typically above the winter fog and extreme summer heat of the lower valley and below most of the snow of the high Sierras. Highway 49 is the main north-south arterial and Highway 4 is the main east-west arterial. Cherokee Creek crosses the northwestern section of the city. Angels Creek, Sixmile Creek and Indian Creek converge to form the Middle Fork Mokelumne River near the south end of town.

The area of Calaveras County that includes Angels Camp is noted for its mineral resources, including a history of gold mining and prospecting. Figure A.2 shows gold mines and prospects in the Angels Camp area circa 1962.

**Figure A.2 Gold Mines and Prospects within the Angels Camp Sphere of Influence, 1962**



Source: Angels Camp General Plan, Appendix 4 Conservation and Open Space; Mines & Mineral Resources of Calaveras County, CA County Report #2 – CA Division of Mines & Geology, 1962

A number of special status plant and animal species as defined by the U.S. Fish and Wildlife Service (USFW), California Department of Fish and Game (CDFG) and California Native Plant

Society (CNPS) occur in the Angels Camp geographic sphere of influence. Table A.1 lists these special status species.

**Table A.1. Special Status Plant and Animal Species Occurring or with the Potential to Occur Within the Angela Camp Sphere of Influence, 2006**

Common Name	Scientific Name	Status
<b>Invertebrates</b>		
Valley elderberry longhorn beetle	<i>Desmocerus californicus dimorphus</i>	FT
<b>Reptiles</b>		
Western pond turtle	<i>Clemmys marmorata</i>	SSC
<b>Amphibians</b>		
California tiger salamander	<i>Abystoma californiense</i>	FC, SSC
California red-legged frog	<i>Rana aurora draytonii</i>	FC, SSC
Foothill yellow-legged frog	<i>Rana boylei</i>	SSC
Western spadefoot	<i>Scaphiopus hammondi</i>	SSC
<b>Birds</b>		
Cooper's hawk	<i>Accipiter cooperi</i>	SSC
Sharp-shinned hawk	<i>Accipiter striatus</i>	SSC
Tricolored blackbird	<i>Agelaius tricolor</i>	SSC
Golden eagle	<i>Aquila chrysaetos</i>	SSC, BGEPA
Ferruginous hawk	<i>Buteo regalis</i>	SSC
Willow flycatcher, nesting	<i>Empidonax traillii extemis</i>	FE
White-tailed kite	<i>Elanus leucurus</i>	SA, FPS
Merlin	<i>Falco mexicanus</i>	SSC
Bald eagle – wintering	<i>Haliaeetus leucocephalus</i>	FT, BGEPA
Loggerhead shrike	<i>Lanius ludovicianus</i>	SSC
California horned lark	<i>Phrynosoma coronatum frontale</i>	SSC
Burrowing owl	<i>Speotyto cunicularia</i>	SSC
<b>Mammals</b>		
Pallid bat	<i>Antrozous pallidus</i>	SSC
Ringtail	<i>Bassaricus astutus</i>	FPS
Greater western mastiff bat	<i>Eumops perotis californicus</i>	SSC
Western red bat	<i>Lasiurus blossevilli</i>	SSC
Pale big-eared bat	<i>Plecotus townsendii pallescens</i>	SA
Pacific western big-eared bat	<i>Plecotus townsendii townsendii</i>	SA
<b>Plants</b>		
lone manzanita	<i>Arctostaphylos myrtifolia</i>	CNPS 1B, FT
Chinese Camp brodiaea	<i>Brodiaea pallida</i>	CNPS 1B, FT, SE
Hoover's calycadenia	<i>Calycadenia hooveri</i>	CNPS 1B
Mariposa cryptantha	<i>Cryptantha mariposae</i>	CNPS 1B

Common Name	Scientific Name	Status
Tuolumne button celery	Eryngium pinnatisectum	CNPS 1B
Parry's horkelia	Horkelia parryi	CNPS 1B
Veined water lichen	Hydrothyria venosa	USDA
Ahart's dwarf rush	Juncus leiospermus var. ahartii	CNPS 1B
Stebbin's lomatium	Lomatium stebbinsii	CNPS 1B
Pansy monkeyflower	Mimulus pulchellus	CNPS 1B
Whipple's monkeyflower	Mimulus whipplei	CNPS 1A
Tongue-leaf copper moss	Scopelophila cataractae	CNPS 2
<p>Status Key</p> <p>CNPS 1A California Native Plant Society, List 1A: Presumed extinct in California, but may occur or be re-discovered during the life of the plan.</p> <p>CNPS 1B California Native Plant Society List 1B: Plants rare, threatened or endangered in California or elsewhere</p> <p>CNPS 2 California Native Plant Society List 2: Plants rare, threatened or endangered in California, but more common elsewhere</p> <p>CNPS 3 California Native Plant Society List 3: More information needed</p> <p>FT: Federally listed, threatened (Federal Endangered Species Act)</p> <p>FE: Federally listed, endangered (Federal Endangered Species Act)</p> <p>FC: Federal candidate for listing (Federal Endangered Species Act)</p> <p>SE: State listed, endangered (California Endangered Species Act)</p> <p>SSC: Species of Special Concern (California Department of Fish and Game, CDFG)</p> <p>SA: California Natural Diversity Database Special Animal (California Department of Fish and Game, CDFG). May include animals considered endangered or rare pursuant to Section 15380(d) of the CEQA guidelines; animals that are biologically rare, very restricted in distribution or declining throughout their range; population(s) in California that may be peripheral to the major portion of the animal's range, but which are threatened with extirpation in California; and animals closely associated with habitat that is declining in California (e.g., wetlands, riparian, native grasslands); this category may apply to species at specific life stages (e.g., wintering, breeding, nesting).</p> <p>BGEPA Bald and Golden Eagle Protection Act (United States Code Sections 668-668d)</p> <p>FPS: Fully protected species, California Department of Fish and Game (California Fish and Game Code Section 4700 of Chapter 8; Section 5050 of Chapter 2, Division 6; and Chapter 1, Section 5515)</p> <p>USDA: United States Department of Agriculture, Forest Service, Sensitive Species</p>		

Source: Angels Camp General Plan, Appendix 4 Conservation and Open Space

Characteristics of the primary soils in the Angels Camp area are described in Table A.2. below.

**Table A.2. Drainage, Permeability and Erosion Potential of Soils in the Angels Camp Geographic Sphere of Influence**

Soil Name	Natural Drainage	Permeability	Erosion Hazard
Guenoc-Stonyford Association*	Good	Moderately slow	Slight-Moderate
Josephine-Mariposa Association*	Good	Moderately slow to slow	Slight to Moderate
Supan Association	Good	Moderately slow	Slight to Moderate
Forward-Rockland Association*	Good	Moderately rapid	Moderate
Auburn-Argonaut Association	Good to Moderate	Moderate to slow	Slight to Moderate
Perkins Acid Variant Association	Good	Moderately slow	Slight to Moderate
Mariposa/Josephine Association	Good	Moderate	Medium to Rapid
Whiterock/Auburn Association	Good	Moderate	Slight to Moderate

Source: Angels Camp General Plan, Appendix 4 Conservation and Open Space

Note: \* indicates primary soils occurring within Angels Camp city limits.

Angels Camp receives an average of 31.3 inches of precipitation per year, slightly less than the U.S. average of 36.6 inches. Based on long term annual trends there are 76 days per year with measurable precipitation and 222 sunny days per year. The July average high is 95.8°F, and the January average low is 38.3°F. Table 2.1 shows climate information for Angels Camp’s in comparison to national averages.

**Table A.3. Angels Camp—Annual Climate Averages**

Climate	Angels Camp	United States
Precipitation (Inches)	31.3	36.6
Precipitation Days	76	101
Sunny Days	255	205
Average July High	95.8	86.5
Average January Low	38.3	20.8
Elevation (Feet)	1,379	1,062

Sources: Sperlings, [http://www.bestplaces.net/city/Angels\\_City-California.aspx](http://www.bestplaces.net/city/Angels_City-California.aspx)

## Population

The California Department of Finance population estimate for Angels Camp in January 2008 is 3,593. Based on data from the 2000 Census, demographic and social characteristics for Angels Camp are compared to Calaveras County, California and the U.S. are shown in Table A.3.

**Table A.3. Angels Camp—Comparative Demographic and Social Characteristics, 2000**

Characteristic	Angels Camp	Calaveras County	California	U.S.
Population (2000)	3,004	40,554	33,871,648	281,421,906
Under 5 Years (%)	5.2	4.4	7.3	6.8
65 Years and Over (%)	18.2	18.2	10.6	12.4
Average Household Size	2.34	2.44	2.87	2.59
High School Graduate or Higher (%)	85.3	85.7	76.8	80.4
Bachelor Degree or Higher (%)	16.3	17.1	26.6	24.4

Source: U.S. Census Bureau, 2000, [www.census.gov/](http://www.census.gov/)

## History

The history of Angels Camp is similar to many of the towns formed in the mid-19<sup>th</sup> century during the California's Gold Rush. During the first few years, there were as many as 4,000 miners working the surface gold of Angels in the one mile area from Angels Creek to Utica Park. This source played out quickly, but as the legend goes, Bennegar Raspberry's fired his muzzle loader into the ground and split a stone to reveal gold inside, thus initiating the era of hard rock mining in Angels Camp.

The main quartz vein extended from southern Altaville to Angels Creek and all along Main Street of early Angels Camp. The estimated gross recovery of gold from the 5 primary mines from 1886 to 1910 was \$19,985,747...and Angels Creek ran chalky white from the mill wastes.

Mark Twain based his short story "The Celebrated Jumping Frog of Calaveras County" on a story he claimed he heard at the Angels Hotel. The event is commemorated to this day with a Jumping Frog Jubilee in May each year at the Calaveras County Fairgrounds, just east of Angels Camp.

## Economy

According to the 2000 U.S. Census, the industries that employed the highest percentages of Angels Camp's labor force were educational, health and social services (28.7 percent); retail trade (14.8 percent) and construction (9.8 percent). Economic characteristics for Angels Camp are shown in Table A.4. compared to Calaveras County, California and the U.S. overall.

**Table A.4. Angels Camp—Comparative Economic Characteristics**

Characteristic	Angels Camp	Calaveras County	California	U.S.
Families below Poverty Level, (%) 1999	10.0	8.7	10.6	9.2
Individuals below Poverty Level, (%) 1999	13.0	11.8	14.2	12.4
Median Home Value (\$)	146,400	156,900	211,500	119,600
Median Household Income, (\$) 1999	33,371	41,022	47,493	41,994
Per Capita Income, (\$) 1999	19,599	21,420	22,711	21,587
Population in Labor Force (%)	57.6	54.0	62.4	63.9

Source: U.S. Census Bureau (2000), [www.census.gov/](http://www.census.gov/)

## A.2 Hazard Identification and Profiles

The Angels Camp planning team identified the hazards that affect the community and summarized their geographic location, probability of future occurrence, potential magnitude or severity, and planning significance specific for the city (see Table A.5). In the context of the countywide planning area, there are no hazards that are unique to Angels Camp.

**Table A.5. Angels Camp—Hazard Summary**

Hazard Type	Geographic Extent*	Probability*	Magnitude*	Planning Significance
Dam and Levee Failure	N/A	Unlikely	Negligible	Low
Drought		Occasional	Limited	Low
Earthquake		Occasional	Critical	Moderate
Expansive Soils		Unlikely	Limited	Low
Extreme Heat		Occasional	Limited	Low

Hazard Type	Geographic Extent*	Probability*	Magnitude*	Planning Significance
Flood		Occasional	Limited	Low
Landslide/Erosion		Occasional	Limited	Low
Volcano	N/A	N/A	N/A	N/A
Severe Winter Weather		Unlikely	Limited	Low
Wildfire		Likely	Critical	Moderate
Windstorm		Likely	Critical	Moderate

\*See Section 3.2 for definitions of these factors

Information on past events for each hazard can be found in Section 3.2 Hazard Profiles of the main plan.

### A.3 Vulnerability Assessment

The intent of this section is to assess Angel Camp’s vulnerability as distinguished from that of the planning area as a whole, which has already been assessed in Section 3.3 Vulnerability Assessment. This vulnerability assessment analyzes the population, property, and other assets exposed to impact from hazards with moderate or high planning significance for the City of Angels Camp using the same approach and methodology established for the county as a whole in Chapter 3 Risk Assessment.

### Community Asset Inventory

Table A.6 details the number and assessed value of structures in by land use type in Angels Camp. Land values were purposely excluded from value estimates because land remains following disasters, and subsequent market devaluations are frequently short-term and difficult to quantify. Additionally, state and federal disaster assistance programs generally do not address loss of land or its associated value.

**Table A.6. Angels Camp—Building Exposure by Type**

Property Type	Structure Count	Structure Value
Agriculture-Ranch	9	\$1,667,862
Commercial	63	\$28,907,270
Exempt	16	\$17,160,488
Industrial	2	\$370,586
Other	753	\$90,824,707
Residential	691	\$168,824,490
Vacant	16	\$2,939,891
<b>Total</b>	<b>1,550</b>	<b>\$310,695,294</b>

Source: Calaveras County parcel data (structure number and value data)

Table A.7 lists critical facilities and other community assets identified by Angels Camp planning team as important to protect in the event of a disaster.

**Table A.7. Angels Camp—Critical Facilities**

<b>Name of Asset</b>	<b>Address</b>
<b>Medical Facilities</b>	
Angels Camp Family Medical	445 South Main Street
Stockton Cardiology Medical Group	1300 Kurt Drive
<b>Fire Stations</b>	
Altaville-FFS	125 N. Main Street
Fowler Peak-L.O.	Fowler Peak-L.O.
Angels City Fire Department Station	1404 Highway 4
Angels City Fire Department Station	200 Monte Verda Street
California Department of Forestry	Riata Way

Sources: City of Angels Camp; Calaveras County GIS

## **Vulnerability by Hazard**

This section analyzes existing and future structures and other assets at risk to hazards ranked of moderate or high significance that vary from the risks facing the entire planning area and estimates potential losses. These hazards include flood, and wildfire.

### **Flood**

Areas of potential flooding in Angels Camp include sections of Angels Creek through the center of town and to a lesser extent along sections of Sixmile Creek on the southern end of the city.

#### ***Existing Development***

Angel Camp’s current effective flood insurance rate map (FIRM) is from 1997. The city is participating with Calaveras County in the Federal Emergency Management Agency’s (FEMA) map modernization program to develop new digital flood insurance rate maps (DFIRMs). Flood vulnerability analysis for Angels Camp was based on the location of properties in relation to preliminary DFIRM floodplain. To be considered affected by a 100-year flood, the centroid or geographic center of the property falls within the area of inundation or 100-year floodplain. Table A.8. shows the type, number and value of properties affected by a 100-year flood in the City of Angels Camp.

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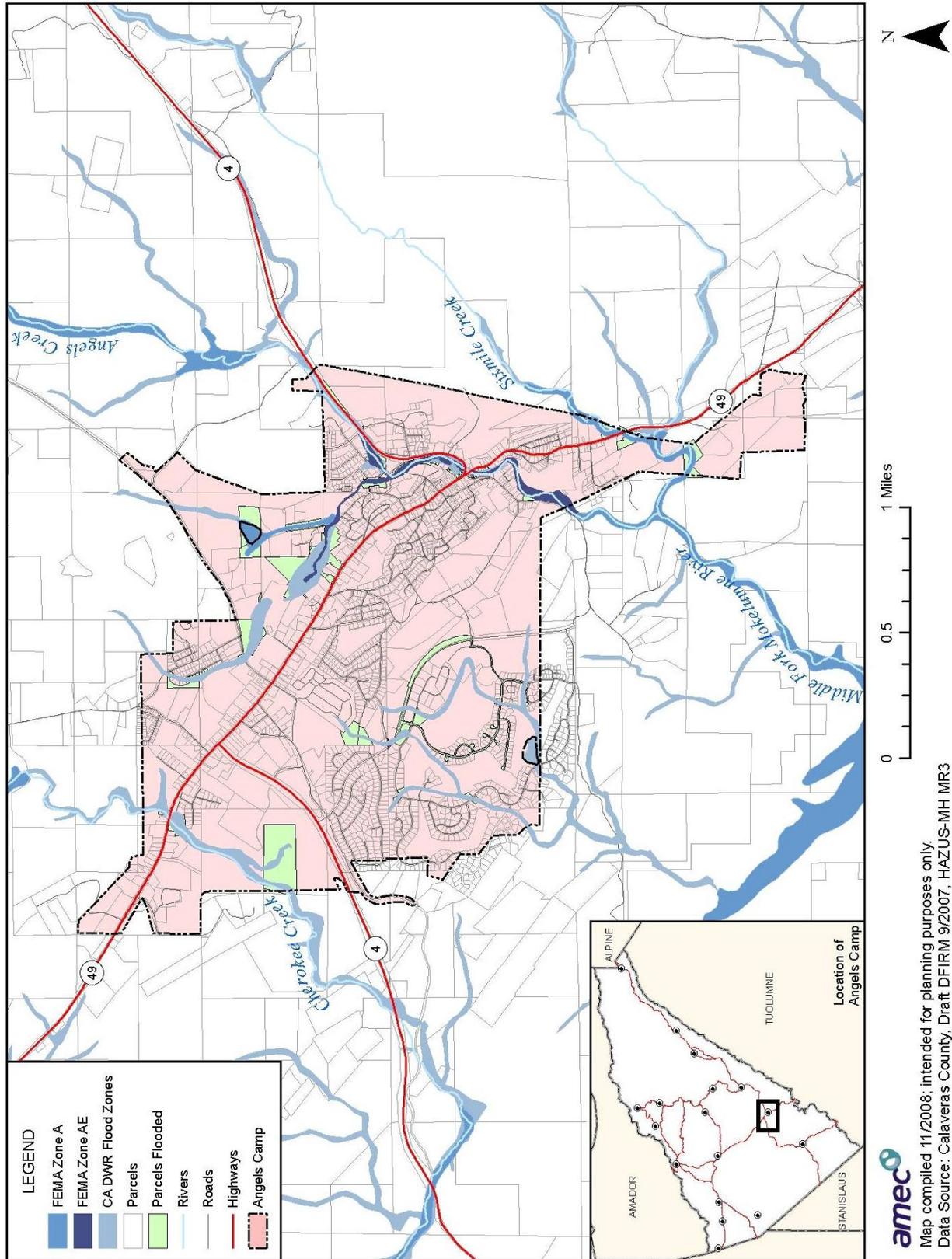
**Table A.8. Angels Camp: Type and Value of Properties Affected by 100-Year Flood**

<b>Property Type</b>	<b>Improved Parcels in the Floodplain</b>	<b>Improved Value</b>	<b>Estimated Contents Value</b>	<b>Total Value</b>	<b>Loss Estimate</b>
Agriculture-Ranch	1	\$152,000	\$76,000	\$228,000	\$45,600
Other	10	\$1,076,549	\$538,275	\$1,614,824	\$322,965
Residential	1	\$197,824	\$98,912	\$296,736	\$59,347
<b>Total</b>	<b>12</b>	<b>\$1,426,373</b>	<b>\$713,187</b>	<b>\$2,139,560</b>	<b>\$427,912</b>

Source: FEMA Preliminary DFIRM data (flood area), Calaveras County (property data)

Figure A.2 on the following page shows the relationship of city parcels and critical facilities to flood zone with 1.0 percent annual probability, or a 100-year flood, based on digital flood insurance rate map flood hydrology and mapping. This analysis indicates that one critical facility, an evacuation site at the junction of Highway 49 and Highway 4, is located in the identified floodplain in Angels Camp

Figure A.2. Angels Camp Preliminary DFIRM and DWR Flood



amec  
Map compiled 11/2008; intended for planning purposes only.  
Data Source: Calaveras County, Draft DFIRM 9/2007, HAZUS-MH MR3  
\*The Preliminary DFIRM Flood Data product is a digital representation of certain features of FEMA's FIRMs product.  
Intended for general planning purposes only.

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### **National Flood Insurance Program**

Based upon the 2000 FEMA Flood Insurance Study, development within the 100-year floodplain in Angels Camp is relatively limited. Angels Camp joined the National Flood Insurance Program (NFIP) on September 24, 1984. NFIP insurance data indicates that as of March 24, 2008, there were nine (9) flood insurance policies in force valued at \$2,634,100 of coverage. Eight (8) of the nine policies were residential (five for single-family homes, three for 2-4 family dwellings). Four of the policies were in A zones and five were in B, C, and X zones.

There have been three paid flood loss claims since Angels Camp joined the NFIP. The value of the paid claims totals \$13,701. There have been no repetitive losses or severe repetitive losses.

As of May 1, 2008 Angels Camp was not a participant in the Community Rating System (CRS).

### **Future Development**

The Town's flood damage prevention ordinance regulates development in special flood hazard areas. At this time there is no future development planned in special flood hazard areas.

### **Wildfire**

#### **Existing Development**

A wildfire hazard severity assessment was developed by the California Department of Forestry and Fire Protection, Fire and Resource Assessment Program for Calaveras County including Angels Camp. It classifies wildfire threat as moderate, high, or very high based on fuel hazards, risk of wildfire ignition, values at risk, and firefighting capability. Tables A.7. and A.8. below shows the type, number and value of properties in Angels Camp located in high fire severity or very high fire severity zones, respectively.

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**Table A.9. Angels Camp—Properties in High Fire Severity Zones**

<b>Property Type</b>	<b>Number of Structures</b>	<b>Improved Value</b>
Agriculture-Ranch	5	\$688,113
Commercial	21	\$11,750,799
Exempt	5	\$10,070,312
Industrial	1	\$197,880
Other	267	\$34,821,010
Residential	293	\$73,828,160
Vacant	8	\$1,221,899
<b>Total</b>	<b>600</b>	<b>\$132,578,173</b>

Source: CA-Department of Forestry; Calaveras County

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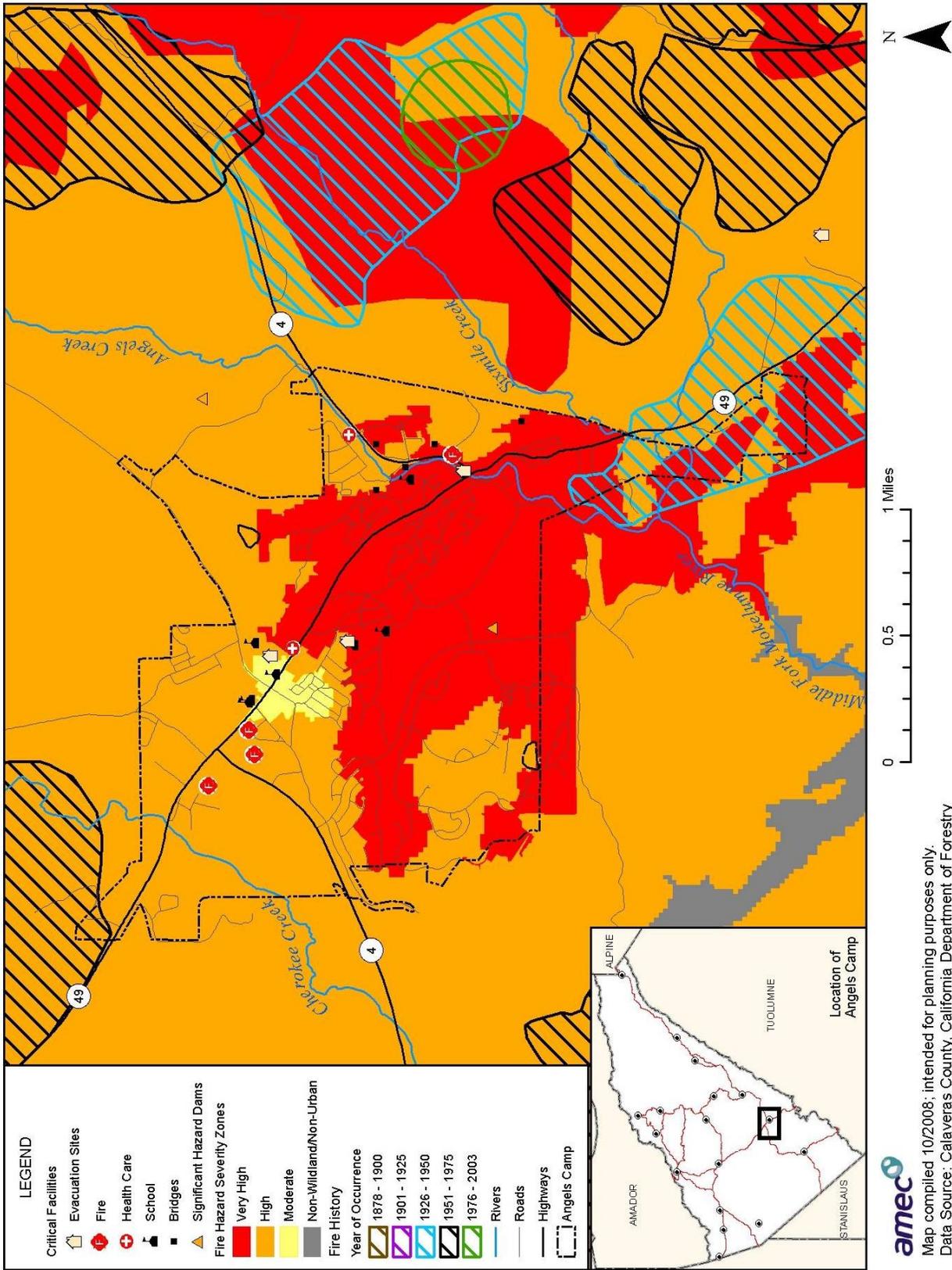
**Table A.10. Angels Camp—Properties in Very High Fire Severity Zones**

Property Type	Number of Structures	Improved Value
Agriculture-Ranch	4	\$979,749
Commercial	35	\$11,472,344
Exempt	11	\$7,090,176
Industrial	-	-
Other	475	\$53,336,230
Residential	394	\$94,674,938
Vacant	8	\$1,717,992
<b>Total</b>	<b>927</b>	<b>\$169,271,429</b>

Source: CA-Department of Forestry; Calaveras County

Based on this analysis, Angels Camp has a total of 1,527 structures (98.5 percent of the city total) located within High Fire Severity or Very High Fire Severity Zones. The total value of improvements within these two zones is over \$300 million, (97.2 percent of the total value of improvements for the city). 394 residences in Angels Camp valued at over \$94 million are located in Very High Fire Severity zones. Figure A.3 shows the location of previous wildfires, and fire severity ratings relative to the location of critical facilities in Angels Camp.

Figure A.3. Angels Camp Wildfire History, Fire Hazard Severity, and Critical Facilities



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### **Future Development**

Wildfire hazards, especially the wildland-urban interface, are becoming a larger issue in Angels Camp and the surrounding lands. A large percentage of the valley floor in the area that includes Angels Camp has been developed and residential subdivisions are now being built on the forested slopes that surround the city.

### **Growth and Development Trends**

The incorporated limits of Angels Camp are roughly 3 square miles (1,920 acres) in area, with a population density of 1,196 persons per square mile in 2007. Table A.8 below shows that since 1999, the city has experienced an increase in the pace of growth and development that is higher than the national average.

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**Table A.11. Angels Camp—Housing Units, Period of Construction**

<b>Period of Construction</b>	<b>Angels Camp, Percent of Housing Units (%)</b>	<b>U.S., Percent of Housing Units (%)</b>
1999 to October 2005	15.02	10.15
1995 to 1998	5.34	6.69
1990 to 1994	6.89	6.7
1980 to 1989	10.43	14.75
1970 to 1979	16.64	17.11
1960 to 1969	13.66	12.78
1950 to 1959	8.63	11.64
1940 to 1949	2.48	6.64
1939 or Earlier	20.92	13.55

Source: U.S. Census

Table A.9 illustrates growth and development trends for Angels Camp in terms of change in population and number of housing units from 2000 to 2008. Note the pace of housing unit increase is higher than the pace of population increase for the period measured.

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**Table A.12. Angels Camp—Change in Population and Housing Units, 2000-2008**

<b>2000 Population</b>	<b>2008 Population</b>	<b>Population % Change 2000-2008</b>	<b>Housing Units 2000</b>	<b>Housing Units 2008</b>	<b>Housing Unit % Change 2000-2008</b>
3,004	3,593	+19.6	1,442	1,812	+25.7

Source: U.S. Census 2000, California DOF, [http://www.dof.ca.gov/research/demographic/reports/estimates/e-5\\_2001-06/](http://www.dof.ca.gov/research/demographic/reports/estimates/e-5_2001-06/)

As shown in Table A.10 below, in 2006, the City of Angels Camp building department issued 24 construction permits, the lowest number since 1997. The total value of housing starts for the period was in excess of \$112 million and the 548 new permits issued during that period represent roughly 30 percent of the city's total housing units as of 2008.

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**Table A.13 City of Angels Camp—Housing Construction Permits and Values, 1996-2006**

Year	Construction Permits	Average Cost of Home (\$)	Total Value of Construction (\$)
1996	35	169,700	5,939,500
1997	23	166,800	3,836,400
1998	36	161,400	5,810,400
1999	66	170,100	11,226,600
2000	89	240,900	21,440,100
2001	61	181,900	11,095,900
2002	52	217,800	11,325,600
2003	56	203,300	11,384,800
2004	50	183,300	9,165,000
2005	56	259,300	14,520,800
2006	24	280,800	6,739,200
<b>Total</b>	<b>548</b>	<b>205,263</b>	<b>112,484,300</b>

Source: <http://www.city-data.com/city/Angels-City-California.html>

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## A.4 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. The capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation outreach and partnerships, and other mitigation efforts.

### Regulatory Mitigation Capabilities

Table A.11 lists planning and land management tools typically used by local jurisdictions to implement hazard mitigation activities.

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**Table A.14. Angels Camp—Regulatory Mitigation Capabilities**

Regulatory Tool (Ordinances, Codes, Plans)	Yes/No
Master Plan	Yes
Zoning Ordinance	Yes
Subdivision Ordinance	Yes
Growth Management Ordinance	In Process
Floodplain Ordinance	Yes
Other Special Purpose Ordinance (Stormwater, Steep Slope, Wildfire)	Yes
Building Code	Yes
Fire Department ISO Rating	Yes
Erosion or Sediment Control Program	Yes

<b>Regulatory Tool (Ordinances, Codes, Plans)</b>	<b>Yes/No</b>
Stormwater Management Program	No
Site Plan Review Requirements	Yes
Capital Improvements Plan	Yes
Economic Development Plan	Yes
Local Emergency Operations Plan	Yes
Flood Insurance Study or Other Engineering Study for Streams	Yes
Elevation Certificates	No

Outlined below are existing, adopted planning documents with provisions specifically relating to hazard mitigation, public safety and loss reduction.

## **City of Angels General Plan, 2006**

### ***Overview***

The City of Angels (Angels Camp) General Plan guides the long-term growth and development of the City. With the goal of defining the community’s view of its future, the General Plan outlines a vision, goals, policies, and implementation programs to guide decision makers in the future. The City of Angels Vision Statement, adopted by the Angels City Council in 1998, is:

- To beautify and promote uniformity in the City by encouraging cleanliness, rehabilitation, maintenance and enhancement of public and private property
- To create family sustaining jobs and healthy well-balanced community
- To promote the cultural interest of the City through the preservation of our historical heritage
- To provide public services and facilities that are compatible with the needs and philosophy of the community.

In keeping with California State Law, the City of Angels General Plan document is organized into seven mandatory elements and five non-mandatory elements: Land Use (Chapter 1); Housing (Chapter 2); Circulation (Chapter 3); Conservation & Open Space (Chapter 4); Noise (Chapter 5); Public Safety (Chapter 6); Public Facilities and Services (Chapter 7); Cultural Resources (Chapter 8); Air Quality (Chapter 9); Economic Development (Chapter 10); Community Identity (Chapter 11); Parks and Recreation (Chapter 12).

### ***Mitigation Capabilities***

The following section outlines specific goals, policies and implementation programs from the various chapters of the General Plan that pertain to hazard mitigation regulatory capabilities.

### **Chapter 1 Land Use Element**

- **Policy 1.A.4:** Protect the public, existing and planned land uses, and the environment from potential identified hazards. Policy 3.1.14: The Town shall establish open space land

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dedication requirements that preserve and protect areas of significance to the community. These include but are not limited to wetlands, steep slopes, 100-year floodplains, significant landforms, significant vegetation, and view corridors.

- **Policy 1.B.2:** Protect life and property from identified flood hazards.
  - **Implementation Program 1.B.e: Designate Identified Flood Hazard Areas as Resource Management/Open Space.** Designate flood hazard areas, as identified by the Federal Emergency Management Agency or as refined through local studies, as Resource Management (“RM” general plan) and Open Space (“OS” zoning).
    - **Equivalent Program:** 4Ha (Conservation & Open Space)
    - **Related Program:** 1Be (Land Use), 4Ha (Conservation & Open Space), 6Bd (Public Safety)
  - **Implementation Program 1.B.f: Designate Resource Management & Open Space Setbacks Along Creeks.** Establish an open space setback encompassing designated flood hazard areas along Angels Creek and Six Mile Creek. Designate these areas as Resource Management (RM) on the city’s general plan maps and as Open Space (OS) on the city’s zoning maps. Establish similar setbacks along other drainages within the city (e.g., China Gulch) or along drainages in areas that may be annexed into the city in the future.
    - **Equivalent Programs:** 4Dd (Conservation & Open Space), 4Gc (Conservation & Open Space), 6Bg (Public Safety), 11Bb (Community Identity)
    - **Related Programs:** 1Be (Land Use), 4Dc (Conservation & Open Space), 4Ha (Conservation & Open Space)
- **Policy 1.B.3** Continue to identify and implement land use strategies to protect life and property from fire hazards.
  - **Implementation Program 1.B.j: Make Available Fire Protection Standards.** Publish the city’s adopted development standards in booklet form or on-line to allow for easy access to this information by the public. Alternatively, amend the municipal code to include a separate title for the city’s adopted fire protection standards including, but not limited to:
    - The City’s adopted standards for the urban/wildland interface including provisions for defensible space, secondary access and other fire-protection related standards
    - Adopted standards for fire flow for commercial, residential, industrial and other land use categories
    - Standards for installing fire sprinklers
    - Standards for fire protection systems
    - Standards for placement of propane tanks and facilities
    - Standards of coverage for fire and emergency medical response as may be established pursuant to **Program 7.C.a**

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- **Equivalent Program:** 1Gc (Land Use), 7Ce (Public Facilities & Services)
  - **Related Programs:** 1Ge (Land Use), 3Ab (Circulation)
  - **General Policy**
    - **Implementation Program 1.C.e: Draft a Hillside Management Ordinance.** Draft a hillside management ordinance establishing acceptable hillside slope-related densities and alternatives for hillside construction standards that reduce grading and other adverse environmental impacts. The ordinance should address infill development on city lots (in particular, those lots established prior to the adoption of the city’s development standards for creating new parcels) and the appropriateness of setbacks, lot sizes, road widths, road-related facilities (e.g., bike ways, sidewalks), parking standards and related development standards.
      - **Equivalent Programs:** 2Bj (Housing), 3Ec (Circulation), 6Aj (Public Safety), 11Bd (Community Identity)
    - **Implementation Program 1.C.f: Prepare a Grading Ordinance/Promote Best Management Practices.** Prepare a grading ordinance addressing: When a grading permit is required, when a grading plan shall be prepared, required contents of a grading plan, anticipated grades before and after construction, the total amount of soil to be removed, location and design of retaining walls, erosion control standards, preparation of erosion control plans, recommended erosion control methods, soil disposal, vegetation retention, revegetation, drainage, requirements for erosion and sediment control plans and other elements, as identified. The ordinance, or a companion publication (either prepared as an original publication or adopted from existing publications), should be prepared/adopted in conjunction with the grading ordinance and illustrate best management practices. Resources for *Best Management Practices* are listed in **Appendix 4C**.
      - **Equivalent Programs:** 4Cf (Conservation & Open Space), 4Ga (Conservation & Open Space), 6Al (Public Safety), 11Ac (Community Identity)
    - **Implementation Program 1.E.e: Establish Standards for Erosion and Dust Control.** Establish and adopt standards for erosion and dust control to be included as conditions of approval, conditions of site development or to be otherwise attached as requirements of entitlements issued by the city, as necessary to reduce dust and erosion during construction activities. Methods to be addressed include, but are not limited to:
      - Revegetating cut and fill slopes
      - Hydroseeding
      - Re-vegetation using native grasses
      - Use of on-site water trucks or similar devices during non-precipitation periods to control dust emissions and maintain water quality during demolitions, construction, or other dust - generating activities
      - Installation of erosion control devices (e.g., silt fences, hay bales) prior to the rainy season

- Measures for protecting soil stability (See **Program 6Ak**)
- Tire-washing stations for trucks leaving construction sites
  - **Equivalent Programs:** 6Am (Public Safety), 9Ad (Air Quality), 11Ad (Community Identity)
  - **Related Program:** 6Ak (Public Safety)
- **General Plan Resource Management (RM) Land Use Classification**
  - Purposes and Intent
    - To conserve important areas of scenic, biological or cultural values
    - To protect the city’s residents from natural hazards (e.g., flood zones, fault zones, areas of geological instability).
  - Location
    - Encompassing areas prone to geotechnical hazards, flooding, important scenic or biological resources, or other significant natural areas. Includes portions of Angels Creek, Six Mile Creek, Cherokee Creek, Greenhorn Creek and Indian Creek (limited recreational use may be permitted along some portions of these creeks).
  - Minimum Design Standards
    - Generally, development within these areas is limited in order to preserve open areas to protect resources or to avoid natural hazards.

Maximum impervious surfaces: 5%. May be increased to 10% for parcels 5 acres or less in size upon the review and approval of the City of Angels Planning Commission to accommodate minor facilities in support of passive recreational uses which may be compatible with some resource management areas.

## Chapter 6 Public Safety Element

The Public Safety Element of the General Plan has a direct relationship to hazard mitigation. In essence each of the goals, policies and implementation programs of the Public Safety Element could be listed here as relating to the established mitigation capabilities of Angels Camp. For sake of brevity Table A.15 below outlines the organizational structure of this element.

**Table A.15. Angels Camp 2020 General Plan: Chapter 6 Public Safety Element Organizational Structure**

Section	Issue	Description
6A	Geologic Hazards	Addresses seismically induced surface rupture, ground shaking, ground failure, tsunamis, seiche, slope instability leading to mudslides and landslides, subsidence, liquefaction and other seismic or geologic hazards known to the City including those associated with collapsing mines. Volcanic activity also is addressed in this section.
6B	Flood Hazard and Dam Failure	Addresses the potential for flooding within the City and evaluates the

Section	Issue	Description
		potential for dam failures to impact the City.
6C	Emergency Services Plan & Emergency Services	Addresses hospitals, ambulance (ground and air) services, and evacuation routes.
6D	Hazardous Materials	Addresses those establishments identified within and near Angels Camp that store these materials and the potential for hazardous material spills.
6E	Water Supply, Utilities & Communications	Addresses peak load demand for Angels Camp and issues associated with water quality and water quantity during emergencies and addressing interruption of sewer services, electrical, communication, gas and other utility services.
6F	Transportation, Severe Weather, Radiological Incidents, Civil Disturbances	Addresses transportation accidents, severe weather, radiological incidents, and civil disturbances.
--	Fire Protection	Fire protection is addressed in the Public Facilities and Services Element of the Angels Camp General Plan (Chapter 7). That element addresses levels of service provided by the Angels Camp Fire Department and mutual aid agencies (e.g., California Department of Forestry and Fire Protection), including minimum road widths and clearances around structures.
--	Law Enforcement	Law enforcement is addressed in the Public Facilities and Services Element of the Angels Camp General Plan (Chapter 7). That element addresses levels of service provided by the Angels Camp Police Department, Calaveras County Sheriff's Department, California Highway Patrol and the County's Court System.
--	Military Installations/Agricultural Disasters	There are no military installations located in or near Angels Camp. Therefore, issues related to protection of military installations are not addressed herein. There are no commercial agricultural operations within the City; therefore, issues related to Agricultural disasters are not addressed herein.

Source: Angels Camp 2020 General Plan

## City of Angels Minimum Site Grading Requirements

Each of the site grading requirements listed below has either a direct or indirect relationship to hazard mitigation, public safety and loss reduction for the City of Angels Camp.

- 1) Erosion control measures will be provided for during construction wet weather grading at the beginning of grading work, and for permanent conditions prior to final inspection, in wet weather conditions measures will be taken to control site water runoff and silting of roadways and road drainage systems. Plans will show a note for the type of erosion controls proposed.
- 2) No modifications to the drainage courses over property lines are allowed unless an engineered design is approved. Plans will show the drainage facilities for both existing and proposed.
- 3) Provide compaction testing reports for the entire depth of fills over 12 inches deep when any structure is supported by the fill. Compaction must meet a minimum 90% relative compaction.

- 4) Maximum fill and cut slopes to be 2:1 (2 horizontal to 1 vertical) or an engineering report for the slope stabilization is required.
- 5) Structure setback at toe of slope (height of fill ÷ 2) 15' max.
- 6) Structure setback at top of slope (height of slope ÷ 3) 40' max.
- 7) Setbacks of slopes to property lines and easements at the toe of the slope (height of slope ÷ 2) 2' min., 20' max.
- 8) Setbacks of slopes to property and easements lines at the top of slope (height of slope ÷ 5) 2' min., 10' max.

## Administrative/Technical Mitigation Capabilities

Table A.16 identifies the personnel responsible for activities related to mitigation in Angels Camp.

**Table A.16. Angels Camp—Administrative and Technical Mitigation Capabilities**

Personnel Resources	Yes/No	Department/Position
Planner/Engineer with Knowledge of Land Development/Land Management Practices	Yes	Planning Department
Engineer/Professional Trained in Construction Practices Related to Buildings and/or Infrastructure	Yes	City Engineer
Planner/Engineer/Scientist with an Understanding of Natural Hazards	Yes	City Engineer
Personnel Skilled In GIS	Yes	Planning Department
Full Time Building Official	Yes	Building Department
Floodplain Manager	Yes	Building Department
Emergency Manager	Yes	Police Department
Grant Writer	Yes	Terry Cox-Part Time Employee As Needed
Warning Systems/Services	Yes	Police Department

## Fiscal Mitigation Capabilities

Table A.13 identifies financial tools or resources that Angels Camp could potentially use to help fund mitigation activities.

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**Table A.13. Angels Camp—Fiscal Mitigation Capabilities**

<b>Financial Resources</b>	<b>Accessible/Eligible to Use (Yes/No)</b>
Community Development Block Grants	Yes
Capital Improvements Project Funding	Yes
Authority to Levy Taxes for Specific Purposes	Yes
Fees for Water, Sewer, Gas, or Electric Services	Yes
Impact Fees for New Development	Yes
Incur Debt through General Obligation Bonds	Yes
Incur Debt through Special Tax Bonds	No
Incur Debt through Private Activities	No
Withhold Spending in Hazard Prone Areas	No

## **Mitigation Outreach and Partnerships**

Angels Camp is involved in ongoing outreach activities and partnerships related to hazard mitigation, which include the following:

- Partnership with Calaveras County
- Public Outreach Programs at local schools on Fire Safety

## **Past Mitigation Efforts**

Other mitigation related programs and projects that Angels Camp has implemented in the past include the following:

- Public Outreach at local schools on Fire Safety
- Fire Extinguisher Use Trainings at Local Businesses
- Weed Abatement Ordinance-

### **15.25.020 Nuisance declaration and abatement.**

- 1) No person owning or otherwise in control of any real property within the city shall permit or allow any weeds as defined to grow, stand or remain upon such real property, lot, street or sidewalk in the city of Angels.
- 2) Weeds as defined are declared to be a nuisance/fire hazard and subject to abatement as required in this chapter. (Ord. 427A (part), 2006: Ord. 427 (part), 2006)

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### **15.25.030 Abatement requirements.**

- 1) All combustible weeds, as defined, shall be removed from parcels less than one acre in size. Parcels more than one acre in size shall be clear of all weeds within one hundred feet of any structures, and thirty feet of any streets, driveways, and property lines of improved properties.
- 2) Abatement shall constitute chemical abatement, or cutting combustible vegetation to less than four inches above mineral soil. Abatement by agricultural means such as grazing by livestock may be permitted provided such means are not in conflict with other regulations or create additional environmental issues. The minimum grazing shall be one animal unit (one thousand pounds) per acre to feed off the grass in one month or less.
- 3) Other abatement specifications may be adopted by the city council by resolution. (Ord. 427A (part), 2006; Ord. 427 (part), 2006)

## **A.5 Mitigation Goals and Objectives**

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Angels Camp adopted the hazard mitigation goals and objectives developed by the Calaveras County Hazard Mitigation Planning Committee and described in Chapter 4 Mitigation Strategy.

## **A.6 Mitigation Actions**

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The planning team for Angels Camp identified and prioritized the following mitigation actions based on the risk assessment. Background information on how each action will be implemented and administered, such as ideas for implementation, responsible agency, potential funding, estimated cost, and timeline also are included.

As part of their mitigation strategy, Angels Camp will continue participation in and compliance with the NFIP. Specific activities that the City will undertake to continue compliance include the following:

- Work with FEMA and the State in the map modernizations program and adopt new DFIRMs when effective
- Evaluate the current status of the County's floodplain management program and identify areas for improvement
- Evaluate participation in the Community Rating System and identify opportunities to obtain points, such as through this planning process
- Evaluate the DWR flood awareness maps for the planning area and identify floodplain management activities to best manage existing and future development in flood-prone areas
- Revising language of the flood damage prevention ordinance to improve clarity and ease of use.

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## **Mitigation Action: Angels Camp**

### ***1. Integrate Local Hazard Mitigation Plan into Safety Element of General Plan***

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**Issue/Background:** Local jurisdiction reimbursement for mitigation projects and cost recovery after a disaster is guided, in part, by AB 2140. Specifically, this bill requires that each jurisdiction adopt a local hazard mitigation plan (LHMP) in accordance with the federal Disaster Mitigation Act of 2000 as part of the safety element of its general plan. Adoption into the safety element of the general plan may be by reference or incorporation.

**Other Alternatives:** No action

**Responsible Office:** City of Angels Camp Planning Department

**Priority (High, Medium, Low):** High

**Cost Estimate:** Staff time

**Potential Funding:** County and jurisdictional budgets

**Benefits (avoided Losses):** Adoption and coordination of planning documents will help jurisdictions maximize potential for state reimbursement

**Schedule:** As soon as possible



# APPENDIX A PLANNING PROCESS

**Table A.1 Hazard Mitigation Planning Committee Contact List**

Name	Organization	Telephone	E-Mail
Andy McMurry	CDF	209/754.3831	andy.mcmurry@fire.ca.gov
Bertha Underhill	CCWD, Director	209/754.3543	bunderhill@goldrush.com
Bill Claudino	Calaveras County	209/754.3754	claudino@sbcglobal.net
Bill Perley	CCWD, O&M Engineer	209/754.3543	billp@ccwd.org
Bob Dean	CCWD, Director	209/754.3543	dean@goldrush.com
Brian Anderson	USACE – New Hogan Dam	916/557.7107	brian.j.anderson@spk01.usace.army.mil
Brian Moss	Calaveras County EHD	209/754.6399	bmoss@co.calaveras.ca.us
Carol Mutzner	Red Cross	209/533.1513	mutzner@sacsierraredcross.org
Charlie Hebrard	CCWD, Director	209/754.3543	charlie.hebrard.ccwd@earthlink.net
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Jeff Davidson	CCWD, Director	209/754.3543	jeff@caltel.com
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Jerry Pelfanio	CHP, Lieutenant Commander	209/754.3541	jpelfanio@chp.ca.gov
Joe Lopez	Cal Trans	209/942.6189	joe_x_lopez@dot.ca.gov

John Gomes	CCWD	209/754.3543	johng@ccwd.org
Jon Bevan	Cal Trans	209/948.4438	jon_bevan@dot.ca.gov
Julie Baxter	AMEC Earth & Environmental	303/742.5324	Julie.Baxter@amec.com
Larry Diamond	CCWD, Assistant General Manager	209/754.3543	larryd@ccwd.org
Lynn Gentry	CCWD, Finance	209/754.3543	lynng@ccwd.org
Margo Erickson	USFS	209/795.1381 x331	merickson@fs.fed.us
Michael Walker	Calaveras County Undersheriff	209/754.6489	mwalker@co.calaveras.ca.us
Mike Noonan	CDF	209/7542700	mike.noonan@fire.ca.gov
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Patricia Emerson	CCWD Admin	209/754.3543	pate@ccwd.org
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Roger Ince	Red Cross, Director	916/368.3146	rince@sacsierraredcross.org
Rudy Hernandez	CCWD, Finance Director	209/754.3543	RudyH@ccwd.org
Sandy Morrill	Cal Works, Deputy Director	209/754.6513	smorrill@co.calaveras.ca.us
Sharon Torrence	OES PIO	209/768.5542	donnshe@volcano.net
Sherri Munson	Calaveras County OES	209/754.2888	smunson@co.calaveras.ca.us
Sid Beckman	USFS	209/795.1381 x323	sbeckman@fs.fed.us
Stephanie Moreno	Calaveras County, Plan Director	209/754.6394	<a href="mailto:smoreno@co.calaveras.ca.us">smoreno@co.calaveras.ca.us</a>
Steve Hutchings	CCWD, District Engineer	209/754.3543	steveh@ccwd.org
Tom Mitchell	Calaveras County, CEO	209/754.3754	tmitchell@co.calaveras.ca.us
Tony Tacheira	Angels PD, Chief	209/736.2567	angelspdchief@goldrush.com
Vince Bowers	CCWD O&M	209/754.3543	vinceb@ccwd.org

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## **Agenda**

### **Calaveras County Multi-Hazard Mitigation Plan Kickoff Meeting**

**January 16, 2008  
9:00 AM-12:00 PM**

**3600 Carol Kennedy Drive  
San Andreas, CA**

- 1) Opening Remarks (5 min)
  - 2) Introductions (15 min)
  - 3) Local Hazard Mitigation Plan Purpose and Requirements (45 min)
  - 4) Multi-Jurisdictional Participation and the Hazard Mitigation Planning Committee (20 min)
- Break (10:30-10:45)
- 5) Hazard Identification and Data Collection Needs (40 min)
  - 6) Planning for Public Involvement (20 min)
  - 7) Next Steps (15 min)

Sign-In Sheet  
 Calaveras County Multi-Hazard Mitigation Plan  
 Kickoff Meeting  
 January 16, 2008

Name	Jurisdiction/ Department	Address	Phone	E-Mail
JOHN KING	CAL FIRE	3225 SIX MILE RD ANGERS CAMP CA 95222	209-743-0540	John.King@Fire.ca.gov
TERRY BULLOCK	CAL DES	891 MT RANCH RD SAN ANDREAS	209-754-2894	tbulllock@co.calaveras.ca.us
Sherril Munson	CCSO/OES	891 Mt. Ranch Rd. San Andreas, CA 95249	209-754-2888	Smunson@co.calaveras.ca.us
MICHAEL MILLER	CCPW	" " "	209-754-6401	mhmiller@co.calaveras.ca.us
DAVE SEAUWELL	CCSO	" " "	209-754-6575	dseawell@co.calaveras.ca.us
Kevin Wright	AG	891 Mt Ranch Rd San Andreas	209-754-6504	KWright2@co.calaveras.ca.us
MICHAEL WALKER	CCSO	891 Mt. Ranch Rd. San Andreas	(209) 754-6500	MWalker@co.calaveras.ca.us
TIM STURM	CCSO	" "	(209) 754-6417	tsturm@co.calaveras.ca.us
C Hawkins	CCSO	" "	209-754-2891	chawkins@co.calaveras.ca.us

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# Agenda

## Calaveras County Multi-Hazard Mitigation Plan Meeting #2: Risk Assessment

Wednesday, May 28, 2008

9:00 AM-12:00 PM

3600 Carol Kennedy Drive  
San Andreas, CA

- 1) Welcome and Introductions
- 2) Today's Agenda and Plan Purpose Review
- 3) Update on Jurisdictional Participation
- 4) Results of Risk Assessment
  - Hazard Profiles
  - Vulnerability Assessment
  - Summary of Key Issues

Break (10:15-10:30)

- 5) Formation of Goals and Objectives
- 6) Planning for Public Involvement
- 7) Next Steps

**Sign-In Sheet**  
**Calaveras County Multi-Hazard Mitigation Plan**  
 Meeting #2  
 May 28, 2008

Name	Jurisdiction/ Department	Address	Phone	E-Mail
Jan Ballew	USACOE	1325 J street Sacramento CA	916 557-7137	janet.Ballew@USACE.army.mil
Kevin Richardson	USACOE	" " " "	916 557 7108	Kevin.A.Richardson@USACE.army.mil
Tim Sturm	CCSO	2911 NEW RAVEN RD SAN ANTONIO CA	209 757-6500	tsturm@co.calaveras.ca.us
Robert Lehmann	Cal Fire	785 Mountain Ranch Rd San Andreas	209-419-4412	Bob.Lehmann@fire.ca.gov
Jeanne Boyce	Health Service	891 Mountain Ranch Rd. San Andreas CA	209-754-6460	jboyce@co.calaveras.ca.us
Hemming Schwilke	CC GIS	" "	209 754 6669	hschwilke@co.calaveras.ca.us
Douglas Polkoni	TSP/GIS	" "	209-754-6608	dpolkoni@co.calaveras.ca.us
FOOD FORDATH	ANGELS CAMP PD	PO BOX 459 ANGELS CAMP, CA 95222	209-736-2507 X144	ANGELSFD207@GOLDBUSH.COM
Frank Orlando	Calaveras County Office of Ed	PO Box 760 Angels Camp 95221	209 736 6010	FJORLANDO@CCOE.K12.CA.US
Phil Holcomb	COE	New Hogan Lake Valley Springs CA	209 772-2927	Phil.Holcomb@usace.army.mil
Terry Bullock	ccso/OES	891 Mt Ranch San Andreas CA 95249	209 754 2894	tbullock@co.calaveras.ca.us
Dave Pastizzo	CC Planning	891 Mtn. Ranch Rd. San Andreas, CA 95249	209 754-6394	dpastizzo@co.calaveras.ca.us
Sherril Munson	CCSO/OES	891 Mtn. Ranch Rd. San Andreas, CA 95249	209-754-2888	smunson@co.calaveras.ca.us

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# Agenda

## Calaveras County Multi-Hazard Mitigation Plan Meeting #3: Mitigation Actions

October 8, 2008  
9:00am-12:00pm

Calaveras County Airport  
3600 Carol Kennedy Drive  
San Andreas, California

- 1) Welcome and Introductions (9:00-9:15)
- 2) Today's Agenda and Plan Purpose Review (9:15-9:30)
- 3) Identification of Mitigation Actions (9:30-10:15)
- Break (10:15-10:30)
- 4) Identification of Mitigation Actions Continued (10:30-11:15)
- 5) Prioritization of Mitigation Actions (11:15-11:30)
- 6) Plan Implementation and Maintenance (11:30-11:45)
- 7) Mitigation Action Implementation Worksheets and Next Steps (11:45-12:00)

**Sign-In Sheet**  
**Calaveras County Multi-Hazard Mitigation Plan**  
 Meeting #3  
 October 8, 2008

Name	Jurisdiction/ Department	Address	Phone	E-Mail
Kevin Richardson	US Army Corps of Engineers	1325 J street SACRAMENTO CA 95814 200 MONTE VENDO ST ANGELS CAMP	916 557 7108	Kevin.A.Richardson@ USA.CE.ARMY.MIL
DALE MENDENHALL	ANGELS CAMP PD		209 736-2567	dale.mendenhall@angelscamp.gov
Shari Moore	CCSO / OES	891 Mountain Road Rd. S.A.	209-754-2888	Smunson@co.calaveras.ca.us
Terry Bullock	CCSO / OES	891 Mt Ranch Rd S.A	209-754-2894	tbullock@co.calaveras.ca.us
Howard Stokeman	CALVERTS TOWNSHIP	" "	209 754-6657	ASTOKEM@co.calaveras.ca.us
David Pastizzo	Calaveras Planning	" "	209 754-2855	dpastiz@co.calaveras.ca.us
JEFF MILLAR	CAL FIRE	705 MIN. IANU RD., SA	209-795-1542	JEFF.MILLAR@CA.FIRE.COV
Clay Hawkins	CCSO	891 " "	209-754-2891	Chaukhuse@calaveras.ca.us

# Calaveras County Multi-Hazard Mitigation Plan Data Collection Guide

## WORKSHEET #1: CAPABILITY ASSESSMENT

Name of Jurisdiction: \_\_\_\_\_

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. Please complete this worksheet and provide supporting documentation if possible.

### Regulatory

The following planning and land management tools are typically used by local and tribal jurisdictions to implement hazard mitigation activities. Please indicate which of the following your jurisdiction has in place. If your jurisdiction does not have this capability or authority, please indicate in the comments column if a higher level of government has the authority. Also use the comments column to indicate how we can obtain a copy of the plan or document (i.e. available on the web, will email or mail).

Regulatory Tool (ordinances, codes, plans)	Y/N	Comments
Master Plan		
Zoning ordinance		
Subdivision ordinance		
Growth management ordinance		
Floodplain ordinance		
Other special purpose ordinance (stormwater, steep slope, wildfire)		
Building code		Version:
Fire department ISO rating		Rating:
Erosion or sediment control program		
Stormwater management program		
Site plan review requirements		
Capital improvements plan		
Economic development plan		
Local emergency operations plan		
Other special plans		
Flood insurance study or other engineering study for streams		
Elevation certificates		
Other		

## Administrative/Technical

Identify the technical and personnel resources responsible for activities related to hazard mitigation/loss prevention within your jurisdiction. For smaller jurisdictions without local staff resources, if there are public resources at the next higher level government that can provide technical assistance, please indicate so in the comments column.

Personnel Resources	Yes/No	Department/Position	Comments
Planner/Engineer with knowledge of land development/land management practices			
Engineer/Professional trained in construction practices related to buildings and/or infrastructure			
Planner/Engineer/Scientist with an understanding of natural hazards			
Personnel skilled in GIS			
Full time building official			
Floodplain Manager			
Emergency Manager			
Grant writer			
Other personnel			
GIS Data – Hazard areas			
GIS Data - Critical facilities			
GIS Data – Building footprints			
GIS Data – Land use			
GIS Data – Links to Assessor's data			
Warning Systems/Services (Reverse 9-11, cable override, outdoor warning signals)			
Other			

## Fiscal

Identify whether your jurisdiction has access to or is eligible to use the following financial resources for hazard mitigation

Financial Resources	Accessible/Eligible to Use (Y/N)	Comments
Community Development Block Grants		
Capital improvements project funding		
Authority to levy taxes for specific purposes		
Fees for water, sewer, gas, or electric services		
Impact fees for new development		
Incur debt through general obligation bonds		
Incur debt through special tax bonds		
Incur debt through private activities		
Withhold spending in hazard prone areas		
Other		

## Additional Capabilities Questions

1. Does your community have any hazard-related certifications, such as Storm Ready certification or Firewise Communities certification?
2. List any past or ongoing public education or information programs, such as for responsible water use, fire safety, household preparedness, or environmental education.
3. List any other past or ongoing projects or programs designed to reduce disaster losses, these may include projects to protect critical facilities.

Prepared by: \_\_\_\_\_  
 Phone: \_\_\_\_\_  
 Email: \_\_\_\_\_  
 Date: \_\_\_\_\_

Please return worksheets by mail, email, or fax to:  
**Julie Baxter, AMEC Earth & Environmental**  
 355 S. Teller St, Suite 300  
 Lakewood, CO 80226  
 fax: (303) 935-6575  
 email: [julie.baxter@amec.com](mailto:julie.baxter@amec.com)

Calaveras County Multi-Hazard Mitigation Plan  
**WORKSHEET #2: HISTORIC HAZARD EVENT**

Name of Jurisdiction: \_\_\_\_\_

Please fill out one sheet for each significant hazard event with as much detail as possible. Attach supporting documentation, photocopies of newspaper articles, or other original sources.

Type of event	
Nature and magnitude of event	
Location	
Date of event	
Injuries	
Deaths	
Property damage	
Infrastructure damage	
Crop damage	
Business/economic impacts	
Road/school/other closures	
Other damage	
Insured losses	
Federal/state disaster relief funding	
Opinion on likelihood of occurring again	
Source of information	
Comments	

Prepared by: \_\_\_\_\_  
 Phone: \_\_\_\_\_  
 Email: \_\_\_\_\_  
 Date: \_\_\_\_\_

Please return worksheets by mail, email, or fax to:  
**Julie Baxter, AMEC Earth & Environmental**  
 355 S. Teller St, Suite 300  
 Lakewood, CO 80226  
 fax: (303) 935-6575  
 email: [julie.baxter@amec.com](mailto:julie.baxter@amec.com)



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## Calaveras County Multi-Hazard Mitigation Plan WORKSHEET #3: VULNERABILITY ASSESSMENT

Name of Jurisdiction: \_\_\_\_\_

The purpose of this worksheet is to assess the vulnerable buildings, populations, critical facilities, infrastructure, and other important assets in your community by using the best available data to complete the table and questions that follow. Use the table on the next page to compile a detailed inventory of specific assets at risk including critical facilities and infrastructure; natural, cultural, and historical assets; and economic assets. These may include hospitals, fire stations, or historic buildings. Attach supporting documentation, such as photographs, reports, or plans if possible. In the hazard specific column of the asset inventory table, indicate if there is a specific hazard to which the asset is at risk.

### Critical Facilities and Infrastructure

A critical facility may be defined as one that is essential in providing utility or direction either during the response to an emergency or during the recovery operation. FEMA's HAZUS-MH loss estimation software uses the following three categories of critical assets. 'Essential facilities' are those that if damaged would have devastating impacts on disaster response and/or recovery. 'High potential loss facilities' are those that would have a high loss or impact on the community. Transportation and lifeline facilities are third category of critical assets; examples are provided below.

#### Essential Facilities

- Hospitals and other medical facilities
- Police stations
- Fire station
- Emergency Operations Centers

#### High Potential Loss Facilities

- Power plants
- Dams/levees
- Military installations
- Hazardous material sites
- Schools
- Shelters
- Day care centers
- Nursing homes
- Main government buildings

#### Transportation and Lifeline

- Highways, bridges, and tunnels
- Railroads and facilities
- Bus facilities
- Airports
- Water treatment facilities
- Natural gas facilities and pipelines
- Oil facilities and pipelines
- Communications facilities

### Natural, Cultural, and Historical Assets

Natural resource assets may include wetlands, threatened and endangered species, or other environmentally sensitive areas. Historical assets include state and federally listed historic sites.

### Economic Assets

Economic assets at risk may include major employers or primary economic sectors, such as agriculture, whose losses or inoperability would have severe impacts on the community and its ability to recover from disaster.



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## Additional Vulnerability Questions

1. Number of flood insurance policies
2. Number of repetitive loss properties
3. Number of unreinforced masonry buildings
4. Describe any hazard-related concerns or issues regarding the vulnerability of special needs populations, such as the elderly, disabled, low-income, or migrant farm workers.
5. Describe development trends and expected growth areas and how they relate to hazard areas and vulnerability concerns/issues.

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Prepared by: \_\_\_\_\_  
Phone: \_\_\_\_\_  
Email: \_\_\_\_\_  
Date: \_\_\_\_\_

Please return worksheets by mail, email, or fax to:  
**Julie Baxter, AMEC Earth & Environmental**  
355 S. Teller St, Suite 300  
Lakewood, CO 80226  
fax: (303) 935-6575  
email: [julie.baxter@amec.com](mailto:julie.baxter@amec.com)

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## Figure A.1 BOS Public and Stakeholder Meeting Announcement (from Pinetree.net)

Posted by: Kim\_Hamilton on 09/23/2008 12:56 PM  
Updated by: Kim\_Hamilton on 10/07/2008 12:57 AM  
Expires: 01/01/2013 12:00 AM

### Public Input Sought on Calaveras County Multi-Hazard Mitigation Plan

*Calaveras County, CA...Calaveras County Office of Emergency Services will present information and obtain input on reducing risk to natural disasters in Calaveras County at an upcoming study session of the Calaveras County Board of Supervisors. Citizens and other interested parties are invited and encouraged to attend. The meeting will be held on Tuesday, October 7th, at 1:30pm at the Board of Supervisors Chambers.....*



The presentation is part of the Calaveras County Multi-Hazard Mitigation Planning Project. Calaveras County and the City of Angels Camp are developing a comprehensive Multi-Hazard Mitigation Plan to reduce the vulnerability of people and property in the County to the impacts of natural hazards and to become eligible for mitigation funding programs from the Federal Emergency Management Agency (FEMA).

The plan is being developed by a Hazard Mitigation Planning Committee with input from the city, county, state, and federal agencies; special districts; and local stakeholders. The plan will address a comprehensive list of natural hazards - ranging from flooding to wildfire and drought - and will assess the likely impacts of these hazards to communities in Calaveras County. The plan will also set goals and prioritize projects to reduce the impacts of future disasters on people and property in the county.

Calaveras County and the City of Angels Camp are seeking public input on the plan. A public meeting will be held at the:  
Calaveras County Board of Supervisors Chambers  
891 Mountain Ranch Road  
San Andreas, CA 95249  
October 07,2008 at 1 :30 pm

The purpose of the session is to 1) provide information on the purpose and process of the plan, 2) present the results of the countywide risk assessment, and 3) discuss community assets and public priorities for risk reduction.

Nationwide, taxpayers pay billions of dollars annually helping communities, organizations, businesses, and individuals recover from disaster. Some natural disasters are predictable and, in many cases, much of the damage can be reduced or even eliminated. FEMA has targeted natural disaster loss reduction as one of its primary goals.

The Disaster Mitigation Act of 2000 requires local governments, including universities and special districts, to have a FEMA-approved hazard mitigation plan to maintain eligibility for certain federal disaster assistance and hazard mitigation funding programs.

Hazard mitigation is defined as any sustained action taken to reduce or eliminate long-term risk to human life and property from hazards. Natural hazard mitigation planning is the process by which natural hazards that threaten a community are identified, their likely impacts are assessed, mitigation goals are set, and appropriate strategies for reducing risk are developed, prioritized, and implemented.

The Calaveras County Office of Emergency Services (OES) took the lead on writing this plan under the direction of Lieutenant Tim Sturm. Sturm has drawn on the expertise of consultants with AMEC Earth and Environmental, Inc., a firm that specializes in hazard mitigation and emergency management. Calaveras County OES and the consultants formed the Hazard Mitigation Planning Committee to facilitate development of the plan.

Feedback from the public meeting will be used to inform the draft plan, which will be available for public review and comment. Upon approval by the California Office of Emergency Services and FEMA, the plan will be presented to the Calaveras County Board of Supervisors and the Angels Camp City Council for formal adoption. For more information on this project, contact Lieutenant Tim Sturm at (209) 754-6417 or [tsturm-co.calaveras.ca.us](mailto:tsturm-co.calaveras.ca.us).

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## Figure A.2 Press Release Soliciting Input on Draft Plan

### Calaveras County, California PRESS RELEASE

For Immediate Release

Contact: Sergeant Tim Sturm, Calaveras County Office of Emergency Services  
(209) 754-6417

October 19, 2009

#### **PUBLIC INPUT SOUGHT ON CALAVERAS COUNTY MULTI-HAZARD MITIGATION PLAN**

Calaveras County, CA — Calaveras County Office of Emergency Services is seeking to obtain input on the Calaveras County Multi-Hazard Mitigation Plan. Calaveras County and the City of Angels Camp have developed a comprehensive Multi-Hazard Mitigation Plan to reduce the vulnerability of people and property in the County to the impacts of natural hazards and to become eligible for mitigation funding programs from the Federal Emergency Management Agency (FEMA).

The plan is being developed by a Hazard Mitigation Planning Committee with input from the city; county, state, and federal agencies; special districts; and local stakeholders. The plan addresses a comprehensive list of natural hazards – ranging from flooding to wildfire and drought – and assesses the likely impacts of these hazards to communities in Calaveras County. The plan also sets goals and prioritizes projects to reduce the impacts of future disasters on people and property in the county.

Nationwide, taxpayers pay billions of dollars annually helping communities, organizations, businesses, and individuals recover from disaster. Some natural disasters are predictable and, in many cases, much of the damage can be reduced or even eliminated. FEMA has targeted natural disaster loss reduction as one of its primary goals. The Disaster Mitigation Act of 2000 requires local governments, including universities and special districts, to have a FEMA-approved hazard mitigation plan to maintain eligibility for certain federal disaster assistance and hazard mitigation funding programs.

Hazard mitigation is defined as any sustained action taken to reduce or eliminate long-term risk to human life and property from hazards. Natural hazard mitigation planning is the process by which natural hazards that threaten a community are identified, their likely impacts are assessed, mitigation goals are set, and appropriate strategies for reducing risk are developed, prioritized, and implemented.

The plan can be viewed on the Calaveras County Website at [www.co.calaveras.ca.us/departments/sheriff.html](http://www.co.calaveras.ca.us/departments/sheriff.html) or viewed at the front desk of the Calaveras County Sheriff's Office between the hours of 7:30am and 5:00 pm.

The deadline for public comment is November 2, 2009. Your feedback will be incorporated into the final version of the plan, which will be reviewed and approved by the California Emergency Management Agency (Cal EMA) and FEMA Region IX. Upon approval, the plan will be presented to the Calaveras County Board of Supervisors and the Angels Camp City Council for formal adoption.

Your comments and ideas are invited and welcomed. Comments may be submitted in one of the following ways:

- Mail written comments to:  
Jeanine Foster  
AMEC Earth & Environmental  
355 S. Teller Street, Suite 300  
Lakewood, CO 80226
- Fax written comments to 303 935-6505 (Attention Jeanine Foster)
- Email your comments to [jeanine.foster@amec.com](mailto:jeanine.foster@amec.com)
- Drop off written comments with Sgt. Tim Sturm at the Calaveras County Sheriff's Office

For more information on this project, contact Sergeant Tim Sturm at (209) 754-6417 or [tsturm@co.calaveras.ca.us](mailto:tsturm@co.calaveras.ca.us).



## APPENDIX B REFERENCES

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Angels Camp 2020 General Plan

Angels Camp General Plan, Appendix 4 Conservation and Open Space.

Avery/Hathaway Pines Community Plan, 1998; Safety Element, Community Plan Recommendation.

CAL OES, Calaveras County.

Calaveras County Assessors Data.

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Calaveras County Stormwater Management Plan (Draft); Appendix C. Minimum Control Measures, Table 4.

Calaveras County Stormwater Management Plan (Draft); Appendix C. Minimum Control Measures, Table 5.

Calaveras County Water District.

California Department of Finance. [www.dof.ca.gov/html/DEMOGRAP/](http://www.dof.ca.gov/html/DEMOGRAP/).

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California Department of Finance. [www.dof.ca.gov/research/demographic/reports/estimates/e-1\\_2006-07/documents/e-1press.pdf](http://www.dof.ca.gov/research/demographic/reports/estimates/e-1_2006-07/documents/e-1press.pdf)

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California Department of Forestry & Fire Protection, Calaveras County.

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California Water Plan. 2005. [www.waterplan.water.ca.gov/](http://www.waterplan.water.ca.gov/).

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FEMA Multi-Hazard Identification and Risk Assessment. 1997.

FEMA Preliminary DFIRM data (flood area), Calaveras County (property data).

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# APPENDIX C: MITIGATION STRATEGY

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## Categories of Mitigation Measures Considered

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The following categories are based on the Community Rating System. To accommodate other hazards, multi-hazard examples were added:

### Prevention

- Planning and zoning
- Open space preservation
- Land development regulations
- Stormwater management
- Fuels management

### Property Protection

- Firewise construction
- Defensible space/fuels modification
- Water supply
- Flood protection

### Natural Resource Protection

- Erosion and sediment control
- Wetlands protection
- Threatened and endangered species protection
- Fuels management

### Emergency Services

- Warning and evacuation
- Communications
- Critical facilities protection
- Lifeline utilities protection
- Health and safety maintenance

### Structural Projects

- Detention/retention structures
- Sediment basins/low-head weirs
- Channel modifications

- 
- Culvert resizing/replacement/maintenance
  - Floodwalls

### **Public Information**

- Hazard maps
- Outreach programs (mailings, media, web, speakers bureau)
- Education program (children/adults)

## **Alternative Mitigation Measures per Category**

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### **Prevention**

Preventive measures are designed to keep the problem from occurring or getting worse. Their objective is to ensure that future development is not exposed to damage and does not increase damage to other properties.

- Planning
- Zoning
- Open space preservation
- Land development regulations
  - Subdivision regulations
  - Floodplain development regulations
- Stormwater management
- Fuels management, fire breaks
- Building codes
  - Firewise construction
- (also see Property Protection)

### **Emergency Services**

Emergency services protect people during and after a disaster. A good emergency services program addresses all hazards. Measures include:

- Warning (floods, tornadoes, ice storms, hail storms, dam failures)
  - NOAA weather radio all hazards
  - Sirens
  - Reverse 911
- Evacuation and sheltering
- Communications
- Emergency planning
  - Activating the emergency operations room (emergency management)

- 
- Closing streets or bridges (police or public works)
  - Shutting off power to threatened areas (utility company)
  - Holding children at school/releasing children from school (school district)
  - Passing out sand and sandbags (public works)
  - Ordering an evacuation (mayor)
  - Opening evacuation shelters (red cross)
  - Monitoring water levels (engineering)
  - Security and other protection measures (police)
  - Monitoring of conditions (dams)
  - Critical facilities protection (buildings or locations vital to the response and recovery effort, such as police/fire stations, hospitals, sewage treatment plants/lift stations, power substations)
    - Buildings or locations that, if damaged, would create secondary disasters, such as hazardous materials facilities and nursing homes
    - Lifeline utilities protection
    - Health and safety maintenance

## **Property Protection**

Property protection measures are used to modify buildings subject to damage rather than to keep the hazard away. A community may find these to be inexpensive measures because often they are implemented by or cost-shared with property owners. Many of the measures do not affect the appearance or use of a building, which makes them particularly appropriate for historical sites and landmarks.

- Retrofitting/disaster proofing
  - Floods
    - Wet/dry floodproofing (barriers, shields, backflow valves)
    - Relocation
    - Acquisition
  - Tornadoes
    - Safe rooms
    - Securing roofs and foundations with fasteners and tie-downs
    - Strengthening garage doors and other large openings
  - Drought
    - Improve water supply (transport/storage/conservation)
    - Remove moisture competitive plants (tamarisk/salt cedar)
    - Water restrictions/water saver sprinklers/appliances
    - Grazing on CRP lands (no overgrazing—see noxious weeds)
    - Create incentives to consolidate/connect water services
    - Recycled wastewater on golf courses
  - Earthquakes

- 
- Removing masonry overhangs, bracing other parts
  - Tying down appliances, water heaters, bookcases and fragile furniture so they will not fall over during a quake.
  - Installing flexible utility connections that will not break during shaking (pipelines, too)
  - Wildland fire
    - Replacing building components with fireproof materials (roofing, screening)
    - Creating “defensible space”
    - Installing spark arrestors
    - Fuels modification
  - Noxious weeds/insects
    - Mowing
    - Spraying
    - Replacement planting
    - Stop overgrazing
    - Introduce natural predators
  - Insurance

## **Natural Resource Protection**

Natural resource protection activities are generally aimed at preserving (or in some cases restoring) natural areas. In so doing, these activities enable the naturally beneficial functions of floodplains and watersheds to be better realized. These natural and beneficial floodplain functions include the following:

- Storage of floodwaters
- Absorption of flood energy
- Reduction in flood scour
- Infiltration that absorbs overland flood flow
- Groundwater recharge
- Removal/filtering of excess nutrients, pollutants, and sediments from floodwaters
- Habitat for flora and fauna
- Recreational and aesthetic opportunities

Methods of protecting natural resources include:

- Erosion and sediment control
- Wetlands protection
- Riparian area/habitat protection
- Threatened and endangered species protection
- Fuels management
- Set-back regulations/buffers

- 
- Best management practices—Best management practices (“BMPs”) are measures that reduce nonpoint source pollutants that enter the waterways. Nonpoint source pollutants come from non-specific locations. Examples of nonpoint source pollutants are lawn fertilizers, pesticides, and other farm chemicals, animal wastes, oils from street surfaces and industrial areas and sediment from agriculture, construction, mining and forestry. These pollutants are washed off the ground’s surface by stormwater and flushed into receiving storm sewers, ditches and streams. BMPs can be implemented during construction and as part of a project’s design to permanently address nonpoint source pollutants. There are three general categories of BMPs:
    - Avoidance—Setting construction projects back from the stream.
    - Reduction—Preventing runoff that conveys sediment and other water-borne pollutants, such as planting proper vegetation and conservation tillage.
    - Cleanse—Stopping pollutants after they are en route to a stream, such as using grass drainageways that filter the water and retention and detention basins that let pollutants settle to the bottom before they are drained
  - Dumping regulations
  - Water use restrictions
  - Weather modification
  - Landscape management

## **Structural Projects**

Structural projects have traditionally been used by communities to control flows and water surface elevations. Structural projects keep flood waters away from an area. They are usually designed by engineers and managed or maintained by public works staff. These measures are popular with many because they “stop” flooding problems. However, structural projects have several important shortcomings that need to be kept in mind when considering them for flood hazard mitigation:

- They are expensive, sometimes requiring capital bond issues and/or cost sharing with Federal agencies, such as the U.S. Army Corps of Engineers or the Natural Resources Conservation Service.
- They disturb the land and disrupt natural water flows, often destroying habitats.
- They are built to a certain flood protection level that can be exceeded by a larger flood, causing extensive damage.
- They can create a false sense of security when people protected by a structure believe that no flood can ever reach them.
- They require regular maintenance to ensure that they continue to provide their design protection level.

Structural measures include:

- Detention/retention structures

- 
- Erosion and sediment control
  - Basins/low-head weirs
  - Channel modifications
  - Culvert resizing/replacement/maintenance
  - Levees and floodwalls
  - Fencing (for snow, sand, wind)
  - Drainage system maintenance
  - Reservoirs (for flood control, water storage, recreation, agriculture)
  - Diversions
  - Storm sewers

## Public Information

A successful hazard mitigation program involves both the public and private sectors. Public information activities advise property owners, renters, businesses, and local officials about hazards and ways to protect people and property from these hazards. These activities can motivate people to take protection

- Hazard maps and data
- Outreach projects (mailings, media, web, speakers bureau)
- Library resources
- Real estate disclosure
- Environmental education
- Technical assistance

## Mitigation Alternative Selection Criteria

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The following criteria were used to select and prioritize proposed mitigation measures:

### STAPLE/E

- **Social**—Does the measure treat people fairly? (different groups, different generations)
- **Technical**—Will it work? (Does it solve the problem? Is it feasible?)
- **Administrative**—Do you have the capacity to implement and manage project?
- **Political**—Who are the stakeholders? Did they get to participate? Is there public support? Is political leadership willing to support?
- **Legal**—Does your organization have the authority to implement? Is it legal? Are there liability implications?
- **Economic**—Is it cost-beneficial? Is there funding? Does it contribute to the local economy or economic development?
- **Environmental**—Does it comply with environmental regulations?

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## **Sustainable Disaster Recovery**

- Quality of life
- Social equity
- Hazard mitigation
- Economic development
- Environmental protection/enhancement
- Community participation

## **Smart Growth Principles**

- Infill versus sprawl
- Efficient use of land resources
- Full use of urban resources
- Mixed uses of land
- Transportation options
- Detailed, human-scale design

## **Other**

- Does measure address area with highest risk?
- Does measure protect ...
  - The largest # of people exposed to risk?
  - The largest # of buildings?
  - The largest # of jobs?
  - The largest tax income?
  - The largest average annual loss potential?
  - The area impacted most frequently?
  - Critical infrastructure (access, power, water, gas, telecommunications)?
- What is timing of available funding?
- What is visibility of project?
- Community credibility

## **Submitting Mitigation Actions**

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The table on the following page lists mitigation actions identified and prioritized by the Hazard Mitigation Planning Committee. A mitigation action implementation worksheet must be completed for each action the Hazard Mitigation Planning Committee would like to include in the plan. A blank implementation worksheet was attached to the email with this document. Two examples of completed implementation worksheets are attached at the end of this document.

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All of the potential actions listed are important; priority was determined relative to each other by adding up the votes from the final Hazard Mitigation Planning Committee meeting. In addition, items that must be completed to meet FEMA requirements were given a high priority ranking (these are marked with an asterisk\*).

The person or agency most likely to take a lead role in implementing the action in the future should write-up the implementation worksheet, which captures how the agency foresees the action getting done. Our best guesses at the best person to either complete or coordinate the completion of the worksheet are included in the table below. These can be changed/delegated as needed.

If an action has a low priority ranking, but you are already working on it or know that your jurisdiction has the capabilities to get it done, please complete the worksheet. If an action has a low ranking, and you think the feasibility of getting it done in the next five years is not strong, please let me know. It may be better to table this action until the next plan update or until funding or other staff capabilities become available. In this case, we do not need to develop an implementation worksheet.

## **Angels Camp**

Each jurisdiction should complete an implementation worksheet for each of the actions listed in the table below that it would like to submit, but that would require specific implementation by the jurisdiction. I have indicated in the responsibility column which actions these may be.

Each jurisdiction should also identify any other mitigation actions/projects unique to it, such as a public works project or protection of a critical facility, and complete an implementation worksheet for these. Jurisdictions should prioritize their actions into high, medium, or low based on the same criteria used in the last Hazard Mitigation Planning Committee meeting of being socially, technically, administratively, politically, legally, environmentally, and economically feasible and desirable.

The best way for jurisdictions to get implementation worksheets done efficiently and effectively is to organize a meeting (or get on agenda of an existing meeting) with key staff members from different departments to get those unfamiliar with the project on board, finalize and prioritize actions, and assign who will be responsible for writing up each implementation worksheet.

**Table 1: Actions Identified and Prioritized by the Hazard Mitigation Planning Committee**

No.	Action	Priority	Votes	Comments/Ideas for Implementation	Responsibility for Completing Worksheet
1	Coordinate annual review of multi-hazard mitigation plan	High*	n/a		Calaveras OES
2	Adopt multi-hazard mitigation plan in safety element of general plan	High*	n/a		Calaveras Planning Department <b>Angels Camp</b>
3	Develop mitigation page on County's website to host final version of multi-hazard mitigation plan and keep hard copies of final plan available in libraries	High*	n/a		Calaveras Technology Services <b>Angels Camp</b>
4	Create and maintain wildfire defensible space around critical facilities and infrastructure in high fire hazard areas, including schools, evacuation sites, repeater towers, water pumping stations, and electric and phone substations	High	6		Calaveras OES /CalFire/ Fire Districts
5	Replace wooden flume	High	5		Calaveras OES
6	Expand capabilities and potential uses of Reverse 911 system	High	5		Calaveras Technology Services
7	Enhance GIS modeling and analysis of wildfire threat	High	3		Calaveras Technology Services
8	Pursue adoption of defensible space provision for unimproved parcels	High	2		Calaveras Planning Department/CalFire
9	Develop a business continuity plan for county departments	High	1	Consider lowering priority due to current staff time/budget	Administration
10	Pursue adoption of hillside development standards to reduce wildfire risk	High	1		Calaveras Planning Department/ Calaveras OES
11	Reduce future flood losses along Cosgrove Creek	High	1		Calaveras OES
12	Address repetitive loss properties along Cosgrove Creek	High	1		Calaveras OES
13	Work with FEMA on determining areas for detailed floodplain studies	High	1		Calaveras OES Planning Department
14	Join National Flood Insurance Program Community Rating System	High	1		Calaveras OES Planning Department
15	Improve channel maintenance and upkeep to prevent debris buildup at road bridges	High	1		Calaveras Public Works

No.	Action	Priority	Votes	Comments/Ideas for Implementation	Responsibility for Completing Worksheet
16	Promote National Flood Insurance Program to improve awareness of public and other stakeholders including realtors, lenders, insurers	High	1		Calaveras Floodplain Administrator (Community Development) <b>Angels Camp</b>
17	Improve flood warning system through better stream gage data collection	High	n/a		Calaveras OES
18	Coordinate with fire safe council to fund and expand wildfire mitigation activities	Medium			?
19	Ensure implementation of State 4290/4291 regulations	Medium			Calaveras Planning Department/ CalFire/Fire Districts?
20	Replace redwood water storage tanks	Medium		Action already developed by CCWD	CCWD
21	Mail notice to property owners about hazards and risk as part of tax bills.	Medium			?
22	Develop and maintain defensible space around Foothills Village assisted living	Medium			Angels Camp
23	Implement fuel reduction along County right of ways	Medium			Calaveras Public Works?
24	Provide flood protection for Jenny Lind water treatment plant	Medium		Action already developed by CCWD	CCWD
25	Coordinate with State OES and CCWD on new special flood hazard areas near Peachtree Dam, including notification and evacuation planning	Medium		Planning and Development Department would be partner in implementation	Calaveras OES
26	Improve hazard related information available on the County's website including on winter weather traveler information, water conservation, and links to Corps water management site and CDEC site	Medium			Calaveras Technology Services  Angels Camp
27	Identify stormwater flooding projects	Low			Calaveras Public Works Angels Camp Public Works
28	Include police and fire in planning of future development to improve knowledge of hazards	Low			Angels Camp Police Department
29	Use school resource officers to provide education on hazards/risk and preparedness and mitigation measures.	Low			Angels Camp Police Department

<b>No.</b>	<b>Action</b>	<b>Priority</b>	<b>Votes</b>	<b>Comments/Ideas for Implementation</b>	<b>Responsibility for Completing Worksheet</b>
30	Improve building permit inspection process to accurately locate access to properties	Low			Calaveras Technology Services
31	Improve coordination of joint meetings and trainings, including functional exercises	Low			Calaveras OES/ Calaveras Building Department  Angels Camp
32	Develop education and incentives program to encourage responsible water use	Low		CCWD developed action. County's action should discuss how to complement partnership	?
33	Identify needed improvements to vulnerable populations planning	Low			Calaveras Works and Human Services Agency
34	Identify critical facilities/infrastructure needing backup power sources	Low			Calaveras OES and Calaveras Public Works?

## EXAMPLE: Mitigation Action Implementation Worksheet

Jurisdiction:	Multi-jurisdictional	Priority:	High
<b>Action Title:</b>	Enhance existing centralized, interjurisdictional GIS program to improve capabilities in mitigation, preparedness, and response for all hazards.		
<b>Issue/Background:</b>	Access to current and updated GIS information is critical to effective evaluation, mitigation, and response to emergencies by all jurisdictions. This resource is already well-established in the Kings County Planning Agency and should be built upon and extended to more agencies in the county. It could be enhanced for multiple hazards.		
<b>Ideas for Implementation:</b>	The Kings County Planning Agency already maintains countywide GIS data and is sharing information resources with city planning departments. A centralized GIS program would connect first responding agencies with uniform data and would prioritize the development of critical information layers. A web-based mapping application could be developed to provide public information and restricted first responder information.		
<b>Responsible Office:</b>	Kings County Planning Agency – GIS Services Division		
<b>Partners:</b>	Cities of Avenal, Corcoran, Lemoore, and Hanford and special districts		
<b>Potential Funding:</b>			
<b>Cost Estimate:</b>	\$20,000 for all four cities to contract with county GIS services in fiscal year 2007-2008. \$25,000 for web application and \$3,000 annual maintenance. \$50,000-\$100,000 every three years for data resources updates.		
<b>Benefits: (Losses Avoided)</b>	\$1000s in potential losses avoided over the long term through enhanced, more accurate information and improved accessibility and coordination. Saves jurisdictions money by pooling resources.		
<b>Timeline:</b>	Establish GIS support agreement with cities in fiscal year 2007-2008. Aerial imagery update in summer 2007. Web application in fiscal year 2007-2008.		
<b>Completed by:</b>			

## EXAMPLE: Mitigation Action Implementation Worksheet

<b>Jurisdiction:</b>	<b>Multi-jurisdictional</b>	<b>Priority:</b>	<b>High</b>
<b>Action Title:</b>	Replace redwood water storage tanks with steel tanks		
<b>Issue/Background:</b>	The CCWD owns 11 redwood water storage tanks that are approaching 40 years of age. These tanks are made of wood and are vulnerable to fire—the 602 tank in the Jenny Lind service area was destroyed by wildfire in 2004 and had to be replaced with a steel tank. Many of these tanks are also in high wildfire risk areas. There is a strong likelihood one or more redwood tanks will be destroyed by fire in the next few years, depriving a large group of customers their drinking water and depleting water storage available for fire protection. These tanks also release small amounts of organics into the drinking water, leaving behind a taste and odor, as well as creating substrate materials for carcinogen creation		
<b>Ideas for Implementation:</b>	The CCWD plans to replace all redwood tanks due to the vulnerability to fire and to the problems with water quality. Steps will involve procuring funding and prioritizing which tanks to replace first based upon the condition of the tank, population served, and wildfire hazard present.		
<b>Responsible Office:</b>	CCWD Engineering Department		
<b>Partners:</b>	California Department of Forestry and Fire Protection		
<b>Potential Funding:</b>	District revenue from rates, fees, property taxes, interest on investments FEMA Hazard Mitigation Grant Program, Pre-Disaster Mitigation Program U.S. EPA State revolving fund grants and/or loans		
<b>Cost Estimate:</b>	The replacement cost for a typically-sized redwood tank is \$600,000. Total capital cost for replacing all redwood tanks is \$6.6 million.		
<b>Benefits: (Losses Avoided)</b>	Reliable water delivery for domestic consumption and fire flow Reduce risk of property damage Protect public health and safety		
<b>Timeline:</b>	Replace all 11 tanks within next seven years		
<b>Completed by:</b>			



# APPENDIX D: ADOPTION RESOLUTION

BOARD OF SUPERVISORS, COUNTY OF CALAVERAS

STATE OF CALIFORNIA

May 11, 2010

**RESOLUTION  
No. 10- 071**

**RESOLUTION ADOPTING THE CALAVERAS COUNTY  
LOCAL HAZARD MITIGATION PLAN**

**WHEREAS**, Calaveras County is subject to various weather related hazards including wildfires, floods, drought, landslides, severe weather, and;

**WHEREAS**, Calaveras County recognizes that disasters do not recognize city, county or special district boundaries, and;

**WHEREAS**, Calaveras County seeks to maintain and enhance both a disaster resistant county by reducing the potential loss of life, property damage, and environment degradation from natural disasters, while accelerating economic recovery from those disasters, and;

**WHEREAS**, Calaveras County is committed to increasing the disaster resistance of the infrastructure, health, housing, economy, government services, education, environment, and land use systems in Calaveras County; and;

**WHEREAS**, the federal Disaster Mitigation Act of 2000 (42 U.S.C. 5133 et. seq.) requires all cities, counties, and special districts to have adopted a Local Hazard Mitigation Plan to receive disaster mitigation funding from the Federal Emergency Management Agency (FEMA), and;

**WHEREAS**, numerous agencies in Calaveras County, including the City of Angels Camp, worked with AMEC Earth and Environmental, Inc. (a firm that specializes in hazard mitigation and emergency management) to create the

Calaveras County Multi-Hazard Mitigation Planning Project as its multi-jurisdictional local hazard mitigation plan, and;

**WHEREAS**, the Calaveras County Local Hazard Mitigation Plan was submitted and reviewed by the California Emergency Management Agency (Cal-EMA) in December 2009 and the plan was forwarded to FEMA for approval, and;

**WHEREAS**, FEMA completed an initial review of the Calaveras County Local Hazard Mitigation Plan and determined it was approved pending adoption. The prerequisite for final FEMA approval is adoption of the plan by the local governing body.

**NOW THEREFORE BE IT RESOLVED**, that Calaveras County adopts this multi-jurisdictional plan as its Local Hazard Mitigation Plan.

**ON A MOTION BY** Supervisor Thomas, seconded by Supervisor Tryon, the foregoing Resolution was duly passed and adopted this 11th day of May, 2010, by the following vote:

AYES: Supervisors Callaway, Tryon and Thomas

NOES: None

ABSENT: Supervisors Tofanelli and Wilensky

ABSTAIN: None

  
Chair, Board of Supervisors

ATTEST:

  
County Clerk and Ex-Officio Clerk to the Board of Supervisors,  
County of Calaveras County, State of California