Amador County
Local Hazard Mitigation Plan Update

October 2025









FOSTER MORRISON
CONSULTING

Executive Summary

Amador County, five incorporated communities, and two special districts prepared this Local Hazard Mitigation Plan (LHMP) Update to the Federal Emergency Management Agency (FEMA) approved 2020 Amador County LHMP. This Amador County LHMP is a multi-jurisdictional plan that geographically covers the entire area within Amador County's jurisdictional boundaries (hereinafter referred to as the Planning Area). The following jurisdictions participated in the planning process and are seeking FEMA approval of the LHMP Update:

- Amador County*
- City of Amador City*
- City of Ione*
- City of Jackson*
- City of Plymouth*
- City of Sutter Creek*
- Amador Water Agency*
- Jackson Valley Irrigation District*

* Participated in 2020 Amador County LHMP

4 jurisdictions that were approved for the 2020 LHMP, but are not seeking approval for this Plan Update include:

- Amador Fire Safe Council
- Lockwood Fire Protection District
- Pine Grove Community Services District
- River Pines Public Utility District

The purpose of this 2025 Amador County LHMP Update and hazard mitigation planning process is to reduce or eliminate long-term risk to people and property, critical facilities and infrastructure, natural and historic and cultural resources, and other community assets from future hazard events and natural disasters. This LHMP Update demonstrates the participating jurisdictions' commitment to reducing risks from hazards and serves as a tool to help decision makers direct mitigation activities and resources. This LHMP Update was also developed in order for the participating jurisdictions to be eligible for certain federal disaster assistance, specifically, the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Grant Program (HMGP), Building Resilient Infrastructure and Communities (BRIC) program, and the Flood Mitigation Assistance (FMA) program.

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 through natural hazard mitigation.

2025 LHMP Update Plan Development Process

Hazard mitigation planning is the process through which hazards that threaten communities are identified, likely impacts determined, mitigation goals set, and appropriate mitigation strategies determined, prioritized, and implemented. This LHMP Update documents the 2025 hazard mitigation planning process and identifies relevant hazards, community risk and vulnerabilities, and mitigation strategies the participating jurisdictions will use to decrease vulnerability and increase resiliency and sustainability in the Amador County Planning Area.

This LHMP Update was prepared pursuant to the requirements of the Disaster Mitigation Act of 2000 (Public Law 106-390), 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, and current FEMA guidance. Amador County jurisdictions followed a planning process prescribed by FEMA as detailed in Table ES-1.

Table ES-1 Local Hazard Mitigation Planning Process

DMA Process	Modified CRS Process
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

The planning process began with the organizational phase to establish the Hazard Mitigation Planning Committee (HMPC), comprised of key Amador County jurisdictional representatives, and other local and regional stakeholders; to involve the public; and to coordinate with other departments and agencies. A detailed risk assessment was then conducted followed by the development of a focused mitigation strategy for the Amador County Planning Area and specific to each participating jurisdiction. Once approved by Cal OES and FEMA, this 2025 LHMP Update will be adopted and implemented by the participating jurisdictions over the next five years.

Risk Assessment

A natural hazard risk assessment was conducted that identified and profiled hazards that pose a risk to the Amador County Planning Area and to each participating jurisdiction, assessed the vulnerability of the Amador County Planning Area and jurisdictions to these hazards, and examined the existing jurisdictional capabilities to mitigate identified hazards.

The Amador County Planning Area is vulnerable to numerous hazards that are identified, profiled, and analyzed in this 2025 LHMP Update. Wildfires, floods, earthquakes, drought, dam failure, and other severe weather events are among the hazards that can have a significant impact on the Planning Area. Table ES-2 details the hazards identified for this 2025 LHMP Update.

Table ES-2 Amador County Planning Area Hazard Identification Assessment

Hazard	Geographic Extent	Likelihood of Future Occurrences	Magnitude/ Severity	Significance	Climate Change Influence
Agricultural Hazards (severe weather/pests/invasive species)	Extensive	Highly Likely	Limited	Medium	Medium
Avalanche	Limited	Likely	Critical	Medium	Medium
Climate Change	Extensive	Likely	Limited	Medium	--
Dam Failure	Limited	Unlikely	Critical	Medium	Medium
Drought & Water shortage (w/ tree mortality)	Extensive	Likely	Critical	Medium	High
Earthquake (w/subhazards)	Extensive	Unlikely	Catastrophic	Medium	Low
Floods: 1%/0.2% annual chance (w/ levee failure)	Significant	Occasional/Unlikely	Critical	Medium	Medium
Floods: Localized Stormwater	Extensive	Highly Likely	Limited	Medium	Medium
Landslide, Mudslide, Debris Flow	Limited	Likely	Critical	Medium	Medium
Severe Weather: Extreme Cold, Freeze, and Snow	Extensive	Highly Likely	Limited	Medium	Medium
Severe Weather: Extreme Heat	Extensive	Highly Likely	Limited	Medium	High
Severe Weather: Heavy Rains and Storms (Hail, Lightning)	Extensive	Highly Likely	Limited	Medium	Medium
Severe Weather: High Winds and Tornadoes	Extensive	Highly Likely	Limited	Medium	Medium
Wildfire (w/smoke and air quality)	Extensive	Highly Likely	Catastrophic	High	Medium

Geographic Extent

Limited: Less than 10% of planning area

Significant: 10-50% of planning area

Extensive: 50-100% of planning area

Likelihood of Future Occurrences

Highly Likely: Near 100% chance of occurrence in next year, or happens every year.

Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.

Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.

Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity

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

Critical: 25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability

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

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

Significance

Low: Minimal potential impact

Medium: Moderate potential impact

High: Widespread potential impact

Climate Change Influence

Low: Minimal potential impact

Medium: Moderate potential impact

High: Widespread potential impact

Mitigation Strategy

Based on the results of the risk assessment, a mitigation action strategy was developed to reduce the Amador County Planning Area's risk and vulnerability to identified natural hazards. The resulting mitigation strategy is comprised of goals and objectives, and a mitigation action plan which includes a series of mitigation actions, projects, and implementation measures. The 2025 LHMP Update Goals and Objectives are detailed below followed by a summary table of the 2025 mitigation actions and projects.

Goal #1: Provide protection for people's lives, property, public health, and the environment and reduce risk and losses from natural hazards

- Minimize impact to existing development
- Minimize impact to future development
- Minimize economic and resource impact
- Promote resiliency strategies
- Consider and prioritize the use of prevention measures such as land use controls and code enhancements

Goal #2: Provide protection for critical facilities, infrastructure, utilities and services from hazard impacts

- Protect and improve resiliency of critical facilities, services, and community lifelines from hazard impacts to protect life and reduce loss of property
- Implement critical facility upgrades, retrofits, and mitigation measures to ensure reliability of services
- Update and maintain GIS list of critical facilities: Essential Services, At-Risk Populations, Hazardous Materials Facilities

Goal #3: Improve community (public and stakeholder) awareness, education, and preparedness to natural hazard events

- Enhance public/stakeholder outreach, education and preparedness planning for all hazards of concern and for all populations, including underserved and vulnerable populations
- Reinforce emergency response systems
- Foster household preparedness and self responsibility for hazard mitigation
- Increase public and stakeholder knowledge and awareness about the risk and vulnerability to identified hazards and how to take responsibility for and mitigate these risks with a focus on high priority hazards such as wildfire and flood
- Leverage existing public outreach and education mechanisms such as community coalitions and other existing forums; expand social media presence and local community boards
- Increase use of technology to communicate hazard information (e.g., GIS)
- Provide education and outreach on evacuation routes, signage, roles and responsibilities, as well as on various emergency communication modes

Goal #4: Build community resilience and increase communities' ability to be prepared for, respond to, and recover from a disaster event

- Improve community capabilities to mitigate hazards, reduce losses, and to better recover from disasters

- Integrate mitigation into planning and decision making by embedding mitigation strategies into everyday county policies, capital projects, and other similar mechanisms
- Improve interagency (local, state, federal) emergency coordination, communication, and operational capacity to ensure effective community preparedness, response and recovery
- Maintain current service levels and continue internal and operational training
- Enhance alert and warning systems and ensure effective system redundancies
- Improve emergency communication systems with reliable backup (e.g., cell phones, radios, sirens, reverse 911, multi-media, etc.)
- Improve identification, education, and emergency notifications of vulnerable and underserved populations
- Enhance the use of shared resources/Develop a strong mutual aid support system
- Improve and make better use of technology (e.g., GIS)
- Establish and expand GIS technologies to map hazards and community assets for mitigation planning and to support hazard response and community recovery
- Maintain coordination of disaster plans, data, and information with changing DHS/FEMA and State requirements
- Support and build upon evacuation planning and sheltering efforts in the County
- Mitigate future hazard losses through adequate land use/facilities planning

Goal #5: Reduce fire severity and intensity in Amador County and surrounding lands

- Reduce life safety issues, property loss, natural resource impacts, and damages associated with wildfires
- Prevent and reduce wildfire ignitions
- Increase agency and jurisdictional coordination to reduce wildfire risk, severity and intensity
- Increase vegetation management countywide to reduce wildfire losses
- Be proactive in identifying and prioritizing mitigation funding to minimize risk and vulnerability to wildfire
- Prioritize wildfire mitigation around critical facilities and infrastructure
- Support efforts to gain access to affordable insurance for all communities including underserved and vulnerable populations

Goal #6: Maintain FEMA Eligibility/Position the communities for Grant funding

- Improve community ability to be competitive/successful with grant funding opportunities from application development to project delivery
- Establish and share best practices among agencies for development of grant applications, project permits, etc.
- Educate (and advocate) local officials to support local access to funding.

Based on the risk assessment review and goal setting process, the HMPC identified mitigation actions (Table ES-3), which provide direction for reducing future hazard-related losses within the Amador County Planning Area and specific to each participating jurisdiction.

Table ES-3 Amador County Planning Area Mitigation Actions

Action Title	New Action/ Previous Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Amador County					
Multi-Hazard Actions					
Action 1. Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	Previous Action	X	X		Prevention
Action 2. Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness	Previous Action	X	X	X	Prevention Public Education
Action 3. Backup Power Projects for Critical Facilities & Infrastructure	Previous Action	X	X		Prevention Property Protection Natural Resource Protection
Action 4. Establish and Fund a Full-Time Geographic Information Systems (GIS) position for Hazard Mitigation and Emergency Planning	Previous Action	X	X		Prevention Emergency Services
Action 5. Enhance and Harden Cellular and Repeater Communications Infrastructure Countywide	Previous Action	X	X		Property Protection Structural
Action 6. Upgrade and Replace Countywide Emergency Radio Communications Infrastructure	Previous Action	X	X		Prevention Emergency Services
Action 7. Emergency Water Storage & Hauling Infrastructure Project	Previous Action	X	X		Prevention Emergency Services
Action 8. Launch of PHapp Mobile Preparedness Public Health Application	New Action	X	X		Prevention Property Protection Natural Resource Protection
Agricultural Hazard Actions					
Action 9. Invasive Pests (Insect)	Previous Action	X	X		Property Protection Natural Resource Protection
Action 10. Invasive Pests (Weeds)	Previous Action	X	X		Property Protection Natural Resource Protection
Climate Change Actions					
Action 11. Climate Resilience through Multi-Hazard Mitigation	New Action	X	X		Prevention Property Protection Natural Resource Protection

Action Title	New Action/ Previous Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Dam Failure, Flood, Localized Flood, and Heavy Rains and Storm Actions					
Action 12. Flood & Dam Failure Resilience Plan	New Action	X	X	X	Prevention Property Protection Natural Resource Protection
Earthquake Actions					
Action 13. Amador County Earthquake Preparedness & Seismic Resilience Plan	New Action	X	X		Prevention Property Protection Natural Resource Protection
Landslide Actions					
Action 14. Landslide Hazard Mitigation & Slope Stability Plan	New Action	X	X		Prevention Property Protection Natural Resource Protection
Severe Weather: Extreme Cold, Freeze, and Snow Actions					
Action 15. Severe Winter Weather Resilience Plan	New Action	X	X		Prevention Property Protection Natural Resource Protection
Severe Weather: Extreme Heat Actions					
Action 16. Extreme Heat Resilience Plan	New Action	X	X		Prevention Property Protection Natural Resource Protection
Wildfire, Drought, and Extreme Heat Actions					
Action 17. Tree Mortality Program Coordinator	New Action	X	X		Prevention Property Protection Natural Resource Protection
Action 18. Countywide wildfire resiliency coordination GIS mapping project to support fuels reduction efforts	New Action	X	X		Prevention Property Protection Natural Resource Protection
Action 19. Forest Health Projects	New Action	X	X		Prevention Property Protection Natural Resource Protection
Action 20. Ingress/Egress Phases I and II: Public Education and Fuels Reduction	Previous Action	X	X		Prevention Property Protection Natural Resource Protection
Action 21. Community Fuel Break Network	Previous Action	X	X		Prevention Property Protection Natural Resource Protection

Action Title	New Action/ Previous Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Action 22. Defensible Space Assistance	New Action	X	X		Prevention Property Protection Natural Resource Protection
Action 23. Defensible Space Public Education	New Action	X	X		Public Education
Action 24. Develop Amador County CWPP and Implementation of Identified Projects	Previous Action	X	X		Prevention Property Protection Public Education Natural Resource Protection
Action 25. Vegetation Management projects – Monitoring and Maintenance	Previous Action	X	X		Property Protection Natural Resource Protection
City of Amador City					
Action 1. Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	Previous Action	X	X		Prevention
Action 2. Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness	Previous Action	X	X	X	Prevention Public Education
Action 3. Old Hwy 49/Main Street Slope and Road Stabilization	Previous Action	X	X	X	Property Protection Natural Resource Protection
Action 4. Cooling Center/Severe Weather Center	New Action	X	X		Structural
Action 5. Amador Creek Annual Cleaning projects	New Action	X	X	X	Property Protection Natural Resource Protection
Action 6. Stormwater Masterplan Development and Implementation	Previous Action	X	X	X	Property Protection Natural Resource Protection
Action 7. Vegetation Management and Perimeter Wildfire Protection Fuel Break	Previous Action	X	X		Property Protection Natural Resource Protection
City of Ione					
Action 1. Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	Previous Action	X	X		Prevention
Action 2. Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness	Previous Action	X	X	X	Prevention Public Education
Action 3. Develop a Climate Adaptation Plan	New Action	X	X	X	Prevention Public Education

Action Title	New Action/ Previous Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Action 4. Implement Water Conservation and Drought Preparedness Program	New Action	X	X		Prevention Property Protection Natural Resource Protection
Action 5. Update Floodplain Ordinance and Join Community Rating System (CRS)	Previous Action	X	X	X	Prevention Property Protection Natural Resource Protection
Action 6. Develop a Storm Water Master Plan	Previous Action	X	X	X	Prevention Public Education
Action 7. Establish a Cooling Center Network and Shelter Upgrades	Previous Action	X	X		Emergency Services Prevention Property Protection Natural Resource Protection
Action 8. Implement Urban Forestry and Debris Management Program	New Action	X	X		Prevention Property Protection Natural Resource Protection
Action 9. Enhance Wildfire Preparedness and Defensible Space	New Action	X	X		Prevention Property Protection Natural Resource Protection
Action 10. Develop a Sustainable Sutter Creek Maintenance Program	New Action	X	X		Prevention Property Protection Natural Resource Protection
City of Jackson					
Action 1. Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	Previous Action	X	X		Prevention
Action 2. Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness	Previous Action	X	X	X	Prevention Public Education
Action 3. Creation of Drone Program	New Action	X	X		Property Protection Natural Resource Protection
Action 4. Backup Power Projects for Critical Facilities and Infrastructure (e.g. Generators, Batteries, Solar, Etc.)	New Action	X	X		Property Protection Structural
Action 5. Creek Excavation and Annual Clearing Projects	Previous Action	X	X	X	Property Protection Natural Resource Protection
Action 6. Pitt Street Bridge Replacement	New Action	X	X	X	Structural

Action Title	New Action/ Previous Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Action 7. Mattley Street Erosion Project	New Action	X	X	X	Prevention Property Protection Natural Resource Protection
Action 8. Home Hardening Education Program/Go Bags, ARC	New Action	X	X		Prevention Property Protection Natural Resource Protection
Action 9. Defensible Space Public Education	Previous Action	X	X		Public Education
Action 10. Fuel Break Projects	New Action	X	X		Prevention Property Protection Natural Resource Protection
Action 11. Jackson Fire Station 131 Replacement Project	New Action	X	X		Structural
City of Plymouth					
Action 1. Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	Previous Action	X	X		Prevention
Action 2. Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness	Previous Action	X	X	X	Prevention Public Education
Action 3. Develop a Community Wildfire Prevention Plan	New Action	X	X		Prevention Public Education
Action 4. Repairs of Old Sacramento Road to Reduce Flooding and Road Blockage	New Action	X	X	X	Prevention Property Protection Natural Resource Protection
Action 5. Additional Water Tank Storage	Previous Action	X	X		Structural
City of Sutter Creek					
Action 6. Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	Previous Action	X	X		Prevention
Action 7. Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness	Previous Action	X	X	X	Prevention Public Education
Action 8. Auditorium, Community Center, and WWTP Backup Power Generators	New Action	X	X	X	Structural
Action 9. Development of Walking Paths, Native Tree Protection, and Native Tree Species Planting	Previous Action	X	X		Prevention Property Protection Natural Resource Protection

Action Title	New Action/ Previous Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Action 10. Henderson Underdrain	New Action	X	X	X	Structural
Action 11. Recycled Water System for New Development	New Action	X	X		Structural
Action 12. Early EQ Warning Program	New Action	X	X		Prevention Property Protection Natural Resource Protection
Action 13. Sutter Creek Excavation/Annual Cleaning Projects	Previous Action	X	X	X	Prevention Property Protection Natural Resource Protection
Action 14. Stormwater Masterplan Development and Implementation	Previous Action	X	X	X	Prevention Property Protection Natural Resource Protection
Action 15. Culvert Cleaning Projects	Previous Action	X	X	X	Prevention Property Protection Natural Resource Protection
Action 16. Karsan Drive Tributary Slope and Road Stabilization	New Action	X	X		Structural Property Protection Natural Resource Protection
Action 17. Cooling Center/Severe Weather Center	New Action	X	X		Prevention Property Protection Natural Resource Protection
Action 18. Vegetation Management Enforcement and Perimeter Wildfire Protection Fuel break	Previous Action	X	X		Prevention Property Protection Natural Resource Protection
Amador Water Agency					
Action 19. AWA Tank Flexibility Connectors	New Action	X	X		Structural
Action 20. Camanche WWTP Treatment, Disposal, and Effluent Storage Upgrades	New Action	X	X		Structural Property Protection Natural Resource Protection
Action 21. CAWP Transmission Main Improvements and Tank D Replacement	New Action	X	X		Structural Property Protection Natural Resource Protection
Action 22. CAWP Tiger Creek Afterbay Alternate Supply	New Action	X	X		Structural Property Protection Natural Resource Protection

Action Title	New Action/ Previous Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Action 23. Ione WTP Backwash Handling Improvements	New Action	X	X		Structural Property Protection Natural Resource Protection
Action 24. Tanner Clearwell Replacement	New Action	X	X		Structural Property Protection Natural Resource Protection
Action 25. Tanner WTP Backwash Drying Beds	New Action	X	X		Structural Property Protection Natural Resource Protection
Action 26. Tank Replacement/ Tank Repair	New Action	X	X		Structural Property Protection Natural Resource Protection
Action 27. Amador and Ione Water Systems Taste and Odor Mitigation	Previous Action	X	X		Structural Property Protection Natural Resource Protection
Action 28. Replacement of Two Hypalon Lined and Covered Tanks with New Tanks	Previous Action	X	X		Structural Property Protection Natural Resource Protection
Action 29. Mt. Crossman Main Area Tank for Upper CAWP System	Previous Action	X	X		Structural Property Protection Natural Resource Protection
Action 30. Martell Regional Lift Station and Collection System Improvements	New Action	X	X		Structural Property Protection Natural Resource Protection
Action 31. Mace Meadows Pump Station Flooding	New Action	X	X	X	Structural Property Protection Natural Resource Protection
Action 32. Water Treatment Plant Raw Water Bypasses	New Action	X	X		Structural Property Protection Natural Resource Protection
Action 33. Upgrade Fire Pumps	New Action	X	X		Structural Property Protection Natural Resource Protection
Action 34. Tanner WTP Flow Control and Reliability Improvements	New Action	X	X		Structural Property Protection Natural Resource Protection

Action Title	New Action/ Previous Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Action 35. Ione Reliability Capacity Expansion and Site Security	New Action	X	X		Structural Property Protection Natural Resource Protection
Jackson Valley Irrigation District					
Action 36. Aquatic Invasive Species Monitoring Plan and Decontamination Station	Previous Action	X	X		Natural Resource Protection
Action 37. Long Term Water Solutions Analysis Due to Climate Change	Previous Action	X	X		Property Protection Natural Resource Protection
Action 38. Jackson Creek Dam Spillway Apron Extension Project	Previous Action	X	X	X	Structural Property Protection Natural Resource Protection
Action 39. Lake Amador Spillway Rubber Dam Project	Previous Action	X	X	X	Structural Property Protection Natural Resource Protection
Action 40. JVID Water Procurement and Additional Water Storage Study	Previous Action	X	X		Property Protection Natural Resource Protection
Action 41. Jackson Creek Streambank and Levee Maintenance Project	Previous Action	X	X	X	Structural Property Protection Natural Resource Protection
Action 42. Lake Amador Drive Box Culvert Expansion Project	Previous Action	X	X	X	Structural Property Protection Natural Resource Protection

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Annex D: City of Plymouth

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Annex F: Amador Water Agency

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Appendices

Appendix A: Planning Process

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Appendix C: Mitigation Strategy

Appendix D: Adoption Resolution

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Appendix F: Critical Facilities

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Abbreviations and Acronyms

Acronym	Definition
AB	Assembly Bill
AF	Acre-feet
ALERT	Automated Local Evaluation in Real Time
APG	California Adaptation Planning Guide
AQI	Air Quality Index
ASTDR	Agency for Toxic Substances and Disease Registry's
BAM	Best Available Map
BCA	Benefit Cost Analysis
BCEGS	Building Code Effectiveness Grading Schedule
BFE	Base Flood Elevation
BLM	Bureau of Land Management
BRIC	Building Resilient Infrastructure and Communities
CA-DWR	California Department of Water Resources
CAISO	California Independent System Operator
Cal EPA	Environmental Protection Agency
Cal OES	California Office of Emergency Services
CAP	Climate Adaptation Plan
CAS	Climate Adaptation Strategy
CAV	Community Assistance Visit
CBC	California Building Code
CCHPR	Climate Change and Health Profile Report
CCSM	Community Climate System Model
CDAA	California Disaster Assistance Act
CDBG	Community Development Block Grant
CDC	Center for Disease Control
CDFW	California Department of Fish and Wildlife
CEMP	Comprehensive Emergency Management Program
CEQA	California Environmental Quality Act
CERT	Community Emergency Response Team
CFR	Code of Federal Regulations
CGS	California Geological Survey
CIP	Capital Improvements Plan
CLOMR	Conditional Letter of Map Revision
CNPS	California Native Plant Society
CNRA	California Natural Resource Agency
COG	Continuity of Government
COO	Continuity of Operations

Acronym	Definition
CPUC	California Public Utilities Commission
CRS	(National Flood Insurance Program's) Community Rating System
CRV	Contents Replacement Value
CVP	Central Valley Project
CWPP	Community Wildfire Protection Plan
DAC	Disadvantaged Community
DFIRM	Digital Flood Insurance Rate Map
DMA	Disaster Mitigation Act of 2000
DOF	Department of Finance
DSOD	Division of Safety of Dams
EF	Enhanced Fujita
EOC	Emergency Operations Center
EPSS	Enhanced Powerline Safety Settings
ESPM	University of California, Berkeley's Department of Environmental Science, Policy, and Management
ETSU	Enhanced Treatment and Site Upgrade
F	Fujita
FEMA	Federal Emergency Management Agency
FHSZ	Fire Hazard Severity Zone
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
FMA	Flood Mitigation Assistance Program
FPA	Floodplain Administrator
FRA	Federal Responsibility Area
FRAP	Fire and Resource Assessment Program
FWS	US Fish and Wildlife Service
GFDL	Geophysical Fluid Dynamics Laboratory
GHG	Greenhouse Gases
GIS	Geographic Information Systems
GPH	Gallons per Hour
GRASP	Geospatial Research, Analysis & Services Program
HHPD	High Hazard Potential Dam
HI	Heat Index
HMGP	Hazard Mitigation Grant Program
HMPC	Hazard Mitigation Planning Committee
ICS	Incident Command System
IPCC	Intergovernmental Panel on Climate Change
IRWM	Integrated Regional Water Management
LHMP	Local Hazard Mitigation Plan
LOMA	Letter of Map Amendment

Acronym	Definition
LOMC	Letters of Map Change
LOMR	Letter of Map Revision
LRA	Local Responsibility Area
MHI	Median Household Income
MMI	Modified Mercalli Intensity Scale
MSL	Mean Sea Level
MW	Megawatt
NASA	National Aerospace and Science Agency
NAVD	North American Vertical Datum
NCDC	National Climactic Data Center
NDMC	National Drought Mitigation Center
NEHRP	National Earthquake Hazards Reduction Program
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NGVD	National Geodetic Vertical Datum
NIDIS	National Integrated Drought Information System
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NWS	National Weather Service
OHP	Office of Historic Preservation
PDM	Pre-Disaster Mitigation Program
PIT	Point-in-time Homeless Count
PM	Particulate Matter
PNAS	Proceedings of the National Academy of Sciences
PSPS	Public Safety Power Shutoff
RCP	Representative Concentration Pathway
RHNA	Regional Housing Need Allocation
SAC-SJ	Sacramento-San Joaquin Valley
SB	Senate Bill
SBA	Small Business Administration
SEMS	Standard Emergency Management System
SFHA	Special Flood Hazard Area
SGMA	Sustainable Groundwater Management Act
SHBC	State Historical Building Code
SRA	State Responsibility Area
SVI	Social Vulnerability Index
SWP	State Water Project
UAV	Unmanned Aerial Vehicle
UBC	Uniform Building Code

Acronym	Definition
UCERF	Uniform California Earthquake Rupture Forecast
UFMP	Urban Forest Management Plan
UHF	Ultra High Frequency
UNFCCC	United Nations Framework Convention on Climate Change
UPRR	Union Pacific Railroad
URM	Unreinforced Masonry
USACE	US Army Corp of Engineers
USDA	United States Department of Agriculture
USGS	United States Geologic Survey
UWMP	Urban Water Management Plan
VHFHSZ	Very High Fire Hazard Severity Zone
WCD	Water Control District
WRCC	Western Regional Climate Center
WSOC	Wildfire Safety Operations Center
WUI	Wildland Urban Interface
WWTP	Wastewater Treatment Plant

Chapter 1 Introduction

1.1 Purpose

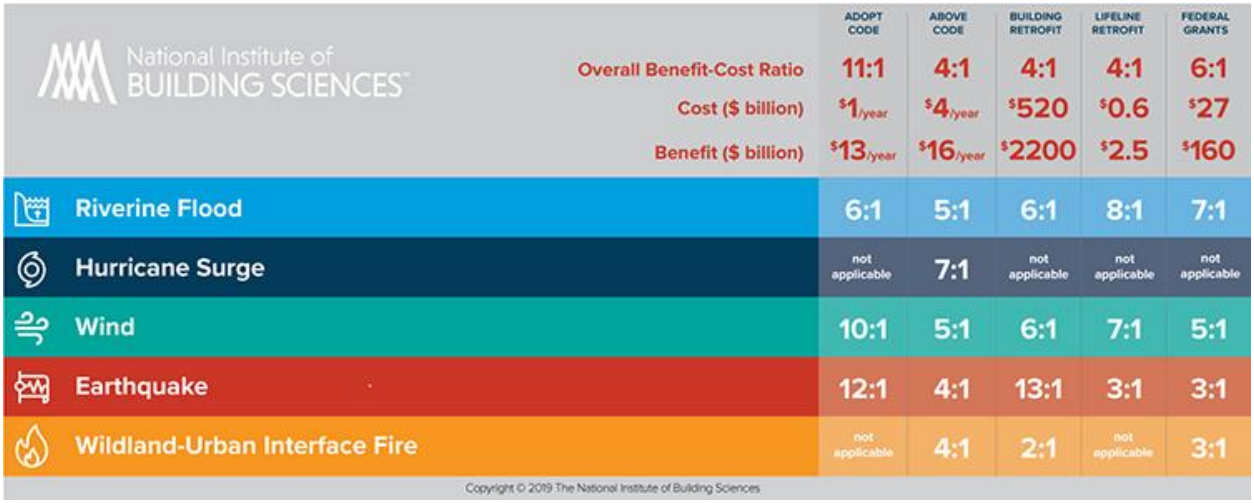
Amador County, five incorporated communities, and two special districts prepared this 2025 Local Hazard Mitigation Plan (LHMP) Update to the Federal Emergency Management Agency (FEMA) approved 2020 Amador County LHMP. The purpose of this LHMP Update is to guide hazard mitigation planning to better protect the people and property of the County from the effects of hazard events and natural disasters. This LHMP Update demonstrates the communities' commitment to reducing risks from hazards and serves as a tool to help decision makers direct mitigation activities and resources. This LHMP Update was also developed, among other things, to ensure Amador County and participating jurisdictions' continued eligibility for certain federal disaster assistance: specifically, the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM) program, Building Resilient Infrastructure and Communities (BRIC) program, and the Flood Mitigation Assistance (FMA) program.

1.2 Background and Scope

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 most expenses to insurance companies and nongovernmental organizations are not reimbursed by tax dollars. Although the timing of natural disasters is unpredictable, their occurrence is largely predictable over time, and much of the damage caused by these events can be significantly reduced.

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 provide evidence that, overall, mitigation activities are highly cost-effective investments. On average, each dollar spent on mitigation saves society an average of $6 in avoided future losses in addition to saving lives and preventing injuries (National Institute of Building Science Multi-Hazard Mitigation Council 2019 Interim Report) (see Figure 1-1).

Figure 1-1 Natural Hazard Mitigation Savings by Hazard Type and Mitigation Type



Source: National Institute of Building Science Multi-Hazard Mitigation Council 2019 Interim Report

Hazard mitigation planning is the process through which hazards are identified, likely impacts determined, mitigation goals set, and appropriate mitigation strategies determined, prioritized, and implemented. This plan documents Amador County's hazard mitigation planning process and identifies relevant hazards and vulnerabilities and strategies the County and participating jurisdictions will use to decrease vulnerability and increase resiliency and sustainability in the community.

This Amador County 2025 LHMP is a multi-jurisdictional plan that geographically covers the entire area within Amador County's jurisdictional boundaries (hereinafter referred to as the Planning Area). The following jurisdictions participated in the planning process and are seeking FEMA approval of the LHMP Update:

- Amador County*
- City of Amador City*
- City of Ione*
- City of Jackson*
- City of Plymouth*
- City of Sutter Creek*
- Amador Water Agency*
- Jackson Valley Irrigation District*

* Participated in 2020 Amador County LHMP

4 jurisdictions that were approved for the 2020 LHMP, but are not seeking approval for this Plan Update include:

- Amador Fire Safe Council
- Lockwood Fire Protection District
- Pine Grove Community Services District
- River Pines Public Utility District

This LHMP Update 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. (Hereafter, these requirements and regulations will be referred to collectively as the Disaster Mitigation Act (DMA) or DMA 2000.) This planning effort also follows FEMA's most current effective LHMP Preparation and Review Guidance, LHMP Policy Guide FP 206-21-0002 effective April 11, 2025. While DMA 2000 emphasized the need for mitigation plans and more coordinated mitigation planning and implementation efforts, the regulations establish 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). Because the Amador County Planning Area is subject to many kinds of hazards, access to these programs is vital.

Information in this LHMP Update 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 public health and safety and critical community facilities; reducing liability exposure; and minimizing overall community impacts and disruptions. In the past, the Amador County Planning Area has been affected by numerous hazards on multiple occasions. The participating jurisdictions are thus committed to reducing future impacts from hazard events and maintaining eligibility for mitigation-related federal funding.

1.3 Amador County Profile

Amador County is located in the foothills of the Sierra Nevada Range, approximately 25 miles east of Sacramento. State Route (SR) 49 traverses the county from north to south along the Mother Lode, connecting the cities of Plymouth, Sutter Creek, Amador City, and Jackson. SR 104 and SR 124 connect Ione with neighboring areas of Amador and Sacramento Counties, and SR 16 connects the county with Sacramento to the west. SR 88 extends from Stockton on the west, through the county to the Kirkwood ski resort, passing through Jackson, and the unincorporated communities of Martell, Pine Grove, Pioneer, Red Corral, and Buckhorn. SR 88 is an important route over the Sierra Nevada, connecting the Central Valley to U.S. 395 in the eastern Sierra Nevada.

Amador County is bordered by El Dorado County on the north, Alpine County on the east, Calaveras County on the south, and Sacramento and San Joaquin Counties on the west. The only public airport in Amador County is Westover Field, located in Martell. Private airports in the County include the Eagle's Nest Airport in the northwestern portion of the county, south of SR 16. The former Amador Central rail line extends from Ione to Martell, and connects to active Union Pacific lines in the Central Valley.

A map of the County is shown in Figure 1-2. Multiple entities own land in Amador County. A land ownership map can be seen on Figure 1-3 and is detailed in Table 1-1.

Figure 1-2 Amador County Planning Area

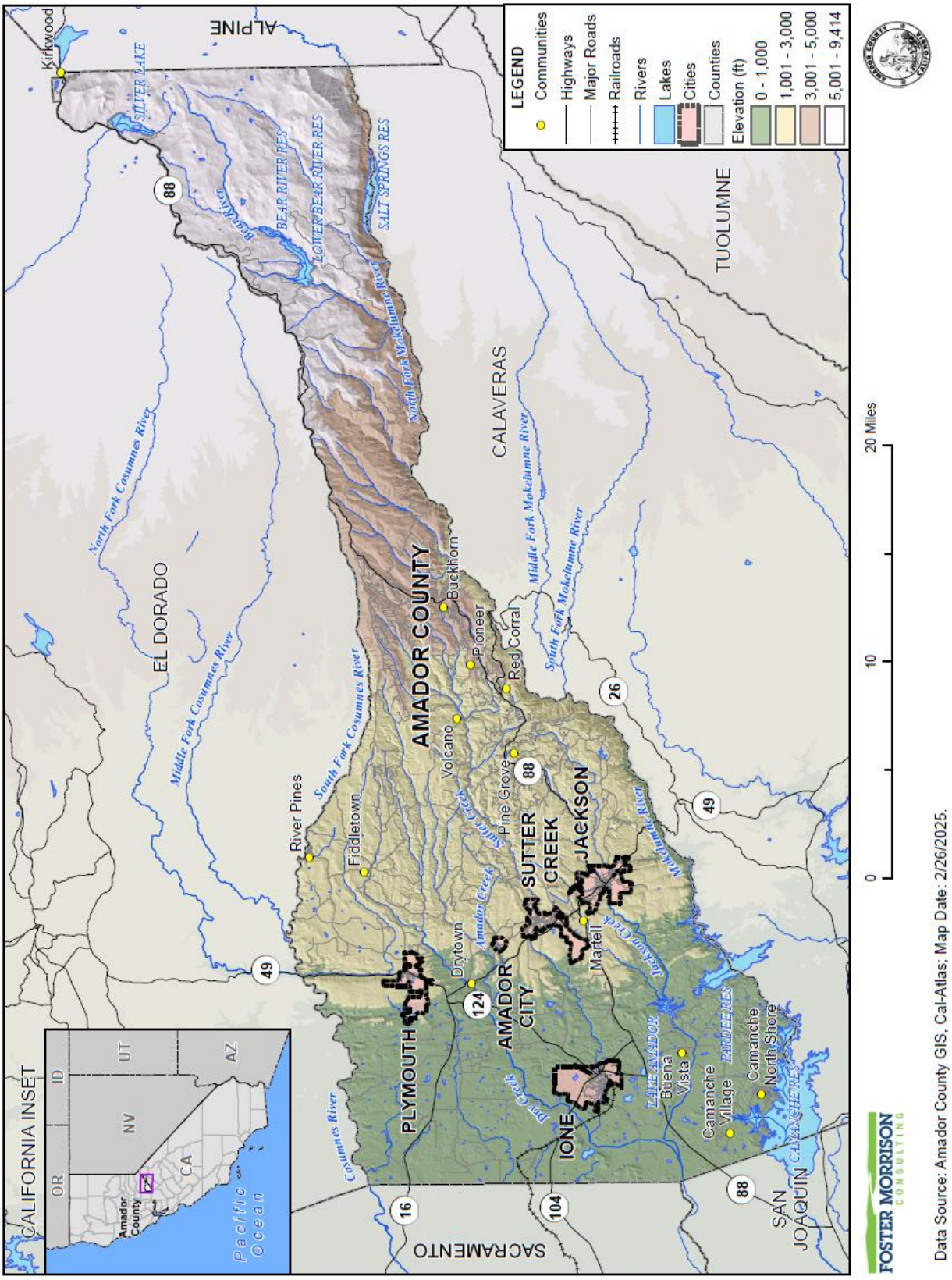


Figure 1-3 Amador County Planning Area – Land Ownership

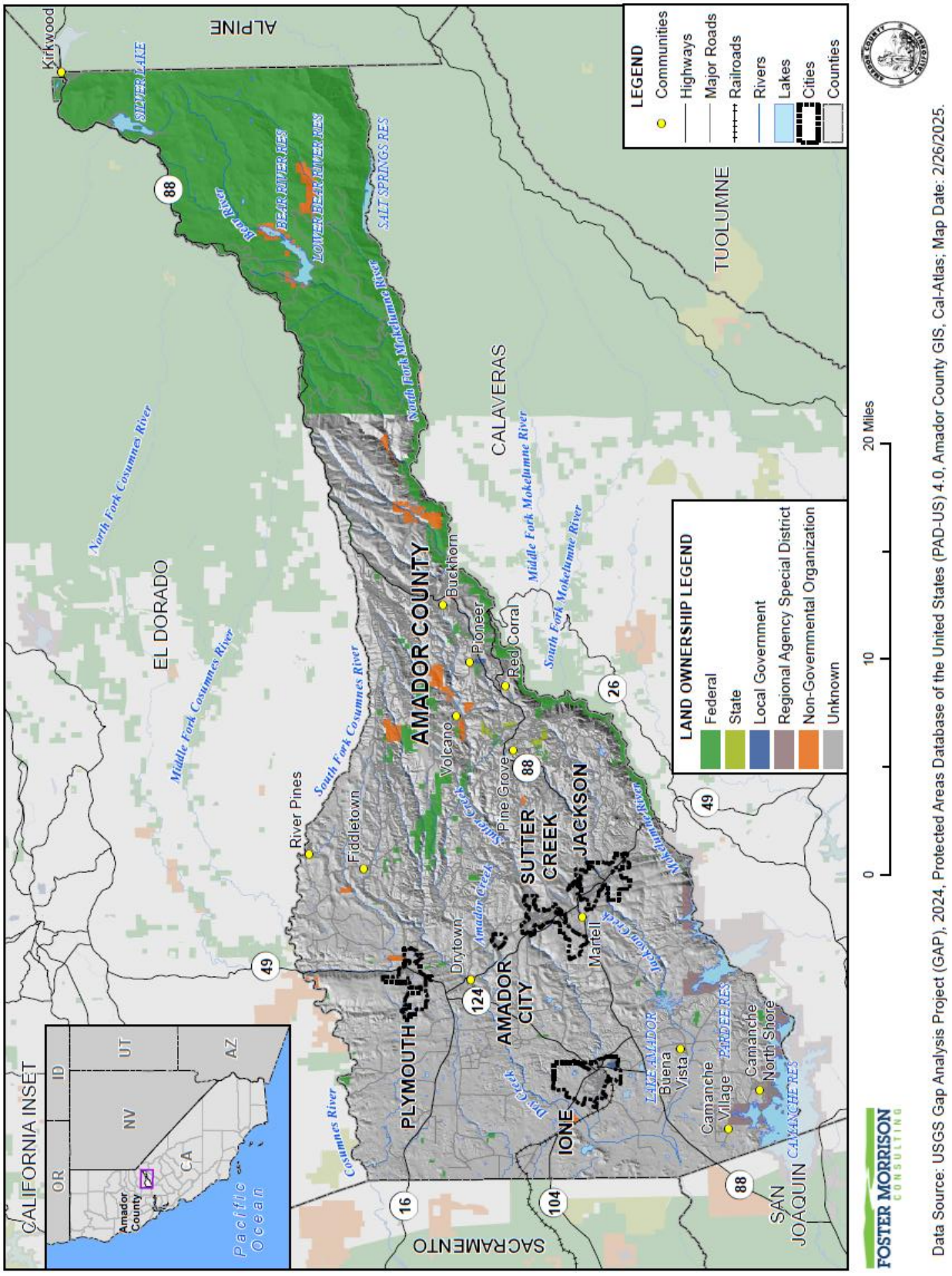


Table 1-1 Amador County Planning Area – Land Ownership by Jurisdiction

Jurisdiction / Land Ownership	Total Acres	% of Total Acres
Amador City		
Local Government	1.46	0.000%
Non-Designated Land Ownership (Countywide)*	196.56	0.038%
Amador City Total	**198.02**	**0.039%**
Ione		
Local Government	92.60	0.018%
Non-Designated Land Ownership (Countywide)*	2,866.15	0.558%
Ione Total	**2,958.75**	**0.576%**
Jackson		
Local Government	14.57	0.003%
Unknown/Other	0.97	0.000%
Non-Designated Land Ownership (Countywide)*	2,283.06	0.444%
Jackson Total	**2,298.59**	**0.447%**
Plymouth		
Local Government	27.81	0.005%
Non-Governmental Organization	0.80	0.000%
Non-Designated Land Ownership (Countywide)*	1,672.77	0.326%
Plymouth Total	**1,701.38**	**0.331%**
Sutter Creek		
Local Government	3.45	0.001%
Non-Designated Land Ownership (Countywide)*	1,713.39	0.333%
Sutter Creek Total	**1,716.84**	**0.334%**
Unincorporated Amador County		
Federal	223,196.50	43.434%
Local Government	72.95	0.014%
Non-Governmental Organization	4,637.08	0.902%
Parks/Recreation/Irrigation/Utility District	8,298.38	1.615%
State	598.43	0.116%
Unknown/Other	298.67	0.058%
Non-Designated Land Ownership (Countywide)*	267,895.65	52.133%
Unincorporated Amador County Total	**504,997.67**	**98.273%**
Grand Total	**513,871.25**	**100.000%**

Source: USGS

*This category is all other "blank/no data" areas

1.3.1. History

The eastern Miwok historically occupied Amador County and surrounding areas to the west. While the Plains Miwok shared a common language and cultural background, they consisted of a number of separate and politically independent groups. Each group used a number of permanently inhabited and seasonally occupied locales. The eastern Miwok relied on a broad spectrum of plant and animal food sources. Of the plant species, the Plains Miwok most valued the valley oak, but also used buckeye, laurel, and hazelnut. Various seeds include wild oats and balsam root, several species of edible roots, and greens such as wild pea and miner's lettuce, berries, and a number of different mushroom varieties. Tule elk and pronghorn antelope were the most important animal species. Various species of rabbit were hunted in the summer. Waterfowl and fish, especially salmon, were extremely important food sources for the eastern Miwok.

On January 28, 1848, John Marshall, a foreman working for John Sutter's sawmill near Coloma happened upon a discovery that would shape the history of California and the nation: gold. As word spread of the discovery, gold miners flooded to the Mother Lode to search for fortune. In 1849, the population of California surged from 14,000 to over 100,000, comprised of Americans and immigrants from around the world. Throughout the Mother Lode, small mining camps and towns sprung up to supply gold mines and miners – the demand for food, booze, supplies, building materials, and entertainment drove development along the American and Mokelumne Rivers, and deep into the Sierra foothills.

Early in the gold rush, streams were placer mined (1846–1857). Most of the important lode deposits were discovered in the 1850s. From the 1870s to the 1890s, mining expanded to maintain profitability. By 1875, mines such as the Keystone, South Spring Hill, Oneida, Old Eureka, and Plymouth had become large and highly profitable. As mining progressed to greater and greater depths, costs increased. The Argonaut, Kennedy, Central Eureka, Bunker Hill, Fremont Gover, and Lincoln Cons were major gold sources in the 1880s and 1890s.

By some estimates, merchants supplying gold miners made more than the miners themselves. In Amador County, a proliferation of other industries, like wine, lumber, and agriculture supplied mining camps and towns with provisions. During the 1850s, the soil in Shenandoah Valley was found to be excellent for growing grapes without irrigation. The official Amador County map of 1866 lists 8 sawmills, and the 1881 map lists 10 sawmills. During the 1870s, cattle ranching became commonplace. As the County developed, towns rose up around early mining settlements and homes and buildings reflecting the popular architectural styles were built.

Mining costs continued to increase, and during the early 1900s and World War I the South Spring Hill, Lincoln Cons, Oneida, Zeila, South Eureka, Bunker Hill and Treasure mines were shut down. However, the County continued to yield large amounts of gold as the Argonaut, Kennedy, Central Eureka, and other mines grew. Mining occurred at greater and greater depths until the Argonaut and Kennedy became the deepest mines in the country.

All of the mines were shut down soon after the beginning of World War II. The Central Eureka mine was reopened in 1945, but due to high costs and a federally fixed price on gold, the mine was shut down again in 1953. This was the last active major gold mine on the Mother Lode in Amador County. However, in

recent years, shaft mining activity has been resumed between the towns of Amador City and Sutter Creek, and gold panning continues to thrill hobbyists and professional gold miners alike.

Since the 1950s, Amador County has seen steady population growth, primarily in rural residential areas. As mining and timber production have declined, tourism has become more important to the County's economy.

1.3.2. Geography and Climate

The topography of the County ranges from low foothill to high Sierra Nevada Mountain areas, with elevations ranging from 150 feet above mean sea level (msl) in the western portion of the County to more than 9,000 feet above msl in the eastern portions of the County. The climate varies widely between the lower west foothill area to the alpine eastern portion of the County. In the western lowlands, summers are hot and winters are mild. Temperatures range from an average of 45 degrees Fahrenheit in January to 79 degrees Fahrenheit in July. Summers and winters are cooler in the higher elevations of the Sierra Nevada Mountains in the east and there is heavy snowfall in this area. Precipitation averages 20 and 60 inches in the western and eastern parts of the County, respectively.

1.3.3. Population and Demographics

The California Department of Finance 2024 estimates for population of Amador County and its jurisdictions are shown in Table 1-2.

Table 1-2 Amador County Population by Jurisdiction, 2024

Jurisdiction	Total Population
City of Amador City	196
City of Ione	8,842
City of Jackson	4,933
City of Plymouth	1,063
City of Sutter Creek	2,589
Unincorporated County	22,301
Total	**39,942**

Source: California Department of Finance, 2024 E-1 Report

Select social and economic information for the unincorporated Amador County are shown in Table 1-3.

Table 1-3 Unincorporated Amador County – Select Social and Economic Statistics

Statistic	Number
Populations	
Population under 5	3.9%
Population over 65	27.2%
Median Age	49.9

Statistic	Number
Race	
White	77.8%
Black or African American	2.0%
American Indian or Alaska Native	1.2%
Asian	1.4%
Native Hawaiian or Pacific Islander	0.1%
Some Other Race	5.3%
Two or more races	12.3%
Income and Poverty	
Median income	$81,526
Mean Income	$104,990
Poverty rate – All families	4.1%
Poverty rate – All people	7.8%
Unemployment Rate (December 2024)	5.3%

Source: 2020 US Census, 2023 US Census Bureau American Community Survey, California Employment Development Department

1.3.4. Economy and Tax Base

Amador County has a diverse economy. US Census estimate show economic characteristics for the unincorporated County. These are shown in Table 1-4 and Table 1-5.

Table 1-4 Unincorporated Amador County Civilian Employed Population 16 years and Over by Industry

Industry	Estimated Employment	Percent
Agriculture, forestry, fishing and hunting, and mining	501	3.1%
Construction	1,645	10.3%
Manufacturing	894	5.6%
Wholesale trade	295	1.8%
Retail trade	1,871	11.7%
Transportation and warehousing, and utilities	694	4.3%
Information	218	1.4%
Finance and insurance, and real estate and rental and leasing	892	5.6%
Professional, scientific, and management, and administrative and waste management services	1,814	11.3%
Educational services, and health care and social assistance	2,215	13.8%
Arts, entertainment, and recreation, and accommodation and food services	1,941	12.1%
Other services, except public administration	1,280	8.0%
Public administration	1,780	11.1%

Source: US Census Bureau American Community Survey 2023 Estimates

Table 1-5 Unincorporated Amador County – Income and Benefits

Income Bracket	Percent
<$10,000	2.5%
$10,000 – $14,999	0.6%
$15,000 - $24,9999	4.9%
$25,000 – $34,999	8.1%
$35,000 – $49,999	11.5%
$50,000 – $74,999	15.3%
$75,000 – $99,999	17.8%
$100,000 – $149,999	17.7%
$150,000 – $199,999	11.0%
$200,000 or more	9.6%

Source: US Census Bureau American Community Survey 2023 Estimates

Major employers in the County are shown in Table 1-6.

Table 1-6 Major Employers in Amador County Planning Area

Employer Name	Location	Industry
Amador County Sheriff	Jackson	Government Offices-County
American Legion Ambulance	Jackson	Ambulance Service
Beth Sogaard Catering	Plymouth	Caterers
Borjon Vineyard & Labor Svc	Plymouth	Farm Management Service
Forestry Fire Protctn CA Dept	Pine Grove	City Government-General Offices
Harrah's Northern CA Casino	Ione	Casinos
Ione Elementary School	Ione	Schools
Ione Junior High	Jackson	Schools
Jackson Cinema Is D'Place	Jackson	Theatres-Movie
Jackson Rancheria Casino Resrt	Jackson	Casinos
Kit Carson Nursing & Rehab	Jackson	Nursing & Convalescent Homes
Lake Camanche Marina & Grill	Ione	Marinas
Louie Oliver's Rstrnt & Bar	Ione	Restaurants
Lowe's Home Improvement	Jackson	Home Centers
Mule Creek State Prison	Ione	State Govt-Correctional Institutions
Raley's	Jackson	Grocers-Retail
Safeway	Jackson	Grocers-Retail
Save Mart	Jackson	Grocers-Retail
Sierra Pacific Industries	Martell	Lumber-Manufacturers
Sutter Amador Hospital	Jackson	Hospitals

Employer Name	Location	Industry
Timber Products Co	Sutter Creek	Lumber-Wholesale
Timber Products Co	Jackson	Lumber-Wholesale
United Home Care	Jackson	Home Health Service
Volcano Vision-Kirkwood Repair	Pine Grove	Television-Cable & CATV
Walmart	Jackson	Department Stores

Source: America's Labor Market Information System (ALMIS) Employer Database, 2025 1st Edition.

1.4 Plan Organization

The 2025 Amador County LHMP Update is organized as follows:

- Chapters
  - ✓ Chapter 1: Introduction
  - ✓ Chapter 2: Community Profile
  - ✓ Chapter 3: Planning Process
  - ✓ Chapter 4: Risk Assessment
  - ✓ Chapter 5: Mitigation Strategy
  - ✓ Chapter 6: Plan Adoption
  - ✓ Chapter 7: Plan Implementation and Maintenance

- Annexes
  - ✓ Annex A: City of Amador City
  - ✓ Annex B: City of Ione
  - ✓ Annex C: City of Jackson
  - ✓ Annex D: City of Plymouth
  - ✓ Annex E: City of Sutter Creek
  - ✓ Annex F: Amador Water Agency
  - ✓ Annex G: Jackson Valley Irrigation District

- Appendices
  - ✓ Appendix A: Planning Process
  - ✓ Appendix B: References
  - ✓ Appendix C: Mitigation Strategy
  - ✓ Appendix D: Adoption Resolution
  - ✓ Appendix E: Threatened and Endangered Species
  - ✓ Appendix F: Critical Facilities
  - ✓ Appendix G: FEMA National Risk Index
  - ✓ Appendix H: Hazus Reports

The **Base Plan** provides the overall framework for this multi-jurisdictional LHMP. It is the umbrella document that includes the planning process, methodologies, and process requirements for all participating jurisdictions (i.e., unincorporated County and all Jurisdictional Annexes). As such, Chapters 1-7 of the Base Plan apply to the unincorporated County, the five incorporated communities, and the two special Districts as participants to this LHMP Update seeking FEMA approval of the Plan. Because this is a multi-jurisdictional plan, the Base Plan addresses the LHMP hazard mitigation planning elements specific to the

Amador County Planning Area which includes data, information and analysis specific to all participating jurisdictions and also includes data, information, and analysis specific to unincorporated Amador County.

The **Jurisdictional Annexes** detail the hazard mitigation planning elements specific to each additional participating jurisdiction to this Amador County LHMP Update. Each annex is not intended to be a standalone document, but appends to, supplements, and incorporates by reference the information contained in the Base Plan document. As such, all Chapters 1-7 of the Base Plan, including the planning process and other procedural requirements and planning elements apply to and were met by each participating jurisdiction. The annexes provide additional information specific to each participating jurisdiction, with a focus on providing additional details on the risk assessment and mitigation strategy.

The **Appendices** provide additional information, data, and planning process documentation that applies to all participating jurisdictions (i.e., unincorporated County and all jurisdictional annexes) to this Amador County LHMP Update.

Chapter 2 What's New

44 CFR §201.6(d)(3) and §201.7(d)(3): A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit it for approval within 5 years in order to continue to be eligible for mitigation project grant funding.

The previous 2020 Local Hazard Mitigation Plan (LHMP), being updated as part of this 2025 Amador County LHMP Update, contained descriptions of planning processes, the risk assessments of identified hazards, and mitigation strategies for reducing the risk and vulnerability from these hazards. Since approval of the 2020 LHMP by FEMA, progress has been made on implementation of the 2020 mitigation strategies, as applicable to the respective participating jurisdictions. As part of this LHMP Update, a thorough review and update of the 2020 LHMP was conducted to ensure that this 2025 Amador County LHMP Update reflects current conditions and priorities in order to realign the updated mitigation strategy for the forthcoming five-year planning period. This section of this LHMP Update includes the following:

- **What's New in the LHMP Update**. Section 2.1 provides an overview of the approach to updating the previous LHMP and identifies new analyses, data and information included in this LHMP Update to reflect current community conditions. This includes a summary of new hazard and risk assessment data as it relates to the Amador County Planning Area and participating jurisdictions as well as information on current and future development trends affecting hazard vulnerability and related issues. The actual updated data, discussions, and associated analyses are contained in their respective sections within this LHMP Update.
- **Summary of Significant Changes to Current Conditions, Planning Area Vulnerability, and Hazard Mitigation Program Priorities**. Section 2.2 provides a summary of significant changes in current conditions, changes in hazard vulnerability, and resulting modifications to the Amador County hazard mitigation program priorities since the 2020 LHMP.
- **2020 Mitigation Strategy Status and Successes**. Section 2.3.2 provides a description of the status of mitigation actions from the 2020 LHMP and also indicates whether a project is no longer relevant or is recommended for inclusion in the updated mitigation strategy. This section also highlights key mitigation success stories since the 2020 LHMP.

This What's New section provides documentation of Amador County Planning Area's progress or changes in risk and vulnerability to hazards and overall hazard mitigation programs. Completion of this LHMP Update further provides documentation of the participating jurisdictions to this Amador County Planning Area's continued commitment and engagement in the hazard mitigation planning process.

2.1 What's New in the Plan Update

Preparing the 2025 LHMP Update involved a comprehensive review and update of each section of the 2020 LHMP and includes an assessment of the success of the participating jurisdictions in evaluating, monitoring, and implementing the mitigation strategy outlined in the 2020 LHMP. Only the information and data still valid from the 2020 LHMP was carried forward as applicable into this LHMP Update.

Also to be noted, Chapter 7 Implementation and Maintenance of this LHMP Update identifies key requirements for updating future plans:

- Consider changes in vulnerability due to action implementation of mitigation actions;
- Document success stories where mitigation actions 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 recommended mitigation actions or changes in the prioritization of mitigation actions.

These requirements and others as detailed throughout this Plan were addressed during this LHMP Update process.

As part of the comprehensive review and update of each section of the LHMP Update, the participating jurisdictions recognized that updated data, if available, would enhance the analysis presented in the risk assessment and utilized in the development of the updated mitigation strategy. Highlights of new data used for this LHMP Update are identified below and also sourced in context within both the Chapter 4 Risk Assessment and the jurisdictional annexes. Sources of specific data used are also provided throughout this LHMP Update and included in Appendix D References. This new data and associated analysis contributed to the development of the updated risk assessment and mitigation strategy presented in Chapter 4 and Chapter 5 of this LHMP Update, as well as within the jurisdictional annexes to this Plan.

Highlights of new information and analyses contained in this LHMP Update includes the following:

- A thorough countywide planning process was conducted for this multi-jurisdictional LHMP Update including outreaching and inviting a broad range of agency, public, and private stakeholders for all participating jurisdictions, including those supporting underserved and vulnerable populations in the Amador County Planning Area.
- Disaster declarations were updated, including federal, state, and USDA disaster declarations. NCDC Storm Events and past historic hazard occurrences since the previous plans were added for each jurisdiction.
- A Local Concerns section was added to each jurisdiction's vulnerability assessment to capture local issues and to support the resulting mitigation strategy.
- Incorporation and analysis of the updated California Department of Finance population data was utilized for this LHMP Update.
- A detailed discussion of socially vulnerable and underserved populations were added to the Base Plan and to each jurisdictional annex and included a discussion of how these populations could be affected by each hazard.
- An updated critical facility GIS layer was provided by the County and jurisdictions for the Amador County Planning Area. This allowed for an updated analysis of critical facilities for each mapped hazard in the Amador County Planning Area.
- Community lifelines were added to the overall asset inventory.
- Economic assets and community activities of value were added to the overall asset inventory.

- Development since the last plan was analyzed in detail for each jurisdiction.
- Future development was gathered from each jurisdiction and analyzed using the most recent hazard data. This was included in each participating jurisdiction's annex.
- A new section on Power Shortage/Failure was added. Public Safety Power Shutoff events were also added.
- Impacts of climate change, changes in population patterns, and changes in land use and development was reviewed and discussed for each hazard and for each jurisdiction.
- Cal-Adapt and other state and local climate change data was added to the climate change section, as well as to other hazards that are exacerbated by climate change.
- Most hazards from the 2020 plan were profiled in this LHMP Update, with the exception of pandemic. Levee failure was placed inside the flood hazard. No new hazards were added.
- An updated and enhanced assessment of each participating jurisdictions' continued compliance with the NFIP was conducted and used to support additional flood risk reduction measures.
- FEMA National Risk Index data for the County was added to all of the natural hazards in the Base Plan.
- New dam data provided by Cal OES and CA DSOD was used for the dam inventory and analysis. This data included an updated hazard classification for identified dams and updated inundation mapping. Assets at risk to dam inundation was analyzed. Critical facilities at risk to dams were tabulated.
- Additional Hazus runs were performed on three separate earthquake shake scenarios for the Amador County Planning Area.
- Deep seated landslide data was added to the landslide hazard profile and vulnerability analysis. An analysis was performed on values at risk (including populations, structures, critical facilities, and future development).
- New CAL FIRE mapping and analyses were conducted using the 2024 State Responsibility Area and the 2025 Local Responsibility Area Fire Hazard Severity Zones data.
- To better meet the revised FEMA plan review tool, a more extensive analysis of the extents to identified hazards was conducted and included in this LHMP Update for all jurisdictions.
- Special Districts' annexes include hazard maps and hazard extent tables for all mapped hazards of concern.
- A greater study of all jurisdiction's mitigation capabilities was added.
- All previous mitigation actions were updated, and many new actions were added to this LHMP Update, including mitigation actions to address issues related to mitigation planning for vulnerable and underserved populations.

2.2 Summary of Significant Changes to Current Conditions, Planning Area Vulnerability, and Hazard Mitigation Priorities

This section provides a summary by hazard of significant changes in current conditions, Amador County Planning Area vulnerabilities, and resulting modifications to the Amador County participating jurisdictions' mitigation program priorities since the 2020 LHMP. As a result of this analysis of factors resulting in changes in community vulnerability since the last Plan, mitigation planning priorities were modified by participating jurisdictions as reflected in each jurisdictions updated lists of priority hazards of concern, updated LHMP goals and objectives, and an updated list and prioritization of mitigation actions and projects for this 2025 LHMP Update.

2025 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Agricultural Hazards: Severe Weather/ Pests/ Invasives			X

- Since 2014, variable drought conditions have stressed local crops, timber, and grazing lands making them more susceptible to invasive species, and other issues.
- Noxious weeds can be more drought tolerant – better able to compete for water over local crops and vegetation and also increases wildfire risk.
- The discovery of the Golden mussel in the nearby Delta has significantly impacted the recreational industry in the County as illustrated by EBMUD's proactive closure of boating activities in the Commanche Reservoir, and threatens additional impacts.
- Successful crop production relies on predictable weather patterns.
- No Hydrilla occurrences detected since 2014.
- Water table seems to be dropping which can impact water supply for all users, including the Agricultural industry.

2025 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Avalanche		X	

- Avalanche risk changes from year to year depending on weather conditions, but overall Planning Area vulnerability to Avalanche has not significantly changed.
- No active avalanche areas were identified during the 2025 LHMP Update process.

2025 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Climate Change			X

- NWS data indicates temperatures are increasing resulting in more extreme heat days. Recent years (2021-2025) have been some of the hottest years on record.
- Snowpack levels have been occurring at higher elevations in recent years.
- Weather extremes, including precipitation, have been increasing and becoming more variable. Amador County is seeing increased precipitation and intensity, as seen with the atmospheric river events in recent years, as well as abnormally dry conditions.
- Changing climate conditions influence multiple hazards, such as heat, flooding, wildfire and others, as described in this LHMP Update.
- Increased temperatures associated with climate change increases the use and costs of energy leaving critical systems and infrastructure more vulnerable.
- Other ongoing impacts include impacts to food sources and food-related diseases, eco-system changes, impacts to natural resources, public health issues, etc.

2025 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Dam Failure		X	

- Risk increases over the years due to aging dam infrastructure. However, dams are more regulated than ever, with requirements for Emergency Action Plans, inspections, and maintenance.
- More people moving within Dam inundation areas will increase the County's vulnerability due to an increase in potentially affected population, not due to an increase in dam failure. However, population growth in Amador County has seen a decrease since 2020.

2025 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Drought and Water Shortage		X	

- Drought conditions since the 2014 LHMP, including water supply issues, have had an impact on the Amador County Planning Area and California. As a result, the drought hazard has become a significant priority for mitigation planning.
- Several disaster declarations occurred in 2023 related to heavy rains and storms and flooding. While these storms temporarily alleviated drought conditions in the County, due to the cyclical nature of drought and storm events, the County remains vulnerable to drought.
- State drought mandates, including conservations measures, to protect water supply throughout California have been implemented with some continuing within the Planning Area.
- Drought conditions, when present, contribute to an increase in tree mortality issues, dry fuels, and general increase in wildfire conditions.
- Drought impacts the stability of soils in the Planning Area leading to more erosion and other issues.
- Water quality concerns are exacerbated in drought conditions.
- Amador County is participating in the State's Drought Resilience Interagency and Partners (DRIP) collaborative, consistent with Senate Bill 552, and established to enhance California's resilience to droughts and water shortage.

2025 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Earthquake		X	

- Overall, Amador County is in a relatively low to moderate seismically active area.
- The primary factor that might change the earthquake vulnerability is additional development and more people moving to the area. However, adherence to current California building codes should ensure sound development in new development areas.

2025 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Flood: 1%/0.2% events			X

- Overall, the net increase or decrease in vulnerability to flood depends on the location within the Planning Area.
- The risk and vulnerability of 1% and 0.2% flood events remain somewhat constant, changing from year to year based on weather and new development in the Planning Area.
- Disaster declarations for heavy rains and storms and flooding occurred in 2021(1) and 2023 (3) causing significant flood impacts throughout the Planning Area and contributing to an increase in flood issues since the 2020 LHMP.
- Land use planning, flood control measures, and adherence to development requirements in identified floodplains have minimized additional exposure to this hazard in the Planning Area, even in years of heavy storms.

2025 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Flood: Localized Stormwater Flooding			X

- Climate change issues may result in more localized flooding as the climate warms and more frequent, wetter, and greater intensity storms create more runoff. Weather extremes seem more variable – the Planning Area seems to fluctuate between heavy rains and dry periods.
- New development in unmapped flood hazard areas could result in a net increase in vulnerability should these areas experience increased stormwater/localized flooding. However, development requirements that require mitigation of stormwater runoff help mitigate this hazard.
- Outdated and undersized drainage systems also contribute to a greater vulnerability to localized, stormwater flooding.
- 2020-2025 storms, many resulting in disaster declarations, including greater intensity atmospheric river events, resulted in more localized flooding throughout the Planning Area. Generally, damage occurs in low lying areas and around creeks and streams. Road damage and closures continue to occur during heavy storm events.
- Rain on snow events compound flooding in the Amador County Planning Area.
- Recent drought conditions in some areas have hardened soils and predisposed areas to worse flooding.
- Recent changes in vegetation caused by past drought conditions as well as large fires also contribute to more runoff, especially in post-fire burn scar areas.

2025 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Landslides, Mudslides, and Debris Flows			X

- With the most recent drought, compounded by several years of high intensity storms, much of the vegetation along sloped areas was lost contributing to a lack of vegetation to hold soil resulting in a greater landslide/mudslide potential.
- Compounded by climate change, heavy rains and higher intensity storm events, such as atmospheric rivers, contribute to saturated and barren soils, increasing the landslide potential, especially in post fire areas.

2025 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Severe Weather: Extreme Cold, Freeze, and Snow			X

- This is a new hazard of concern to Amador County, in part due to the impact to vulnerable and underserved populations in the County. Unhoused populations and economically challenged residents are particularly vulnerable to extreme weather conditions.
- Similar to other weather hazards, the overall vulnerability changes from year to year depending on the season.
- The agricultural industry is particularly vulnerable to increasing extreme cold, freeze, and snow events.

2025 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Severe Weather: Extreme Heat			X

- NWS data indicates temperatures are increasing resulting in more extreme heat days. Recent years (2021-2025) have been some of the hottest years on record.
- Climate change issues will continue to increase heat related impacts and vulnerabilities.
- Air quality issues increase with more extreme heat days.
- Vulnerable populations are at the greatest risk to this hazard. Economically challenged residents may not be able to afford air conditioning. Seniors, the very young, medically vulnerable, and the unhoused are not as resilient to this hazard. The increase in elderly/vulnerable populations increases the population at risk to this hazard.
- Extreme heat, combined with drought conditions, increases the potential for catastrophic wildfires.
- Extreme heat, combined with high winds, also contributes to the wildfire hazard, including the potential for a PSPS as well as other power outage events.

2025 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Severe Weather: Heavy Rains and Storms			X

- Similar to other weather hazards, the overall vulnerability of the Planning Area changes from year to year depending on the season. Recent years have seen significant and heavy rains, and an increase in atmospheric river events causing flooding and other adverse impacts to the County.
- Post fire conditions and areas previously impacted by drought conditions can be significantly vulnerable during periods of heavy rain and storms resulting in slope failures, mudslides, and debris flows.
- The potential for power outages increase during extreme storm events leaving the Planning Area and its residents more vulnerable.
- Outdated and undersized drainage systems also contribute to a greater vulnerability to localized, stormwater flooding during heavy rain events.
- Climate change brings renewed concern moving forward for heavy and more intense rains, storms, and associated issues to the County.

2025 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Severe Weather: High Winds and Tornadoes			X

- Severe wind events have had greater impact in recent years following several years of drought combined with years of heavy rains, resulting in dead and downed trees in the Planning Area. These conditions lead to compromised, hazardous trees often falling over during high wind events.
- High winds, combined with extreme heat, also contributes to the wildfire hazard, including the potential for a PSPS event

2025 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Wildfire (w/ smoke and air quality)			X

- Climate change continues to affect the nature and intensity of wildfires.
- Compounded by recent drought conditions (increasing tree mortality and overall wildfire conditions) and followed by significant heavy rain events, the wildfire hazard has substantially increased, and is no longer just a seasonal issue. The wildfire season, including the potential for a catastrophic wildfire, is now a year around concern.
- The increased development in WUI areas within the County also contributes to an increase in vulnerability.
- The road network and infrastructure, including construction, connectivity, and ingress-egress issues compound the wildfire vulnerability and impact.
- Wind has been a major contributor to the potential for a catastrophic wildfire. And when combined with extreme heat, also can trigger a PSPS which leaves the community at risk in other ways.
- With large wildfires occurring throughout California, the Planning Area has seen a significant change in air quality from smoke (both from fires inside and outside the County) resulting in more recorded bad air days.
- Limited preventative building construction standards in older areas of the County, and ineffective code enforcement has led to more communities being at risk and vulnerable to large, devastating wildfires

2.3 2020 LHMP Mitigation Strategy Successes and Status

The participating jurisdictions successfully implemented numerous mitigation actions identified in the 2020 LHMP mitigation strategies, thus working diligently towards meeting their 2020 goals and objectives, as follows:

Goal #1: Provide protection for people's lives, property, public health, and the environment and reduce losses from natural hazards.

- Minimize impact to existing development
- Minimize impact to future development
- Minimize risk and vulnerability to wildfire
- Minimize risk and vulnerability to flood
- Minimize economic and resource impact
- Promote resiliency strategies

Goal #2: Provide protection for critical facilities, infrastructure, utilities and services from hazard impacts

- Implement critical facility upgrades and mitigation measures to ensure reliability of services
- Update and maintain GIS list of critical facilities: Essential Services, At-Risk Populations, Hazardous Materials Facilities

Goal #3: Improve community (public and stakeholder) awareness, education, and preparedness to natural hazard events

- Enhance public and stakeholder outreach, education and preparedness program to include all hazards of concern
- Increase public and stakeholder knowledge about the risk and vulnerability to identified hazards and how to take responsibility for and mitigate these risks with a focus on high priority hazards such as wildfire and flood
- Leverage existing public outreach and education mechanisms such as community coalitions and other existing forums; expand social media presence and local community boards
- Increase use of technology to communicate hazard information (e.g., GIS)
- Provide education and outreach on evacuation routes, roles and responsibilities, as well as on various emergency communication modes

Goal #4: Increase communities' ability to be prepared for, respond to, and recover from a disaster event

- Improve community capabilities to mitigate hazards and reduce losses
- Improve interagency (local, state, federal) emergency coordination, communication, and operational capacity to ensure effective community preparedness, response and recovery
- Increase the capacity to respond and recover, countywide
- Improve emergency communication systems (cell phones, radios, sirens, reverse 911, multi-media, etc.)
- Increase first responder preparedness and education to hazards of concern
- Improve identification, education, and emergency notifications of vulnerable citizens
- Enhance the use of shared resources/Develop a strong mutual aid support system
- Make better use of technology (e.g., GIS)

- Establish and expand GIS technologies to map hazards and develop models of mitigation planning and to support hazard response and community recovery
- Maintain coordination of disaster plans, data, and related needs
- Mitigate future hazard losses through adequate land use/facilities planning

Goal #5: Maintain FEMA Eligibility/Position the communities for Grant funding

- Improve community ability to be competitive/successful with grant funding opportunities from application development to project delivery
- Establish and share best practices among agencies for development of grant applications, project permits, etc.
- Educate (and advocate) local officials to support local access to funding.

2.3.1. Success Stories

Since the 2020 LHMP, progress has been made on the implementation of the mitigation strategies contained within the previous Plan. Beyond the mitigation strategy implementation from the 2020 LHMP, the participating jurisdictions also continue to implement additional hazard mitigation measures not contained within the previous Plan. This section highlights key mitigation success since the 2020 LHMP.

Amador County

FireWise Community

The Amador Fire Protection District has made significant progress in community wildfire preparedness by utilizing the framework of Firewise USA. Firewise USA is a nationally recognized program developed by the National Fire Protection Association (NFPA), that encourages neighbors working together to reduce the risk of wildfires. The Firewise program strongly emphasizes community wildfire education, defensible space, home hardening, and community level fuel reduction work.

In Amador County, the Amador Fire Protection District serves as the coordinating agency for Firewise. What began as a grassroots effort with one motivated resident in Pioneer teaming up with Amador Fire, has evolved into a robust, countywide initiative with over 40 recognized Firewise Communities and several more currently in the application process. These communities are very active with many of them hosting annual wildfire preparedness events and seasonal clean-up days with the common goal of creating a wildfire resilient community.

In recent years, Amador Fire has integrated evacuation drills in an effort to better prepare our communities. These exercises are conducted in collaboration with allied agencies such as the Amador County Sheriff's Office, Office of Emergency Services (OES), the American Red Cross and local animal evacuation teams. These drills provide critical hands-on experience for residents, first responders, and provide opportunities to test and improve our emergency alert notification systems.

Another key aspect to our approach is education-based property inspections. Amador Fire offers free wildfire defensible space inspections to help educate and guide homeowners through the often-overwhelming process of vegetation management. We provide tailored advice and practical starting points,

helping residents take realistic steps toward better protecting their homes should a wildfire occur in their community.

Amador Fire also works closely with the Amador Fire Safe Council to secure funding for fuel reduction and vegetation mitigation projects. This collaboration provides, local, state, and federal grants, to support on-the-ground work that reduces wildfire risk on both public and private lands.

The success of the Firewise USA program in Amador County is the result of committed partnerships, grassroots engagement, and a shared vision of wildfire preparedness. Amador Fire is proud to lead this initiative and will continue using the Firewise framework to strengthen local capacity, educate residents, and promote long-term community wildfire resilience.

Following the close calls of the Tamarack and Caldor fires in 2021, the Kirkwood community opted to move forward with achieving Firewise USA designation. One of the Firewise requirements was implementing the defensible space standards of Public Resources Code 4291. However, the local tree ordinance in Kirkwood prohibited removal of trees unless they were dead, dying, or diseased, and County permits were required for tree cutting, pruning, or thinning. To eliminate confusion between the State and local policies, the County amended the Kirkwood tree ordinance by adding an exemption to the tree removal permitting requirements to allow for tree trimming and removal to meet the defensible space requirements of PRC 4291. The amendment also eliminated an administrative burden to property owners by abolishing the requirement for tree removal permits for dead, dying, diseased, and hazard trees if certified by an arborist, forester, or fire inspector.

Generators

Amador County has invested in permanently installed generators at critical facilities, ensuring essential services continue during power outages. These generators have already proven their value during recent Public Safety Power Shutoffs and severe winter storms. This uninterrupted power supply insured that the District Attorney's Office was able to continue processing cases, support victims, and coordinate with other law enforcement agencies. Installing a generator at the Pioneer Veteran's Hall has been especially valuable for community resilience. The Hall serves as a gathering place during Public Safety Power Shutoffs (PSPS) and can also be used as a Warming Center during winter storms. With a generator in place, the facility can now provide reliable heat, lighting, and power for charging medical equipment, phones, and other essentials.

Table 2-1 Example of Generator Installed



Ingress/Egress

The Amador Fire Safe Council is currently concluding two Ingress/Egress Grants from CalFire; with these grants, the AFSC sought to enhance wildfire safety in the Wildland-Urban Interface (WUI) through mapping and clearing roadside vegetation along ingress and egress routes. It was estimated this would benefit roughly 17,000 residents in Amador County.

With a substantial grant amount totaling $1,644,296 ($1,044,296.00 from the 1st iteration and $600,000 additional from a direct award grant) the AFSC sought to treat 90 miles or 425 acres of roadside vegetation, establish 6 new Firewise Communities, and develop a county-wide strategic plan for Ingress/Egress, and

hosting demonstration tours. The project has made significant progress, surpassing initial goals and resulting in a safer environment for the local community. By treating 113 miles or 520.73 acres of roadside vegetation, the initiative not only improved evacuation routes but also reduced the risk of wildfires spreading.

Additionally, the establishment of 32 new Firewise Communities has fostered a culture of preparedness and resilience among residents. These efforts, combined with a comprehensive strategic plan, have laid a strong foundation for ongoing wildfire mitigation and community engagement. Through collaborative efforts and continued education, Amador County is better equipped to face future challenges and protect its natural and human resources.

Jackson Creek Forest Health Project

The Jackson Creek Forest and Watershed Health Project, funded by CAL FIRE and managed by the Amador Resource Conservation District (ARCD), aimed to enhance forest and watershed health on 1,000 acres in Amador County. The project focused on reducing fire risk, conserving water, minimizing erosion, protecting water quality, and increasing forest resilience to drought and disease. With a grant of $3,603,152, the ARCD implemented a combination of treatment methods, including prescribed grazing, mastication, hand work, and prescribed fire. These treatments collectively worked to reduce fuel loading and protect local communities from severe wildfires. Given that the project was conducted on private land, community engagement was a key component of its success. The project aimed to create a sustainable and resilient forest ecosystem while providing educational opportunities and promoting long-term community involvement in forest management. Educational workshops and community events were organized to engage residents, equipping them with knowledge about fire prevention and sustainable land practices.

City of Sutter Creek

Dec 2022 to Jan 2023, heavy rains swelled creek leading to a fast and high current that eroded fill and armoring at bend in creek at base of WWTP. In Aug 2024, the Armor wall was reinforced protecting the WWTP.

Worley at Main Street: 2017-2018 storms caused the hillside to fall onto main street. Road was dug out and ultra block installed as temporary fix. After 3-5 years, ultra block was removed and Jute netting and Rice waddle were installed until vegetation returned to the hillside. Natural vegetation is impeding erosion currently.

Crestview Drainage on Meadow Crest – Sept 2023 Homeowner called City about drainage issues. No drainage was provided from upper development and too much flow was entering the residence on 310 Gopher Flat. City investigated and determined that the existing drainage pipe was too small and had been compromised. In fall of 2024, the City installed a 100 LF of new 18-inch pipe and 30 LF of 24-inch pipe, two new DI's and 2 DI's. Problem has been solved

Pump Station Debris – Over time dirt from unfinished road washed down into pump station vault (2020 to 2023). Vault was not above storm flows which would allow storm flow to enter pump station. Debris was removed and vault lip is now above storm flows. Issue solved for next 10 years, possible issue if high storm flows return, monitor debris accumulation and remove as necessary. Pump station vault needs to be lifted.

The City has passed an ordinance to remove fire debris and or to create a fire break on residents property. The City has worked to clear dense vegetation areas throughout town including the Mine head site which is a known area of vegetation overgrowth. The City is working with CAL FIRE to clear dense vegetation roads. The ordinance allows the City to hire clearing crews for lots deemed with excessive vegetation growth. Vegetation management is a considerable expense to the City that is occurring every year around town.

Amador Water Agency

AWA received $1.660,533 in HMGP funding to remove 3 old redwood water storage tanks and replace with wildfire hardened steel tanks. This project was completed in 2022. Additionally, AWA received $1,706,830 in HMGP funding to retrofit the La Mel water treatment building against wildfires. This project is still ongoing.

2.3.2. 2020 Mitigation Strategy Update

The 2020 LHMP contained separate mitigation strategies for each participating jurisdiction. These have been combined below. The 2020 LHMP contained 93 separate mitigation actions for the jurisdictions. Of these, 8 are complete, 2 have portions that are complete and portions that are ongoing, 70 are ongoing, and 13 have not been started. 62 actions have been identified for inclusion in this LHMP Update and have been carried forward in Chapter 5. Table 2-2 provides a status summary of the mitigation action projects from the 2020 LHMP. Following the table is a description of the status of each project.

Table 2-2 Amador County Planning Area 2020 LHMP: Mitigation Action Status Summary

Action Title	Complete	Ongoing	Not Yet Started	In 2025 Update*
Amador County				
All Hazard Actions				
Action 1. Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	X			Y
Action 2. Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness		X		Y
Action 3. Evaluate All Major and Minor Structures Along Evacuation Routes within Amador County Right of Way			X	Y
Action 4. Evaluate All Roadways Used as Evacuation Routes within Amador County Right of Way			X	Y
Action 5. Harden and Enhance Cell service: Additional Cell/Repeater Towers/Mobile Repeaters, Generator Backup, Etc.		X		Y
Action 6. Amador County Evacuation planning for all Hazards; Include Establishment of Sheltering in Place and Refuge areas.		X		Y
Action 7. Reverse 911 Enhancements		X		Y
Action 8. Enhance Agency Communications		X		Y
Action 9. PRC 4290 Compliant Street and Address Signage for Rural Areas		X		Y

Action Title	Complete	Ongoing	Not Yet Started	In 2025 Update*
Action 10. Fixed Generators to Essential County Facilities		X		Y
Action 11. Implement modern GIS capabilities in Amador County		X		Y
Avalanche Actions				
Action 12. Annual Review of Kirkwood Ski Area Avalanche Mitigation Program		X		N
Agricultural Hazards Actions				
Action 13. Invasive Insect Pests		X		Y
Action 14. Invasive Weed Pests		X		Y
Climate Change Actions				
Action 15. Energy Action Plan			X	N
Dam Failure, Flood, Localized Flood, Landslide, and Levee Failure Actions				
Action 16. Improve Storm Water Management Along Road Segments Exhibiting Repetitive Losses From Localized Flooding and Landslides		X		Y
Action 17. Review and Amend Flood Ordinance as Appropriate		X		N
Action 18. Evaluate All Areas With Localized Flooding Along Amador County Maintained Roadways			X	Y
Action 19. Monitor Shakeridge Road (upcountry) for Landslide or Road Movement		X		Y
Action 20. Evaluate Each Roadways That is Subject to Local Land Movement and Minimize Debris Removal within Amador County Right of Way		X		N
Earthquake Actions				
Action 21. Identify Un-Reinforced Masonry (URM) and other seismically vulnerable buildings in the County			X	Y
Wildfire and Drought and Water Shortage Actions				
Action 22. Evaluate Evacuation Routes for Wildfire That Serve Critical Infrastructure	X			N
Action 23. Community Ingress/Egress – Phase I: Fire Safe Programs and Public Education Activities*		X		Y
Action 24. Community Ingress/Egress – Phase II: Brush Clearing and Fuels Reduction*		X		Y
Action 25. Construction of Mitchell Mine Fuelbreak*	X			N
Action 26. Outreach and Public Information Immobile Citizen Evacuation*		X		Y
Action 27. Development of Firewise Communities in Amador County*		X		Y
Action 28. Pine Acres Vegetation Management Program (2526 Acres)		X		Y
Action 29. Shake Fiddletown Vegetation Management Program (2526 Acres)		X		Y

Action Title	Complete	Ongoing	Not Yet Started	In 2025 Update*
City of Amador City Actions				
Action 1. Integrate Local Hazard Mitigation Plan into Safety Element of General Plan		X		Y
Action 2. Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness		X		Y
Action 3. Wastewater Plant Emergency Power		X		Y
Action 4. Midtown Sewer Crossing			X	N
Action 5. Vegetation Management	X	X		Y
Action 6. Landslide and Slope Failure Mitigation		X		Y
City of Ione Actions				
Multi-Hazard Actions				
Action 1. Integrate Local Hazard Mitigation Plan into Safety Element of General Plan		X		Y
Action 2. Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness		X		Y
Action 3. Harden and Enhance Cell Service: Additional Call/repeater towers/mobile repeaters generator back up		X		N
Action 4. Shelter Upgrades to Evalyn Bishop Hall (E.B. Hall)		X		Y
Action 5. Backup generators		X		Y
Flood, Localized Flood, and Levee Failure Actions				
Action 6. Flood Ordinance Review and Update		X		Y
Action 7. Develop and Implement Storm Water Master Plan		X		Y
Action 8. Develop Watershed Based Flood Reduction Programs		X		N
Action 9. Stream Maintenance and Debris/Sediment Removal		X		Y
Action 10. Replace Five Mile Bridge			X	N
Action 11. Pursue certification of the Levee along Sutter Creek			X	N
Wildfire Actions				
Action 12. Ordinance Review – Wildland Urban		X		N
City of Jackson Actions				
Multi-Hazard Actions				
Action 1.Integrate Local Hazard Mitigation Plan into Safety Element of General Plan		X		Y
Action 2.Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness		X		Y
Action 3.Station 131 generator		X		Y
Dam Failure, Flood, Localized Flood Actions				
Action 4.Buena Vista Flood Mitigation Project			X	N
Action 5.Busi Parking Lot Slope Drainage	X			N
Action 6.Annual Creek Cleaning		X		Y

Action Title	Complete	Ongoing	Not Yet Started	In 2025 Update*
Wildfire Actions				
Action 7.Starks Lane Bridge		X		N
Action 8.Defensible Space		X		Y
Action 9.Picardo Bridge			X	N
City of Plymouth Actions				
Multi-Hazard Actions				
Action 1. Integrate Local Hazard Mitigation Plan into Safety Element of General Plan		X		Y
Action 2. Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness		X		Y
Action 3. Secure City Hall as Critical Infrastructure with Commercial Generator	X			N
Action 4. Indian Creek Stream Restoration & Culvert Improvement in Flood Hazard Zone	X	X		N
Action 5. Maintain and Enhance Water Canal by Converting Earthen Arroyo Ditch to Fixed Pipeline or Gunite Lined Canal		X		N
Action 6. Develop a Community Wildfire Prevention Plan		X		Y
City of Sutter Creek Actions				
Multi-Hazard Actions				
Action 1. Integrate Local Hazard Mitigation Plan into Safety Element of General Plan		X		Y
Action 2. Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness		X		Y
Action 3. Development of Walking Paths, Native Tree Protection & Native Tree Species Planting		X		Y
Action 4. Installation of Generator at City Hall and Community Center	X			N
Action 5. Upgrade Ditches and Culverts		X		Y
Action 6. Develop a Stormwater Management Plan		X		Y
Floods and Localized Flood Actions				
Action 7. Sutter Creek City Hall Flooding		X		Y
Action 8. Sutter Creek Bank Stabilization		X		Y
Wildfire Actions				
Action 9. Perimeter Wildfire Protection Fuel Break		X		Y
Amador Water Agency Actions				
Multi-Hazard Actions				
Action 1. AWP Standby Generators		X		N
Ag Hazards and Aquatic Invasive Species Actions				
Action 2. Amador and Ione Water Systems Taste and Odor Mitigation		X		Y

Action Title	Complete	Ongoing	Not Yet Started	In 2025 Update*
Climate Change Actions				
Action 3. Lower Bear Reservoir Expansion Study		X		Y
Drought and Water Shortage and Wildfire Actions				
Action 4. Replacement of Two Hypalon Lined and Covered Tanks with New Tanks		X		Y
Action 5. Mt. Crossman Main Area Tank for Upper CAWP System		X		Y
Action 6. Upgrade Fire Pumps		X		Y
Flood and Localized Flood Actions				
Action 7.Mace Meadows Pump Station Flooding	X			N
Action 8.Eggiman Lane Flooding	X			N
Jackson Valley Irrigation District Actions				
Ag Hazards Actions				
Action 1. Outreach to Farmers regarding Agricultural Hazards in the Area		X		N
Aquatic Invasive Species Actions				
Action 2. Lake Amador Aquatic Invasive Species Monitoring		X		Y
Climate Change Actions				
Action 3. Long Term Water Solutions Analysis Due to Climate Change		X		Y
Dam Failure Actions				
Action 4. Jackson Creek Dam Immediate Inundation Area Public Outreach – Dam Failure		X		N
Action 5. Jackson Creek Dam Spillway Apron Extension Project		X		Y
Drought and Water Shortage and Wildfire Actions				
Action 6. JVID Water Meter Maintenance Program			X	N
Action 7. JVID Water Procurement and Additional Water Storage Study		X		Y
Action 8. Lake Amador Spillway Rubber Dam Project		X		Y
Earthquake Actions				
Action 9. Jackson Creek Dam Seismic Evaluation and Liquefaction Study		X		N
Flood Actions				
Action 10. Lake Amador Drive Box Culvert Expansion Project		X		Y
Levee Failure Actions				
Action 11. Jackson Creek Levee Maintenance Project		X		Y
Severe Weather Actions				
Action 12. JVID Office Backup Generator	X			N
Action 13. JVID Freeze Protection Project			X	N
Wildfire Actions				

Action Title	Complete	Ongoing	Not Yet Started	In 2025 Update*
Action 14. JVID Fire Hydrant Expansion Project			X	N

* Actions not carried forward were determined by the jurisdictions to be no longer feasible, relevant, lacked funding and local resources to implement, and/or no longer considered a priority.

Chapter 3 Planning Process

44 CFR §201.6(b) and §201.6(c)(1): An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:
1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia, and other private and nonprofit interests to be involved in the planning process; and
3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.
[The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

Amador County, as the project lead, and the other participating jurisdictions to this 2025 Amador County LHMP Update, recognized the need for and importance of the update process for their 2020 LHMP and initiated its development. After securing funding for this LHMP Update, Amador County contracted with Foster Morrison Consulting, Ltd. (Foster Morrison) to facilitate and develop the Plan. Jeanine Foster, a professional planner with Foster Morrison, was the project manager in charge of overseeing the planning process and the development of this LHMP Update. Chris Morrison, also a professional planner with Foster Morrison, was the lead planner for the development of this LHMP Update. The Foster Morrison's team's role was to:

- Assist in establishing the Hazard Mitigation Planning Committee (HMPC) as defined by the Disaster Mitigation Act (DMA);
- Meet the DMA requirements as established by federal regulations and following FEMA's planning guidance;
- Support objectives under the National Flood Insurance Program (NFIP) and the Flood Mitigation Assistance (FMA) program;
- Facilitate the entire planning process;
- Identify the data requirements that HMPC participants could provide and conduct the research and documentation necessary to augment that data;
- Assist in facilitating the public input process;
- Produce the draft and final plan documents; and
- Coordinate with the California Office of Emergency Services (Cal OES) and FEMA Region IX Plan reviews.

3.1 Local Government Participation

Amador County and the other participating jurisdictions made a commitment to this 2025 Amador County Multi-Jurisdictional LHMP Update. The DMA planning regulations and guidance stress that each local

government (participating jurisdiction) seeking FEMA approval of their mitigation plan must participate in the planning effort in the following ways:

- Participate in the process as part of the HMPC;
- Detail where within the Amador County Planning Area the risk differs from that facing the entire area;
- Identify potential mitigation actions; and
- Formally adopt the Plan.

For all participating jurisdictions, "participation" meant the following:

- Attending and participating in the HMPC meetings;
- Completing and returning the Data Collection Worksheets;
- Collecting and providing other requested data (as available);
- Coordinating information sharing between internal and external agencies;
- Managing administrative details;
- Making decisions on LHMP process and content;
- Discussing their participation in the NFIP and any identified repetitive loss properties;
- Addressing changes in development since the 2020 LHMP and new development considerations;
- Providing status of 2020 actions and identifying mitigation actions for the Plan;
- Identifying opportunities for integrating the completed Plan into other planning mechanisms;
- Identifying jurisdictional capabilities to support mitigation strategy implementation;
- Making decisions on LHMP process and content;
- Identifying mitigation actions for the Plan;
- Reviewing and providing comments on Plan drafts;
- Providing Draft documents of the LHMP for public review;
- Informing the public, local officials, and other interested stakeholders about the planning process and providing opportunity for them to comment on the draft Plan; and
- Coordinating the formal adoption of the Plan by the governing boards for each jurisdiction.

The participating jurisdictions seeking FEMA approval of this LHMP Update met all of these participation requirements. Multiple representatives from participating jurisdictions attended the HMPC meetings described in Table 3-3 and also brought together an internal planning team to help collect data, identify mitigation actions and implementation strategies, and review and provide data on Plan drafts. Appendix A provides additional information and documentation of the planning process.

Individuals representing various departments and other representatives from the participating jurisdictions to this Amador County LHMP Update were actively involved throughout the Plan Update process as identified in Appendix A in the sign-in sheets for the meetings and as evident through the data, information and input provided by HMPC representatives for the development of this LHMP Update. This Chapter 3 and Appendix A provides additional information and documentation of the planning process and participants to this LHMP Update, including members of the HMPC.

3.2 The 10-Step Planning Process

Foster Morrison established the planning process for updating the Amador County LHMP using the DMA planning requirements and FEMA's associated guidance. Specifically, the LHMP was developed pursuant to the requirements of DMA 2000, published at 44 CFR 201.6 and new FEMA LHMP guidance, LHMP

Policy Guide FP 206-21-0002 effective April 11, 2025, as well as applicable California laws and mitigation requirements. This guidance is structured around a four-phase process:

1. Organize Resources;
2. Assess Risks;
3. Develop the Mitigation Plan; and
4. Implement the Plan and Monitor Progress.

Into this process, Foster Morrison integrated a more detailed 10-step planning process used for FEMA's CRS and FMA programs. The modified 10-step process used for this Plan meets the requirements of six major programs: FEMA's Hazard Mitigation Grant Program (HMGP); Pre-Disaster Mitigation (PDM) program; CRS program; FMA Program; Severe Repetitive Loss (SRL) program; and new flood control projects authorized by the U.S. Army Corps of Engineers (USACE).

Table 3-1 shows how the modified 10-step process fits into FEMA's four-phase process. The sections that follow describe each planning step in more detail.

Table 3-1 Mitigation Planning Processes Used to Develop the 2025 Amador County Local Hazard Mitigation Plan Update

DMA Process	Modified CRS Process
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

As part of this LHMP Update, all sections of the 2020 LHMP were reviewed and updated to reflect new data, processes, and resulting mitigation strategies. Only the information and data still valid from the 2020 LHMP were carried forward as applicable into this 2025 LHMP Update.

3.2.1. Phase 1: Organize Resources

Planning Step 1: Organize the Planning Effort

With each participating jurisdiction's commitment to participate in the DMA planning process, Foster Morrison worked with Amador County's Office of Emergency Services (County OES), as overall project lead, to establish the framework and organization for development of this LHMP. An initial meeting was held with County OES to discuss the organizational and process aspects of this 2025 LHMP Update.

The initial project kick-off meeting was held on December 4, 2024. Invitations to the kickoff meeting were extended to key county and city departments and special districts, as well as to other federal, state, and local stakeholders, including representatives from the public, which might have an interest in participating in the planning process. Representatives from the HMPC members to the 2020 LHMP and other identified stakeholders were used as a starting point for the invite list, with additional invitations extended as appropriate throughout the planning process. The list of invitees is included in Appendix A.

Hazard Mitigation Planning Committee

The HMPC was established as a result of these initial meetings, as well as through interest generated through the initial public meeting and outreach conducted for this project as detailed later in this chapter. The HMPC, comprised of county, city, special district, and other government and stakeholder representatives and the public, developed the Plan with leadership from County OES and facilitation by Foster Morrison. This list includes all HMPC members that were active participants in the Plan development process as evidenced through their attendance at one or more HMPC meetings, as well as those who provided key input into the Plan development process. Although not official participating jurisdictions seeking FEMA approval of the LHMP, several key local stakeholders should be noted for their ongoing participation and significant contribution to the LHMP development process. These key planning partners include the Amador County Fire Safe Council, Amador County Air Quality District, local representatives from the Red Cross and ARC, and others. The following individuals participated on the HMPC:

Table 3-2 Amador County Hazard Mitigation Planning Committee

Organization	Name
Amador County Participants	
Amador County Sheriff	Sheriff Gary Redman
Amador County Sheriff	Lt Jeff Bellotti
Amador County Sheriff	Sgt Matt Girton - OES Coordinator
Amador County Board of Supervisors	Supervisor Jeff Brown
Amador County Board of Supervisors	Supervisor Patrick Crew
Amador County Board of Supervisors	Supervisor Logan Carnell
Amador County Board of Supervisors	Supervisor Dan Epperson
Amador County Board of Supervisors	Supervisor Brian Oneto

Organization	Name
Amador County C.O.A.	Chuck Iley
Amador County Health Officer	Dr. Rita Kerr
Amador County Social Services	Director - Anne Watts
Amador County Behavioral Health	Director - Melissa Cranfill
Amador County Public Health	Director - Joanne Hasson
Amador County Public Health	Diana Haley
Amador County Public Health	Tracy Dehn
Amador County Public Works	Director - Rich Vela
Amador County Public Works	Jack O'Brien
Amador County Waste Management	Jeff Gardner
Amador County Air District	Hermina Perry
Amador County Environmental Health	Scott Meyer
Amador County Animal Control	Director - Evan Jacobs
Amador County Ag Dept	Director - Eric Mayberry
Amador County Ag Dept	Barry Clark
Amador County Planning	Chuck Beatty
Amador County GSA	Director - Glenn Spitzer
Amador County Environmental Health	Scott Meyer
Amador County Building Department	Todd Barr
City's Participants	
City of Jackson	City Manager – Carl Simpson
City of Ione	Council Member – Stacy Rhoades
City of Sutter Creek	City Manager – Tom Dubois
City of Sutter Creek	Public Works Director – Dan Lafontaine
City of Sutter Creek	Vice Mayor – Julia Sierk
City of Sutter Creek	Steve Christensen
City of Amador City	City Manager – Dave Groth
City of Amador City	Mayor – Sandra Staples
City of Plymouth	City Manager – Margaret Roberts
City of Plymouth	City Manager – Cameron Begbie
City of Plymouth	Public Works Director – Cathleen Johnson
Law Participants	
Jackson Police Department	Captain - Jose Arevalos
Fire Participants	
U.S. Forest Service	James Thornock
Amador Fire Protection District	Chief - Rob Withrow
Amador Fire Protection District	Battalion Chief - Justin Yelinek

Organization	Name
Amador Fire Protection District	Ashley Anaya
Amador Fire Protection District	Public Information Officer - Kayla Dale
Jackson Fire Department	Chief - Ryan Pidgeon
Ione Fire Department	Chief - Ken Mackey
Sutter Creek Fire Department	Chief - Dominic Moreno
Jackson Valley Fire District	Chief - Randy Makemson
Medical & Health Participants	
Amador County Public Health	Director - Joanne Hasson
Amador County Public Health	Diana Haley
Amador County Public Health	Tracy Dehn
Sutter Amador Hospital	Emergency Planner - Rachael Dimmer
American Legion Ambulance	President - Alan McNany
American Legion Ambulance	Vice President - Michelle Tyer
MACT Health Care Board	Laura Ellison
Water Districts Participants	
Amador Water Agency	Rick Ferriera
Amador Water Agency	Lucas Carthew
Amador Water Agency	Brandt Cook
Amador Water Agency	Antero Acierto
Jackson Valley Irrigation District	General Manager - Steve Fredricks
River Pines Public Utility District	Amy Gedney
Other Utilities & Transportation Participants	
PG&E	James Croshurst
PG&E	Kim Johansen
PG&E	Samantha Hill
PG&E	Andrew Murray
PG&E	Kevin Quakenbush
PG&E	Mother Lode Hydro Manager - Clint Harris
Volcano Communications	General Manager - Frank Leschinsky
Cal-Trans	Wes Bingham
Cal-Trans	Nick Uselton
Misc Participants	
Foster Morrison	Jeanine Foster
Red Cross	Regional Director - Rebecca Mich
Red Cross	Lisa Baker
Cal-OES	Emergency Services Coordinator - John Anger,

Organization	Name
ARC Amador	Executive Director - Karyn Gregorius
ARC Amador	Lurali Moore
Amador Chamber of Commerce	President - Matt Toma
Amador Chamber of Commerce	Jim Guidi
Amador Chamber of Commerce	Director - Ashley Carnicello
Amador Resource Conservation District	Executive Director - Amanda Watson
Amador Fire Safe Council	Todd Bertwell, RCD/FSC
Ione Citizen	Larry Rhoades
Ione Citizen	Bette Rhoades
ACART	Kitten Chapman

Utilizing a Common Planning Process

The County and all participating jurisdictions developed this LHMP Update utilizing a common Plan development process utilizing the "whole community" approach. This included establishing an HMPC that included key stakeholders for all jurisdictions ensuring that the five required categories of stakeholders, specific to each jurisdiction, were identified and included. Utilizing a common planning process involving all jurisdictional stakeholders promoted better stakeholder participation for all jurisdictions. This approach respected the time and availability of stakeholders, while maximizing participation of a common group of jurisdictional stakeholders by not requiring them to come to duplicate (or really 8 separate meetings) on the same Plan development element(s), which for this Plan would have resulted in 40 separate meetings to cover the 5 primary HMPC topics and meetings. It also spurred conversations between jurisdictions, as well as their public stakeholders, who were invited to come to these meetings. Additional considerations and benefits for utilizing a common planning process for the development of the LHMP Update include:

- The small rural nature of Amador County, the five cities, and two participating special districts was best suited for a common plan development process.
- Common group of stakeholders to all participating jurisdictions necessitated a common plan development process.
- Several of the jurisdictions have shared or overlapping boundaries and economic ties, often work under the same authorities, and have similar needs and capabilities.
- A common plan development process brings key stakeholders together in the same meetings instead of siloing them to specific jurisdictional meetings. This adds value by getting different groups discussing key issues collectively with different experiences and perspectives to bring to the table.
- Improves stakeholder communication and coordination by increasing stakeholder attendance in support of all jurisdictions and not diluting their participation by requiring attendance at multiple, duplicate meetings that they won't be able to attend.
- Key public stakeholders invited to be part of the HMPC were better able to attend a limited set of meetings.
- All participating jurisdictions face similar threats and hazards which drive the resulting mitigation strategy that benefits the Amador County Planning Area as a whole by promoting a comprehensive and regional approach to mitigation.

Additionally, Amador County, as the project lead, has been developing successful multi-jurisdictional LHMPs and LHMP Updates for nearly 20 years. Utilizing this common planning process resulted in multiple entities being engaged and in the room at the same time. All of this is shown in detail throughout this chapter and in Appendix A.

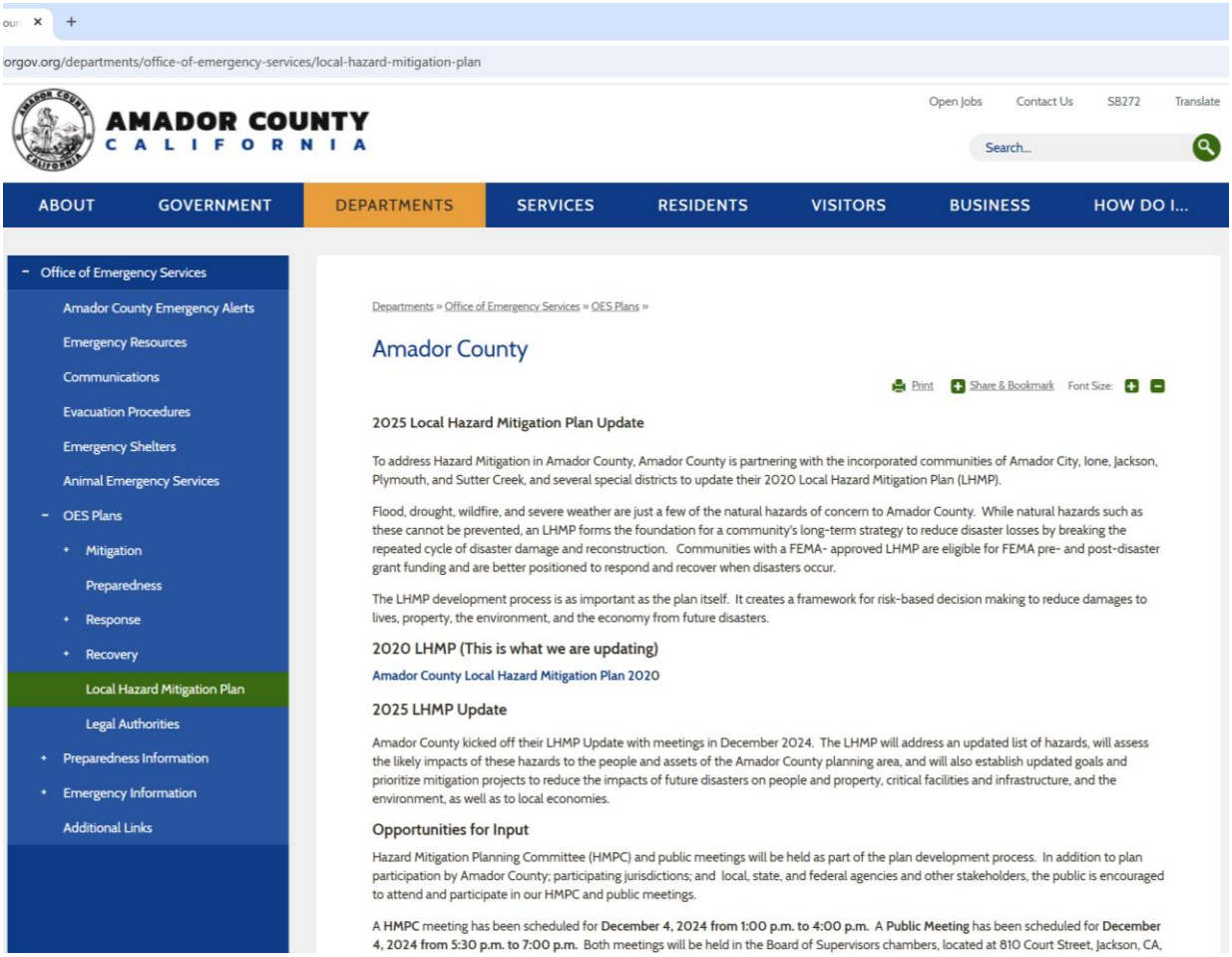
Meetings

The planning process officially began with a kick-off meeting of the HMPC held on December 4, 2024, followed by a public kick-off meeting held the same day at 5:30 pm. The meetings covered the scope of work and an introduction to the DMA requirements. During the HMPC meetings, participants were provided with data collection worksheets to facilitate the collection of information necessary to support development of the Plan. Using FEMA guidance, these worksheets were designed to capture information on past hazard events, identify hazards of concern to each of the participating jurisdictions, identify values at risk to identified hazards, inventory existing capabilities, record possible mitigation actions, and to capture information on the status of mitigation action items from the 2020 LHMP. A copy of the worksheets for this project are included in Appendix A. Each participating jurisdiction seeking FEMA approval of this LHMP Update completed and returned the worksheets to Foster Morrison for incorporation into this 2025 LHMP Update

During the planning process, the HMPC communicated through virtual Team and Zoom meetings, email, telephone conversations, Dropbox websites, and through a County developed webpage dedicated to the Plan development process. This later website was developed to provide information to the HMPC, the public and all other stakeholders on the LHMP process. Draft documents were also posted on these websites so that the HMPC members, stakeholders, and the public could easily access and review them.

The Amador County LHMP website (as shown on Figure 3-1) can be accessed online at: https://www.amadorgov.org/departments/office-of-emergency-services/local-hazard-mitigation-plan.

Figure 3-1 Amador County Local Hazard Mitigation Plan Update Website



Source: Amador County

The HMPC met formally five times during the planning period (December 2024 – October 2025) which adequately covers the four phases of DMA and the 10-Step CRS planning process. Internal jurisdictional meetings were held throughout the planning process to further support Plan development. The key meetings and topics discussed are described in Table 3-3. Invitations, agendas and sign-in sheets for each of the meetings are included in Appendix A.

Table 3-3 Amador County Internal and HMPC Meetings

Meeting Type	Meeting Topic	Meeting Date	Meeting Location(s)
Amador County Internal Kickoff Meeting	1) Overview of LHMP plan development process 2) Initial identification of participating jurisdictions and HMPC members 3) Discussion of GIS and other data needs	October 23, 2024	Virtual Zoom Meeting

Meeting Type	Meeting Topic	Meeting Date	Meeting Location(s)
HMPC #1 Kick-off Meeting	1) Introduction to DMA and the planning process 2) Overview of current LHMP; 3) Organize Resources (CRS Steps 1,2&3): the role of the Planning Committee, planning for public involvement, coordinating with other agencies/stakeholders 4) Introduction to Hazard Identification	December 4, 2024	Amador County Board of Supervisors Chambers Jackson, CA
HMPC #2	1) Risk assessment overview and work session -CRS Step 4: Assess the Hazard -CRS Step 5: Assess the Problem	April 9, 2025	Amador County Board of Supervisors Chambers Jackson, CA
HMPC #3	1) Review of risk assessment summary 2) Review and update of mitigation goals 3) Intro to Mitigation Action Strategy -CRS Step 6: Set Goals -CRS Step 7: Review possible activities	June 11, 2025	Amador County Board of Supervisors Chambers Jackson, CA
HMPC #4	1) Review of mitigation alternatives 2) Review and update of mitigation actions from the 2020 LHMP 3) Identify updated list of mitigation actions by hazard 4) Review of mitigation selection criteria 5) Update and prioritize mitigation actions 6) Mitigation Action Strategy Implementation and Draft Action Development -CRS Step 7: Review possible activities -CRS Step 8: Draft an Action Plan	June 12, 2025	Amador County Board of Supervisors Chambers Jackson, CA
HMPC #5	1) Review of final HMPC, jurisdictional and public comments and input to Plan 2) Review and documentation of changed conditions, vulnerabilities, and mitigation priorities 3) CRS Step 8: Draft an Action Plan 4) CRS Step 9 & 10: Plan Maintenance and Implementation Procedures	October 9, 2025	Amador County Board of Supervisors Chambers Jackson, CA

Planning Step 2: Involve the Public

Public stakeholders for all participating jurisdictions are generally defined as any stakeholder not attached to local government in the Amador County Planning Area. Up-front coordination discussions with Amador County established the initial plan for public involvement. Public involvement activities for this LHMP Update included press releases, social media communications, stakeholder and public meetings, development of an LHMP webpage and associated website postings, and the collection of public and stakeholder comments on the draft Plan through a variety of mechanisms. This included other public outreach activities as further described below and targeted outreach to different groups of people and other agencies throughout the Plan development process. At the internal kick-off meeting, the HMPC discussed additional strategies for public involvement and agreed to an approach using established public information mechanisms and resources within the County.

Early Public Outreach Activities

Public outreach for this LHMP Update began at the beginning of the Plan development process with the development of a 2025 LHMP webpage and outreach on the LHMP development process through a variety of mechanisms as described below:

- Development of an Amador County 2025 LHMP Update webpage
- Inclusion of an Advertisement in the local community printed newspaper – The Ledger Dispatch, November 8, 2024, edition advertising the LHMP project kickoff and inviting the public to the kickoff meetings
- Posting of LHMP Public Information Flyer on community bulletin boards:
  - ✓ Amador City, City Hall, Amador City California
  - ✓ Amador County Administration Building, Jackson California
  - ✓ Amador County Department of Health and Human Services, Sutter Creek California
  - ✓ Amador County Transportation Commission Office, Sutter Creek California
  - ✓ Comanche Blue's General Store, Ione California
  - ✓ Ione City Hall, Ione California
  - ✓ Jackson City Hall, Jackson California
  - ✓ Jackson Fire Department, Jackson California
  - ✓ Jackson Library, Jackson California
  - ✓ Plymouth City Hall, Plymouth California
  - ✓ Sutter Creek City Hall, Sutter Creek California
  - ✓ Young's Payless Market, Pioneer California
  - ✓ Pioneer Branch Library, Pioneer California
  - ✓ Pioneer Veteran's Hall, Pioneer California
  - ✓ Fiddletown Community Center, Fiddletown California
  - ✓ Pine Grove Town Hall and Library, Pine Grove California
  - ✓ Pine Grove Market, Pine Grove California
  - ✓ River Pines Town Hall, River Pines California
  - ✓ Volcano Post Office, Volcano California
  - ✓ Sizemore County Store, Volcano California
- Post on the Amador County Sheriff's Office Facebook page, November 14, 2024

The HMPC Risk Assessment Meeting was also advertised in the April 1, 2025 Fiddletown Community e-newsletter, The Fiddler.

The purpose of this outreach was to inform the public and other stakeholders of the Amador County LHMP Update project, how they could get involved, and how to provide comments on the draft LHMP prior to submittal to Cal OES/FEMA. The outreach also invited the public stakeholders to the HMPC meetings for the project. Information on these outreach efforts can be seen in Appendix A to this LHMP.

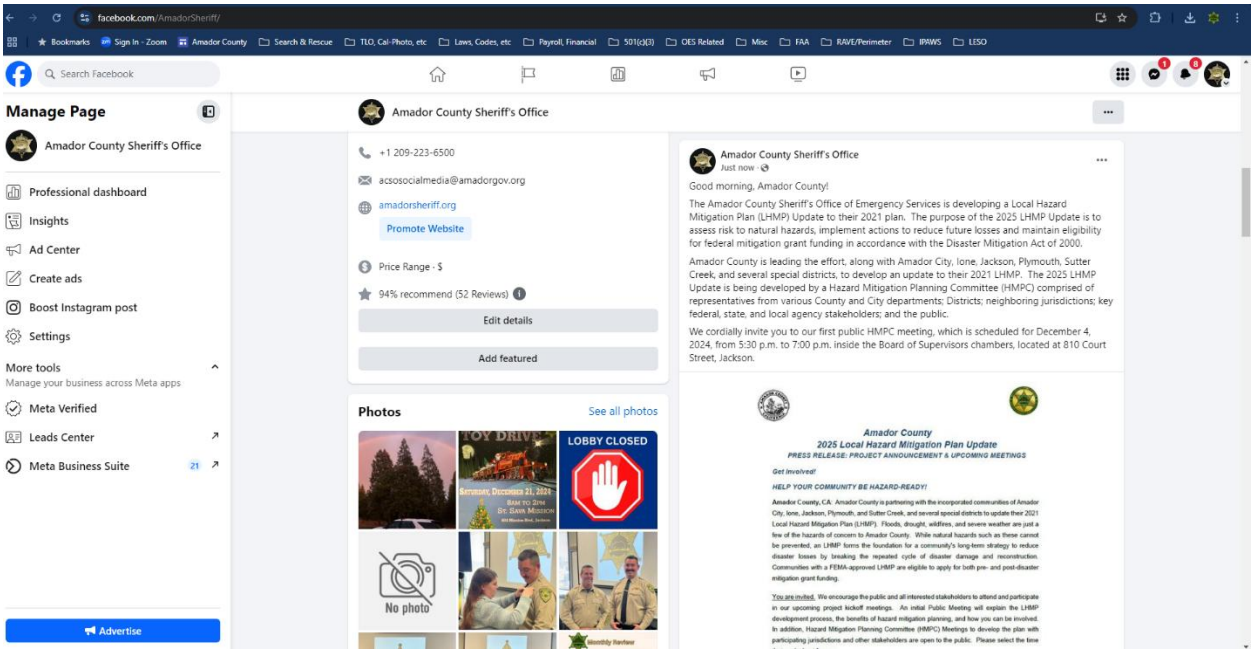
Public Meetings

Two public meetings were planned for this LHMP Update project, during key times of the LHMP development process:

Public Meeting #1: LHMP Kickoff

Public outreach for this LHMP Update began at the beginning of the Plan development process with the early public outreach activities to inform the public of the purpose of the DMA and the hazard mitigation planning process for Amador County and all participating jurisdictions. A press release was also issued at the beginning of the project to invite the public to attend either the public meeting or HMPC meetings. Figure 3-2 captures the Amador County Sheriff's Office Facebook page November 14, 2024, post.

Figure 3-2 Amador County Sheriff's Office Facebook Page, November 14, 2024



Source: Amador County

Public Meeting #2: On the Draft LHMP

The first draft of the LHMP Update was provided to the HMPC in August 2025, with a public review draft provided in September 2025. A public meeting was held on the evening of October 8, 2025, to present the draft LHMP and to collect public comments on the public review draft prior to finalization and submittal to Cal OES/FEMA. The public meeting was advertised in a variety of ways to maximize outreach efforts to both targeted groups and to the public at large and included an advertisement in local newspapers inviting the public to attend either the formal public meetings or the HMPC meeting at their convenience. The advertisement in the local newspaper included information on the date, location, and time of the meeting; where the draft Plan could be accessed in the community; and how to provide comments on the draft LHMP Update. In addition to a copy of the public review draft being placed on the Amador County LHMP website in advance of these meetings, a hard copy of the draft Plan was made available in the Amador County Sheriff's Office, 700 Court St. Jackson, CA 95642. Documentation to support the final public meeting, including meeting outreach, can be found in Appendix A.

In addition to the advertisement for public participation, notices of meetings were sent directly to all persons on the HMPC contact list and also to other agency and key stakeholders (including the public) with an interest in the Amador County Planning Area. The majority of these people reside in the Amador County Planning Area or in surrounding communities. Because this is a multi-jurisdictional planning effort, all public outreach activities for this LHMP Update were conducted in cooperation with and on behalf of the Amador County and all participating jurisdictions to this 2025 LHMP Update. Additional outreach for review of the Draft LHMP and final meetings included:

- Issuing of a Press Release on the Final Meetings and how to provide comments on the Draft LHMP
- Website additions announcing the final HMPC and Public meetings and how to provide comments on the Draft LHMP
- An advertisement/public notice in the Amador County Ledger Dispatch Print edition on September 19 and 26, 2025 announcing the final HMPC and Public meetings and how to provide comments on the Draft LHMP
- Posting of LHMP Public Information Flyer on the Draft LHMP at the following community bulletin boards:
  - ✓ Amador City, Amador City Post Office, Amador City California
  - ✓ Amador County Administration Building, Jackson California
  - ✓ Amador County Department of Health and Human Services, Sutter Creek California
  - ✓ Amador County Transportation Commission Office, Sutter Creek California
  - ✓ Comanche Blue's General Store, Ione California
  - ✓ Ione City Hall, Ione California
  - ✓ Plymouth City Hall, Plymouth California
  - ✓ Sutter Creek City Hall, Sutter Creek California
  - ✓ Pioneer Branch Library, Pioneer California
  - ✓ Fiddletown Community Center, Fiddletown California
  - ✓ Pine Grove Market, Pine Grove California
  - ✓ River Pines Town Hall, River Pines California
  - ✓ Sizemore County Store, Volcano California
  - ✓ Volcano Post Office, Volcano California
  - ✓ Young's Payless Market, Pioneer, California
- Post on the Amador County Sheriff's Office Facebook page, September 15, 2025

The formal public meetings for this project are summarized in Table 3-4.

Table 3-4 Schedule of Public and Stakeholder Meetings

Meeting Type	Meeting Topic	Meeting Date	Meeting Locations
Early Public Kickoff Meeting #1	1) Intro to DMA, CRS and mitigation planning 2) 2025 LHMP Update Process	December 4, 2024	Amador County Board of Supervisors Chambers Jackson, CA
Final Public Meeting #2 on the Draft LHMP	1) Presentation of Draft LHMP and solicitation of public and stakeholder comments	October 8, 2025	Amador County Board of Supervisors Chambers Jackson, CA

Where appropriate, stakeholder and public comments and recommendations were incorporated into the final LHMP throughout the Plan development process, including the sections that address the risk assessment and mitigation goals and strategies. Public comments were solicited throughout the planning process and prior to LHMP submittal to Cal OES and FEMA. No public comments were received as part of the 2025 LHMP Update project. All press releases, newspaper advertisements and articles, website postings, and public outreach efforts are on file with County OES and are included in Appendix A. The draft Plan is currently available online on the Amador County website at: https://www.amadorgov.org/departments/office-of-emergency-services/local-hazard-mitigation-plan.

Planning Step 3: Coordinate with Other Departments and Agencies

Early in the planning process, the HMPC determined that data collection, mitigation strategy development, and LHMP review and approval would be greatly enhanced by inviting other local, state and federal agencies and organizations to participate in the Plan development process. Based on their involvement in hazard mitigation planning, their landowner status in the Amador County Planning Area, and/or their interest as a neighboring or involved jurisdiction, representatives from the following agencies were invited to participate on the Planning Committee:

- American Red Cross
- Cal DWR
- CAL FIRE
- Cal OES
- Cal Trans
- California Department of Education
- California Department of Fish and Wildlife
- California Native Plant Society
- Federal Emergency Management Agency, Region IX
- National Weather Service
- Pacific Gas & Electric
- U.S Bureau of Reclamation
- U.S. Geological Survey
- U.S. Army Corps of Engineers
- United States Forest Service

In addition, coordination with other key agencies, organizations, and advisory groups occurred throughout the planning process as needed to inform them on how to participate in the LHMP Update process and if they had any expertise or assistance, they could lend to the LHMP Update, including information on hazards, risks and vulnerability of the Amador County Planning Area, and any input on possible risk reduction measures. As part of the overall stakeholder and agency coordination effort, the HMPC coordinated with and utilized input to the LHMP Update from the following agencies:

- Cal-Adapt
- Cal Atlas
- Cal OES
- CAL FIRE
- Cal Trans
- California Department of Conservation
- California Department of Finance

- California Department of Fish and Wildlife
- California Department of Food and Agriculture
- California Department of Parks and Recreation
- California Department of Water Resources
- California Division of Mines and Geology
- California Employment Development Department
- California Geological Survey
- California Invasive Plant Council
- California Natural Resources Agency
- FEMA Region IX
- Library of Congress
- National Drought Mitigation Center
- National Levee Database
- National Oceanic and Atmospheric Association
- National Performance of Dams Program
- National Register of Historic Places
- National Resource Conservation Service
- National Response Center
- National Weather Service
- Pacific Gas & Electric
- Public Policy Institute of California
- United States Army Corps of Engineers
- United States Bureau of Land Management
- United States Bureau of Reclamation
- United States Department of Agriculture
- US Department of Transportation
- United States Forest Service
- United States Geological Survey
- Western Regional Climate Center

Several opportunities were provided for the groups listed above to participate in the planning process. At the beginning of the planning process, invitations were extended to many of these groups to actively participate on the HMPC. Specific participants from these groups are detailed in Appendix A. Others assisted in the process by providing data directly as requested in the Data Worksheets or through data contained on their websites or as maintained by their offices. Further as part of the public outreach process, all groups were invited to attend the public and HMPC meetings and to review and comment on the draft LHMP prior to submittal to CAL OES and FEMA.

Other Community Planning Efforts and Hazard Mitigation Activities

Coordination with other community planning efforts is also paramount to the success of this LHMP Update. Hazard mitigation planning involves identifying existing policies, tools, and actions that will reduce a community's risk and vulnerability to hazards. Amador County and the participating jurisdictions to this Plan use a variety of comprehensive planning mechanisms, such as general plans and ordinances, to guide growth and development. Integrating existing planning efforts and mitigation policies and action strategies into this LHMP Update establishes a credible and comprehensive Plan that ties into and supports other community programs. The development of this LHMP Update incorporated information from the following existing plans, studies, reports, and initiatives as well as other relevant data from neighboring communities

and other jurisdictions. This gives a general overall list of plans, studies, and reports. More can be found in Appendix B to this Plan Update.

- 2023 State of California Hazard Mitigation Plan
- CAL FIRE Plans and data
- CAL OES plans and data
- Cal-Adapt reports and data
- California Department of Finance demographic documents
- California Department of Public Health
- California Department of Water Resources plans and information
- California DWR Division of Safety of Dams plans and information
- California Geological Survey Plans
- Capital Improvement Plans for each jurisdiction
- Climate Adaptation Plans
- Climate Change and Health Profile Report – Amador County
- CWPPs
- Dam Emergency Action Plans
- Emergency Operations Plans
- Evacuation Plans
- FEMA mitigation planning documents
- Flood Insurance Studies
- General Plans for each of the jurisdictions
- General Plan Background Reports
- Housing Elements f for each of the jurisdictions
- National Weather Service documents
- Stormwater Master Plans
- US Department of Agriculture Reports
- US Department of Interior Plans
- US Fish and Wildlife reports
- USDA reports
- USGS Reports

Specific source documents are referenced at the beginning of each section of Chapter 4 and in Appendix B. These and other documents were reviewed and considered, as appropriate, during the collection of data to support Planning Steps 4 and 5, which include the hazard identification, vulnerability assessment, and capability assessment. Data from these plans and documents were incorporated into the hazard risk assessment sections of the LHMP. Where data and information from the existing studies and reports is used in this LHMP Update, the source document is referenced throughout this Plan. The information was also used to identify potential hazard mitigation strategies for inclusion in this LHMP Update and in assessing the capabilities of the participating jurisdictions in implementing the resulting mitigation strategy. Appendix B, References, provides a detailed list of references used in the preparation of this LHMP Update.

Coordination with Underserved Communities and Socially Vulnerable Populations

As detailed in FEMA's new 2025 LHMP Guidance, the LHMP development process should utilize the Whole Community approach to hazard mitigation planning. New 2025 FEMA guidance defines planning for the "Whole Community" as a focus on enabling the participation in national preparedness activities of a wider range of players from the private and nonprofit sectors, including nongovernmental organizations

and the general public, in conjunction with the participation of all levels of government in order to foster better coordination and working relationships.

In consideration of these new FEMA requirements as well as applicable California state laws and LHMP requirements, the plan development process focused on key sectors of public and private entities that would enhance hazard mitigation planning for Amador County. Thus, engagement and coordination with a variety of community-based organizations that work directly with or provide support to underserved communities and socially vulnerable populations was a critical component to Amador County in addressing equity in mitigation planning and implementation.

For this LHMP project, significant efforts were made to identify and engage appropriate community members and groups to support the Plan development process. In Amador County, vulnerable populations groups primarily include seniors, children, low income, homeless populations, people with disabilities, those with lack of or limited mobility, and those with limited access to public transportation services in the more rural areas for evacuations and other hazard response needs. There is also a migrant population that arrives for the summer, many of which are Spanish speakers, which can create challenges during hazard events. The concept of Amador County being vulnerable due to its location and status as a small, rural, and somewhat remote community was determined to be a major descriptor of the County's underserved and vulnerable populations.

Given the small, rural nature of Amador County, much of the support for these groups fell to applicable local government agencies, primarily the County. Thus, reaching out to the County departments providing these types of services was the most effective approach to meeting this element. As part of the planning process, efforts made to identify and engage these groups in the Amador County 2025 LHMP Update project included the following:

- **Amador County Health and Human Service** –The mission of Amador County's Department of Health and Human Services (DHHS) is to provide benefits and services in a quality manner, promoting personal responsibility, job readiness and self-sufficiency in order to strengthen individuals and families. Representatives from the DHHS were invited to be on the HMPC and provide input into the Plan development process. Numerous (6) DHHS representatives, with varying roles and responsibilities, participated on the HMPC and provided input into the LHMP Update, including input on mitigation actions. Amador County DHHS divisions include Public Health, Social Services, and Behavioral Health.
- **Sutter Amador Hospital** – The Sutter Amador Hospital's comprehensive services include a full array of programs designed for the needs of the communities it serves. Representatives of the Hospital were invited to be on the HMPC and review and provide comments on the Public Review Draft LHMP. The Hospital's emergency planner attended and participated as part of the HMPC.
- **American Legion Ambulance** – The American Legion Post No. 108 Ambulance Service provides Advanced Life Support (ALS) emergency 911 response to Amador and Calaveras Counties. Its mission is to continue the relentless pursuit of perfection in quality health care and compassion for its patients. American Legion Ambulance representatives were invited to be on the HMPC and review and provide comments on the Public Review Draft LHMP. The Ambulance Company's President attended and participated as part of the HMPC.
- **Mountain County EMSA-** Mountain County EMSA is a State and County authorized service agency composed of Emergency Medical Service (EMS) specialists who coordinate and regulate local

emergency service for our 4 county EMS system in California, including Amador, Alpine, Calaveras and Mariposa counties. Mountain County EMSA representatives were invited to be on the HMPC and review and provide comments on the Public Review Draft LHMP.

- **MACT Health Board** – The MACT Health Board provides services to Mariposa, Amador, Alpine, Calaveras, and Tuolumne counties. Their clinics are specialized and allow patients to receive affordable care for most medical, dental, behavioral health, optometry and chiropractic needs. MACT Health Board representatives were invited to be on the HMPC and review and provide comments on the Public Review Draft LHMP. A Board representative attended and participated as part of the HMPC.
- **ARC Amador** - The Arc of Amador and Calaveras' mission is to provide support and services to persons with intellectual and developmental disabilities so they can better learn, work, live and recreate in the mainstream of life. Since 1971, the Arc has been providing support and services to people with developmental disabilities. The Arc is a nonprofit membership corporation open to anyone with an interest in the welfare of individuals with developmental disabilities. ARC representatives were invited to be on the HMPC and review and provide comments on the Public Review Draft LHMP. Multiple representatives attended and participated as part of the HMPC.
- **Red Cross** - The Sierra-Delta Chapter of the Red Cross covers multiple counties including Amador. The Red Cross mission in Amador County is to prevent and alleviate human suffering in the face of emergencies. This involves providing relief to individuals and communities impacted by disasters, teaching life-saving skills, and supporting those in need through various services. Specifically, in Amador County, the Red Cross focuses on disaster relief, including providing shelter, food, and health services during emergencies. They also offer training in first aid, CPR, and other life-saving skills. Local Red Cross representatives were invited to be on the HMPC and review and provide comments on the Public Review Draft LHMP. Multiple representatives attended and participated as part of the HMPC.
- **Victory Village** - Victory Village is in its fourteenth year of serving veterans in the Central Sierra Nevada Foothills of California at two offices, one in Jackson, CA and one in Auburn, CA. Victory Village's purpose and mission is to develop affordable housing with innovative supportive services and programs for veterans, seniors, families, women, and children experiencing homelessness, poverty, and vulnerability in underserved communities. Victory Village representatives were invited to be on the HMPC and review and provide comments on the Public Review Draft LHMP.
- **Homeless Task Force** – The Homeless Task Force, part of Amador County, serves the homeless populations, identifying needs and gaps in services in order to efficiently address homelessness in the County. Representative of the Homeless Task Force were invited to be on the HMPC and review and provide comments on the Public Review Draft LHMP.
- **Area 12 Agency on Aging** - The Area 12 Agency on Aging, established as a five county Joint Powers Agency in 1987, provides services to approximately 54,000 older adults. It is part of an aging network which includes 33 Area Agencies on Aging statewide and over 675 nationwide. The Area 12 Agency on Aging is responsible for providing funds, through an impartial request for proposal process, to community senior service providers which exhibit a high standard of program excellence. As an advocate for older adults, the Area 12 Agency on Aging strives to ensure opportunities for independence and the highest possible quality of life are available to all Area 12 residents age 60+. Area 12 Agency of Aging representatives were invited to be on the HMPC and review and provide comments on the Public Review Draft LHMP.

- **Jackson Senior Center** – The Amador Senior Center exists to provide activities, education, and support services to the Seniors of Amador County. Representatives from the Jackson Senior Center were invited to be on the HMPC and review and provide comments on the Public Review Draft LHMP.
- **Fiddletown Community Center** - The Fiddletown Community Center is a nonprofit, all volunteer, community-based organization serving residents of Fiddletown and the surrounding area. Started over 60 years ago, this organization continues to be a vital part of local life providing an affordable event center, a free library and tutoring center, providing local gatherings throughout the year, and much more. Fiddletown Community Center representatives were invited to be on the HMPC and review and provide comments on the Public Review Draft LHMP.

3.2.2. Phase 2: Assess Risks

Planning Steps 4 and 5: Identify the Hazards and Assess the Risks

Foster Morrison led the HMPC in a research effort to identify, document, and profile all the hazards that have, or could have, an impact to the Amador County Planning Area. Starting with the 2020 LHMP, natural hazards of concern were added, deleted, and modified for this LHMP Update. Data collection worksheets were developed and used in this effort to aid in determining hazards and vulnerabilities and where the risk varies across the Amador County Planning Area. Geographic information systems (GIS) were used to display, analyze, and quantify hazards and vulnerabilities.

The HMPC also conducted a capability assessment to review and document Amador County's and each participating jurisdictions' current capabilities to mitigate risk from and vulnerability to hazards. By collecting information about existing County/City/District programs, policies, regulations, ordinances, and emergency plans, the HMPC could assess those activities and measures already in place that contribute to mitigating some of the risks and vulnerabilities identified. A more detailed description of the risk assessment process, methodologies, and results are included in Chapter 4 Risk Assessment.

NFIP Participation

Also addressed in the risk assessment and mitigation strategy of this 2025 LHMP is an assessment of the County and five Cities' floodplain management programs and participation in the NFIP, including a discussion of their continued compliance with NFIP requirements. However, it should be noted that this applies only to eligible NFIP communities. Participating special districts to this LHMP Update do not address their compliance with the NFIP as they are not eligible jurisdictions for purposes of the NFIP.

3.2.3. Phase 3: Develop the Mitigation Plan

Planning Steps 6 and 7: Set Goals and Review Possible Activities

Foster Morrison facilitated brainstorming and discussion sessions with the HMPC that described the purpose and process of developing planning goals and objectives, a comprehensive range of mitigation alternatives, and a method of selecting and defending recommended mitigation actions using a series of selection criteria. This information is included in Chapter 5 Mitigation Strategy. Additional documentation on the process the HMPC used to develop the goals and mitigation strategy is in Appendix C.

Planning Step 8: Draft an Action Plan

Based on input from the HMPC regarding the draft risk assessment and the goals and activities identified in Planning Steps 6 and 7, a complete first draft of the LHMP Update was developed. This complete draft was provided for HMPC review and comment via a Dropbox web link. HMPC comments were integrated into the second public review draft, which was advertised and distributed to collect public input and comments. The HMPC integrated comments and issues from the public, as appropriate, along with additional internal review comments and produced a final draft for CAL OES and FEMA Region IX to review and approve, contingent upon final adoption by governing boards of all participating jurisdictions.

3.2.4. Phase 4: Implement the Plan and Monitor Progress

Planning Step 9: Adopt the Plan

In order to secure buy-in and officially implement the LHMP Update, the Plan was adopted by the governing boards of each participating jurisdiction using the sample resolutions contained in Appendix D.

Planning Step 10: Implement, Evaluate, and Revise the Plan

The true worth of any mitigation plan is in the effectiveness of its implementation. Up to this point in the planning process, the HMPC's efforts have been directed at researching data, coordinating input from participating entities, and developing appropriate mitigation actions and projects. Each recommended action includes key descriptors, such as a lead manager and possible funding sources, to help initiate implementation. An overall implementation strategy is described in Chapter 7 Plan Implementation and Maintenance.

Finally, there are numerous organizations within the Amador County Planning Area whose goals and interests interface with hazard mitigation. Coordination with these other planning efforts, as addressed in Planning Step 3, is paramount to the implementation and ongoing success of this plan and mitigation in the Amador County Planning Area and is addressed further in Chapter 7.

Implementation and Maintenance Process: 2020 Amador County LHMP

The previous 2020 LHMP included a process for Plan maintenance and implementation of the mitigation strategy as well as formal updates to the LHMP. The 2020 process called for annual reviews, including a review of the status of mitigation strategy implementation. In addition, the 2020 processes called for a formal plan update as required by DMA regulations every 5 years. With respect to the 2020 LHMP, no formal process was followed for annual reviews. This 2025 LHMP Update, once approved and adopted, will meet the DMA formal 5-year update requirement for all participating jurisdictions.

In addition, the 2025 LHMP was relied on and integrated into other planning mechanisms in the Amador County Planning Area. Table 3-5 lists the planning mechanism the 2020 LHMP Update was integrated into by unincorporated Amador County. Specific to other participating jurisdictions, the jurisdictional annexes identify the planning mechanisms the 2020 LHMP were integrated into by each jurisdiction.

Table 3-5 Unincorporated Amador County Incorporation of 2020 Amador County LHMP into Other Planning Mechanisms

Planning Mechanism 2020 LHMP Was Incorporated or Implemented Through	Details
Amador County General Plan (2016)	Incorporated by reference within Safety Element in accordance with AB2140. Also, integrated as part of our Emergency Response.
Amador County Emergency Operations Plan (2024)	Hazard I.D & Analysis, Hazard Summary, Hazard Mitigation, and just generally referenced.
Amador County Integrated Preparedness Plan (2023)	Hazard I.D.

The plan implementation and maintenance process as set forth in the 2020 Plan has been updated for this LHMP Update. The revised update implementation and maintenance process for the Amador County 2025 LHMP Update is set forth in Section 7 of this Plan document. A strategy for continued public involvement for this update process is also included in Chapter 7.

Chapter 4 Risk Assessment

44 CFR 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.

As defined by the Federal Emergency Management Agency (FEMA), risk is a combination of hazard, vulnerability, and exposure. "It is the impact that a hazard would have on people, services, facilities, and structures in a community and refers to the likelihood of a hazard event resulting in an adverse condition that causes injury or damage."

The risk assessment process identifies and profiles relevant hazards and assesses the exposure of lives, property, and infrastructure to these hazards. The process allows for a better understanding of a community's potential risk to natural hazards and provides a framework for developing and prioritizing mitigation actions to reduce risk from future hazard events.

This risk assessment followed the methodology described in the FEMA publication Understanding Your Risks—Identifying Hazards and Estimating Losses (FEMA 386-2, 2002), which breaks the assessment down into a four-step process:

1. Identify Hazards;
2. Profile Hazards;
3. Inventory Assets; and
4. Estimate Losses.

Data collected through this process has been incorporated into the following sections of this chapter:

- **Section 4.1 Hazard Identification** identifies the natural hazards that threaten the Amador County Planning Area and unincorporated Amador County and describes why some hazards have been omitted from further consideration.
- **Section 4.2 Amador County Planning Area Assets Inventory and Growth and Development Trends** identifies the populations; structures and values; critical facilities and community lifelines; cultural, historical, and natural resources; and economic and community activities of value. It also identifies past growth in the Amador County Planning Area and reviews future development trends. This information is not hazard specific and covers the entire Amador County Planning Area and unincorporated Amador County.
- **Section 4.3 Hazard Profiles and Vulnerability Assessment** provides an overview of each hazard, its location and extent, and discusses the risk, vulnerability, and impacts of each natural hazard to the Amador County Planning Area and unincorporated Amador County. The hazard profile also describes previous occurrences of hazard events and the likelihood of future occurrences. The vulnerability assessment evaluates the Amador County's exposure to natural hazards considering: populations; structures and values; critical facilities and infrastructure; community lifelines; natural, historic, and

cultural resources; economic assets and community activities; and future development trends, and where possible, estimates potential hazard losses.

- **Section 4.4 Capability Assessment** inventories existing mitigation activities and policies, regulations, plans, and programs that pertain to hazards and mitigation in the Amador County Planning Area and unincorporated Amador County and can affect net vulnerability.
- **Section 4.5 Natural Hazard Summary** summarizes the results of the risk assessment and whether a hazard is considered a priority for mitigation strategy planning.

This risk assessment covers the entire geographical extent of Amador County (i.e., the Amador County Planning Area) and unincorporated Amador County. And as required by FEMA, this risk assessment for the Amador County Planning Area also includes an evaluation of how the hazards and risks vary across the Planning Area.

This LHMP Update involved a comprehensive review and update of each section of the 2020 LHMP. Information from the 2020 LHMP was used in this Update where valid and applicable. As part of the risk assessment update, new data was used, where available, and new analyses were conducted. Where data from existing studies and reports was used, the source is referenced throughout this risk assessment. Refinements, changes, and new methodologies used in the development of this risk assessment update are summarized in Chapter 2 What's New and are also detailed in this risk assessment portion of the Plan Update.

4.1 Hazard Identification

44 CFR 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.

The Amador County Hazard Mitigation Planning Committee (HMPC) conducted a hazard identification study to determine the hazards that threaten the Planning Area. This section details the methodology and results of this effort.

Data Sources

The following data sources were used for this Hazard Identification portion of the plan:

- National Climatic Data Center Storm Events Database
- 2020 Amador County Hazard Mitigation Plan
- 2016 Amador County General Plan
- 2023 State of California Hazard Mitigation Plan
- FEMA Disaster Declaration Database
- HMPC input

4.1.1. Results and Methodology

Using existing hazards data and input gained through planning meetings, the HMPC agreed upon a list of hazards that could affect the Amador County Planning Area. Hazards data from the California Office of Emergency Services (Cal OES), FEMA, California Department of Water Resources, the National Oceanic

and Atmospheric Administration (NOAA), and many other sources were examined to assess the significance of these hazards to the Planning Area.

The following hazards in Table 4-1, listed alphabetically, were identified and investigated for this LHMP Update. As a starting point, the 2020 Amador County LHMP Update and the 2023 California State Hazard Mitigation Plan were consulted to evaluate the applicability of new hazards of concern to the State to the Amador County Planning Area. Building upon this effort, hazards from the past plan were also identified, and comments explain how hazards were updated from the previous plan. Most hazards from the 2020 plan were profiled in this LHMP Update, with the exception of pandemic. Levee failure was placed inside the flood hazard. No new hazards were added.

Table 4-1 Amador County Hazard Identification and Comparison between 2020 and 2025 LHMP

2025 Hazards	2020 Hazards	Comment
Agricultural Hazards (severe weather/pests/invasive species)	Ag Hazards: Severe Weather/Insect Pests	This hazard was kept.
–	Aquatic Invasive Species	This hazard was integrated into the Agricultural Hazards
Avalanche	Avalanche	This hazard was kept.
Climate Change	Climate Change	This hazard was kept.
Dam Failure	Dam Failure	This hazard was kept.
Drought & Water shortage	Drought and Water Shortage	This hazard was kept.
Earthquake (w/subhazards)	Earthquake (minor/major)	This hazard was kept and slightly renamed.
Floods: 1%/0.2% annual chance (w/ levee failure)	Flood: 100/500-year	This hazard was kept and levee failure was added.
Floods: Localized Stormwater	Flood: Localized/Stormwater	This hazard was kept.
Landslide, Mudslide, Debris Flow	Landslide, Mudslide, and Debris Flows	This hazard was kept.
–	Levee failure	This was put into the flood hazard.
–	Pandemic	This hazard was dropped from the LHMP.
Severe Weather: Extreme Cold, Freeze, and Snow	Severe Weather: Winter Storms and Freeze	This hazard was renamed.
Severe Weather: Extreme Heat	Severe Weather: Extreme Heat	This hazard was kept.
Severe Weather: Heavy Rains and Storms (Hail, Lightning)	Severe Weather: Heavy Rains and Storms (winds, hail, lightning)	This hazard was kept.
Severe Weather: High Winds and Tornadoes	Severe Weather: High Winds/Tornadoes	This hazard was kept.
Wildfire (w/smoke and air quality)	Wildfire	This hazard was kept, and smoke and air quality subhazards were added.

Certain other hazards were excluded from consideration for this Plan Update. They are shown in Table 4-2.

Table 4-2 Amador County – Excluded Hazards

Hazard Excluded	Why Excluded
Coastal Flooding, Erosion, and Sea Level Rise	The County is not on the coast.
Hurricane	The County is not on the coast.
Tsunami	The County is not on the coast.
Volcano	Given the location of active or potentially active volcanoes relative to the Planning Area, it was felt this hazard was not of concern to the County.

Table 4-3 was completed by the County and HMPC to identify, profile, and rate the significance of identified hazards. Those hazards identified as a high or medium significance in Table 4-3 are considered priority hazards for mitigation planning. Those hazards that occur infrequently or have little or no impact in Amador County were determined to be of low significance and not considered a priority hazard. Significance was determined based on the hazard profile, focusing on key criteria such as frequency, extent, and resulting damage, including deaths/injuries and property, natural and cultural resources, and economic damage.

Table 4-3 Amador County Hazard Identification Assessment

Hazard	Geographic Extent	Likelihood of Future Occurrences	Magnitude/ Severity	Significance	Climate Change Influence
Agricultural Hazards (severe weather/pests/invasive species)	Extensive	Highly Likely	Limited	Medium	Medium
Avalanche	Limited	Likely	Critical	Medium	Medium
Climate Change	Extensive	Likely	Limited	Medium	--
Dam Failure	Limited	Unlikely	Critical	Medium	Medium
Drought & Water Shortage (w/ tree mortality)	Extensive	Likely	Critical	Medium	High
Earthquake (w/subhazards)	Extensive	Unlikely	Catastrophic	Medium	Low
Floods: 1%/0.2% annual chance (w/ levee failure)	Significant	Occasional/Unlikely	Critical	Medium	Medium
Floods: Localized Stormwater	Extensive	Highly Likely	Limited	Medium	Medium
Landslide, Mudslide, Debris Flow	Limited	Likely	Critical	Medium	Medium
Severe Weather: Extreme Cold, Freeze, and Snow	Extensive	Highly Likely	Limited	Medium	Medium
Severe Weather: Extreme Heat	Extensive	Highly Likely	Limited	Medium	High
Severe Weather: Heavy Rains and Storms (Hail, Lightning)	Extensive	Highly Likely	Limited	Medium	Medium
Severe Weather: High Winds and Tornadoes	Extensive	Highly Likely	Limited	Medium	Medium
Wildfire (w/smoke and air quality)	Extensive	Highly Likely	Catastrophic	High	Medium

Geographic Extent

Limited: Less than 10% of planning area

Significant: 10-50% of planning area

Extensive: 50-100% of planning area

Likelihood of Future Occurrences

Highly Likely: Near 100% chance of occurrence in next year, or happens every year.

Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.

Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.

Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity

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

Critical: 25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability

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

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

Significance

Low: Minimal potential impact

Medium: Moderate potential impact

High: Widespread potential impact

Climate Change Influence

Low: Minimal potential impact

Medium: Moderate potential impact

High: Widespread potential impact

4.1.2. Disaster Declaration History

One method used to identify hazards was the researching of past events that triggered federal and/or state emergency or disaster declarations in the Amador County Planning Area. Federal and/or state disaster declarations may be granted when the severity and magnitude of an event 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. Should the disaster be so severe that both the local and state governments' capacities are exceeded, a federal emergency or disaster declaration may be issued allowing for the provision of federal assistance.

The federal government may issue a disaster declaration through FEMA, the U.S. Department of Agriculture (USDA), and/or the Small Business Administration (SBA). 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.

A USDA declaration will result in the implementation of the Emergency Loan Program through the Farm Services Agency. This program enables eligible farmers and ranchers in the affected county as well as contiguous counties to apply for low interest loans. A USDA declaration will automatically follow a major disaster declaration for counties designated major disaster areas and those that are contiguous to declared counties, including those that are across state lines. As part of an agreement with the USDA, the SBA offers low interest loans for eligible businesses that suffer economic losses in declared and contiguous counties that have been declared by the USDA. These loans are referred to as Economic Injury Disaster Loans. Disaster declarations for these programs are discussed in Section 4.3.6.

Based on the disaster declaration history provided in Table 4-4, Amador County is among the many counties in California susceptible to disaster. Details on federal and state disaster declarations were obtained by the HMPC, FEMA, and Cal OES and compiled in chronological order in Table 4-4. A review of state declared disasters indicates that Amador County received 31 state declarations between 1950 and 2025. Of the 31 state declarations: 22 were associated with severe winter storms, heavy rains, or flooding; 3 were for fire; 2 were for drought; 2 were from pandemic, 1 was for freeze and severe weather conditions; and 1 was from economic disaster. A review of federal disasters shows 27 federal disaster declarations from 1950 to 2025. Of these 27 federal declarations: 20 were associated with severe winter storms, heavy rains, or flooding; 2 for fire; 2 were from pandemic, 1 for drought; 1 was for seismic sea wave (which was declared for the entire State of California); and 1 was for hurricane (a nationwide declaration for Katrina evacuations). A summary of these events by disaster type is shown in Table 4-5.

Table 4-4 Amador County Federal and State Disaster Declarations, 1950-2025

Year	Disaster Name	Disaster Type	Disaster Cause	State Declaration # and Date	Federal Declaration # and Date
2023	California Severe Winter Storms, Straight-line Winds, Flooding, Landslides, and Mudslides	Storm	Storm	–	DR-4699 4/3/2023
2023	California Severe Winter Storms, Flooding, Landslides, and Mudslides	Flood	Severe winter storms	3/01/2023	EM-3592 3/10/2023
2023	California Severe Winter Storms, Flooding, Landslides, and Mudslides	Flood	Severe winter storms	2023-01 1/4/2023	DR-4683 1/14/2023
2021	December 2021 Storms	Storm	Storm	2022-03 12/30/2021	–
2021	California Caldor Fire	Fire	Fire	2021-06 8/17/2021 9/1/2021	EM-3571 9/1/2021
2020	California Covid-19 Pandemic	Biological	Biological	3/22/2020	DR-4482 3/22/2020
2020	California Covid-19 Pandemic	Biological	Biological	3/13/2020	EM-3428 3/13/2020
2019	California Severe Winter Storms, Flooding, Landslides, And Mudslides	Storms	Storms	2019-03 5/18/2019	DR-4434 5/18/2019
2017	Severe Winter Storms, Flooding, Mudslides in California	Flood	Storms	2017-03 3/7/2017	DR-4308 4/1/2017
2017	Severe Winter Storms, Flooding, and Mudslides in California	Storm	Storm	2017-01 1/23/2017	DR-4301 2/14/2017
2015	California Butte Fire	Fire	Fire	–	FM-5111 8/16/2016
2015	California Drought/Tree Mortality	Drought	Drought	2015-05 10/10/2015	–
2015	Summer 2015 Wildfires	Fire	Fire	2015-03 8/27/2015	–

Year	Disaster Name	Disaster Type	Disaster Cause	State Declaration # and Date	Federal Declaration # and Date
2007	2007 Severe Freeze	Freeze	Freeze	2007-02 01/12/07, 01/16/07, 01/19/07, 01/20/07, 01/26/07	–
2006	California Severe Storms, Flooding, Landslides, and Mudslides	Flood	Storms	2006-03 4/10/2006	DR-1646 6/5/2006
2005/2006	Severe Storms, Flooding, Mudslides, and Landslides in California	Flood	Storms	2006-01 1/12/2006	DR-1628 2/3/2006
2005	Hurricane Katrina Evacuations	Economic	Hurricane	–	EM-3248 2/3/2006
2001	Energy Emergency	Economic	Greed	1/1/2001	–
1998	California Severe Winter Storms and Flooding	Flood	Storms	–	DR-1203 2/9/1998
1997	California Severe Storms/flooding	Flood	Storms	97-01 1/2/1997-1/31/1997	DR-1155 1/4/1997
1995	California Severe Winter Storms, Flooding, Landslides, Mud Flows	Flood	Storms	95-03-N 95-04-S 3/12/1995-3/24/1995	DR-1046 3/12/1995
1995	California Severe Winter Storms, Flooding, Landslides, Mud Flows	Flood	Storms	95-01 1/09/1995-2/17/1995	DR-1044 1/10/1995
1986	California Severe Storms, Flooding	Flood	Storms	86-01 2/18/1986-3/12/1986	DR-758 2/21/1986
1982	Heavy Rain and Flooding	Flood	Storms	82-03 4/1/1982	–
1980	April Storms	Flood	Storms	80-01 4/1/1980	–
1977	California Drought	Drought	Drought	–	EM-3023 1/20/1977

Year	Disaster Name	Disaster Type	Disaster Cause	State Declaration # and Date	Federal Declaration # and Date
1976	1976 Drought	Drought	Drought	2/9/76, 2/13/76, 2/24/76, 3/26/76, 7/6/76	–
1969	California Severe Storms, Flooding	Flood	Storms	1/23/69, 1/25,69, 1/28/69, 1/29/69, 2/8/69, 2/10/69, 2/16/69, 3/12/69	DR-253 1/26/1969
1964	California Heavy Rains & Flooding	Flood	Storms	12/22/64, 12/23/64, 12/28/64, 1/5/65, 1/14/65	DR-183 12/24/1964
1964	Seismic Sea Wave	Other	Other	–	DR-169 4/1/1964
1963	Severe Storms, Heavy Rains and Flooding	Flood	Storms	2/7/63, 2/26/63, 2/29/63, 4/22/63	DR-145 2/25/1963
1962	Severe Storms and Flooding	Flood	Storms	–	DR-138 10/24/1962
1961	1961 Widespread Fires	Fire	Fire	9/8/1961	–
1959	1959 Heavy Rains	Flood	Storms	9/17/1959	–
1958	1958 April Storms and Floods	Flood	Storms	4/2/1958	DR-82 4/4/1958
1958	1958 February Storms and Floods	Flood	Storms	2/26/1958	–
1955	1955 Floods	Flood	Flood	12/22/1955	12/23/1955
1950	1950 Floods	Flood	Flood	50-01 11/21/1950	DR-15 2/15/1954

Source: Cal OES, FEMA. Retrieved March 2025.

Table 4-5 Amador County – Federal and State Disaster Declarations Summary 1950-2025

Disaster Type	State Declarations		Federal Declarations	
	Count	Years	Count	Years
Drought	2	1976, 2015	1	1977

Disaster Type	State Declarations		Federal Declarations	
	Count	Years	Count	Years
Economic	1	2001	0	–
Fire	3	1961, 2015, 2021	2	2016, 2021
Flood	22	1950, 1955, 1958 (twice), 1959, 1963, 1964, 1969, 1980, 1982, 1986, 1995 (twice*), 1997, 2006 (twice*), 2017 (twice*), 2019*, 2021, 2023 (twice*)	20	1950, 1955, 1958, 1962, 1963, 1964, 1969, 1986, 1995 (twice*), 1997, 1998, 2006 (twice*), 2017 (twice*), 2019*, 2023 (three*)
Freeze	1	2007	0	
Hurricane	0	–	1	2005
Pandemic	2	2020 (twice)	2	2020 (twice)
Seismic Sea Wave (Tsunami)	0	–	1	1964
Totals	**31**	–	**27**	**–**

Source: Cal OES, FEMA. Retrieved March 2025.

Amador County Disasters since 2020 LHMP

- 2020 California Covid-19 Pandemic (2 state and 2 federal declarations)
- 2021 California Caldor Fire (state and federal declaration)
- 2021 December 2021 Storms (state declaration)
- 2023 California Severe Winter Storms, Flooding, Landslides, and Mudslides (2 state and 3 federal declarations)

4.2 Amador County Asset Inventory and Growth and Development Trends

As a starting point for analyzing the Amador County Planning Area's vulnerability to identified hazards, a variety of data was used to define a baseline against which all disaster impacts could be compared. If a catastrophic disaster was to occur in the Amador County Planning Area, this section describes significant lands, assets, and other resources at risk. This section is broken into two parts:

- **Asset Inventory** – The assets inventory identifies the Amador County Planning Area's and unincorporated Amador County's total assets, including the people and populations: structures; critical facilities and infrastructure, and community lifelines; natural, historic, and cultural resources; and economic assets and community activities of value. This data is not hazard specific, but is representative of total assets within the Amador County Planning Area and unincorporated Amador County, potentially at risk to identified hazards as discussed in Section 4.3 Hazard Profiles and Vulnerability Assessment.
- **Growth and Development Trends** – A discussion of growth and development trends in the Amador County Planning Area with a focus on unincorporated Amador County, both current and future, is presented.

Data Sources

- 2016 Amador County General Plan
- 2021-2029 Amador County Housing Element
- 2024 Amador County Parcel/Assessor Data
- 2016 Amador County General Plan Land Use Element
- Amador County GIS
- CalAtlas
- California Department of Conservation
- California Department of Finance
- California Department of Fish and Wildlife Service
- California Department of Parks and Recreation Office of Historic Preservation
- California Department of Water Resources (CA DWR) Special Populations and Disadvantaged Community Mapping
- California Environmental Protection Agency (Cal EPA) Disadvantaged Communities
- California Environmental Quality Act (CEQA)
- California Natural Diversity Database
- Center for Disease Control (CDC) Social Vulnerability Index
- Amador County Building Department and Planning Department
- Amador County GIS
- FEMA Community Disaster Resilience Zones
- FEMA National Risk Index
- Hazus-MH 6.1
- National Environmental Policy Act (NEPA)
- State of California Department of Conservation
- US Census Bureau

4.2.1. Assets Inventory

If a catastrophic disaster was to occur in the Amador County Planning Area, this section describes populations, structures, critical facilities and infrastructure, and other key assets and resources at risk that comprise the existing built environment. Assets inventoried in this baseline assessment include:

- People and Populations
- Structures
- Critical Facilities and Infrastructure,
- Community Lifelines
- Natural, Historic, and Cultural Resources
- Economic Assets and Community Activities of Value

Populations

Life safety is a priority issue for hazard mitigation planning. The people that work and recreate in the Amador County Planning Area, and those that live and work in surrounding communities are also potentially at risk during a natural hazard event.

The estimated population of Amador County (both incorporated communities and the unincorporated County) for January 1, 2025 was 39,563. Populations potentially at risk are described in the Table 4-6 based on California Department of Finance estimates. The most recent estimates are dated 1/1/2025, which are shown in the table below.

Table 4-6 Amador County Planning Area – Populations

Jurisdiction	Population
Amador City	196
Ione	9,037
Jackson	4,822
Plymouth	1,122
Sutter Creek	2,538
Unincorporated Amador County	21,848
Total	**39,563**

Source: Cal DOF E-1. 1/1/2025

Table 4-7 illustrates the pace of population growth in Amador County dating back to 1940. The data on population and housing growth shows that Amador County saw tremendous growth during the late 20th century. That growth slowed somewhat between 2000 and 2010, and the County has seen smaller population growth since 2010, with a slight decline in population since the 2020 LHMP. Details on population growth in the cities is included in their respective annexes to this LHMP Update.

Table 4-7 Amador County Planning Area – Population Growth 1940-2024

Year	Population	Percent Increase
1940	8,973	–
1950	9,151	2.0%
1960	9,990	9.2%
1970	11,821	18.3%
1980	19,500	54.0%
1990	30,039	16.8%
2000	35,100	8.3%
2010	38,011	8.3%
2020	40,474	6.5%
2025	39,563	-2.3%

Sources: 2021-2029 Amador County Housing Element Background Report, California Department of Finance, US Census Bureau

Vulnerable and Underserved Populations

Vulnerable populations include those who may be disproportionately affected by hazards or may need additional help or accommodation during a hazard event or disaster. The vulnerable and underserved populations discussion for the Amador County Planning Area is based on the following sources:

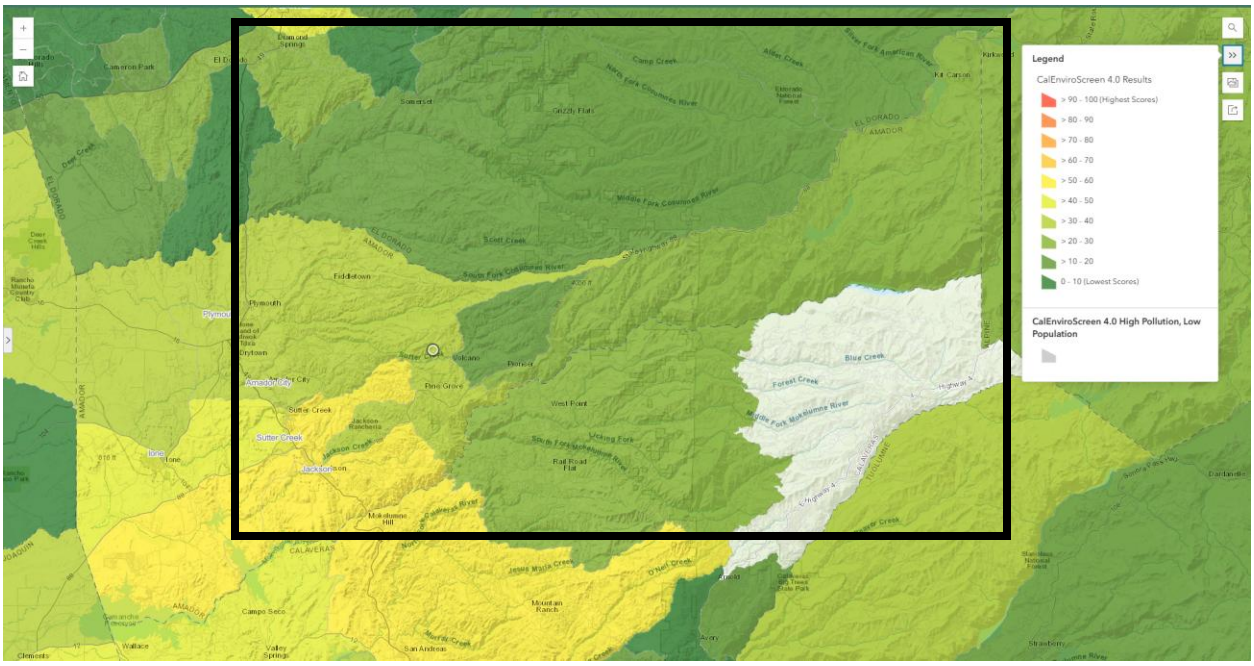
- California Environmental Protection Agency (Cal EPA) Disadvantaged Communities
- Center for Disease Control (CDC) Social Vulnerability Index
- California Department of Water Resources (CA DWR) Special Populations and Disadvantaged Community Mapping
- FEMA Community Disaster Resilience Zones
- FEMA National Risk Index
- Local Input

Note: These sources below show information for the Amador County Planning Area and unincorporated Amador County. Information on specific data for the incorporated jurisdictions can be found in their respective annexes to this Plan Update.

Cal EPA Disadvantaged Communities

Disadvantaged communities are defined by CalEPA as the top 25 percent of communities experiencing disproportionate amounts of pollution, environmental degradation, and socioeconomic and public health conditions according to the Office of Environmental Health Hazard Assessment's CalEnviroScreen tool. CalEPA is responsible for identifying disadvantaged communities for the purposes of the Cap-and-Trade funding program. This uses the CalEnviroScreen 4.0 Tool. Maps showing these areas in the Planning Area are shown on Figure 4-1.

Figure 4-1 Amador County Planning Area – Cal EPA Disadvantaged Communities

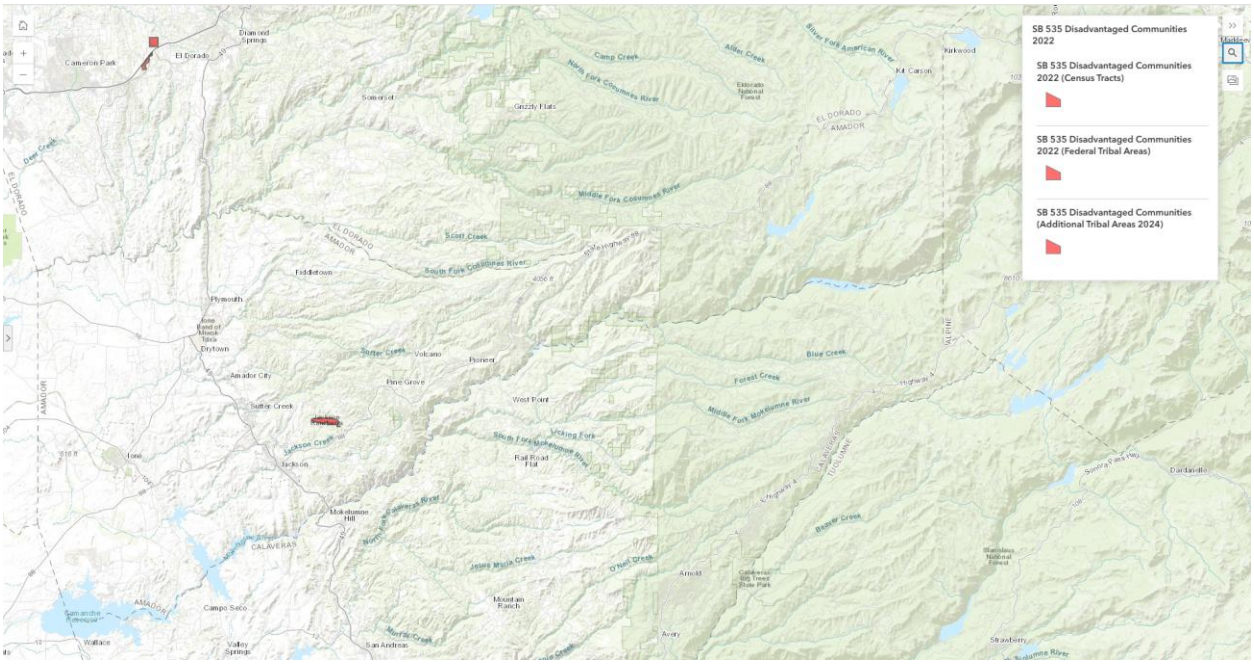


Source: Cal EPA, map retrieved 01/28/2025.

Cal EPA has another way to track disadvantaged communities. California Climate Investments are funds (Greenhouse Gas Reduction Fund and appropriated by the Legislature) from the proceeds of the State's Cap-and-Trade Program specifically targeted for investment in disadvantaged communities in California. These funds must be used for programs that further reduce emissions of greenhouse gases. Senate Bill 535

directed that at least a quarter of the proceeds go to projects that provide a benefit to disadvantaged communities and at least 10 percent of the funds go to projects located within those communities. Cal EPA has also mapped these communities. Those communities that fall inside this program in Amador County are shown on Figure 4-2. As shown, these areas are very limited in Amador County.

Figure 4-2 Amador County SB 535 Disadvantaged Communities (2022)



Source: Cal EPA, map retrieved 01/28/2025.

CDC Social Vulnerability Index

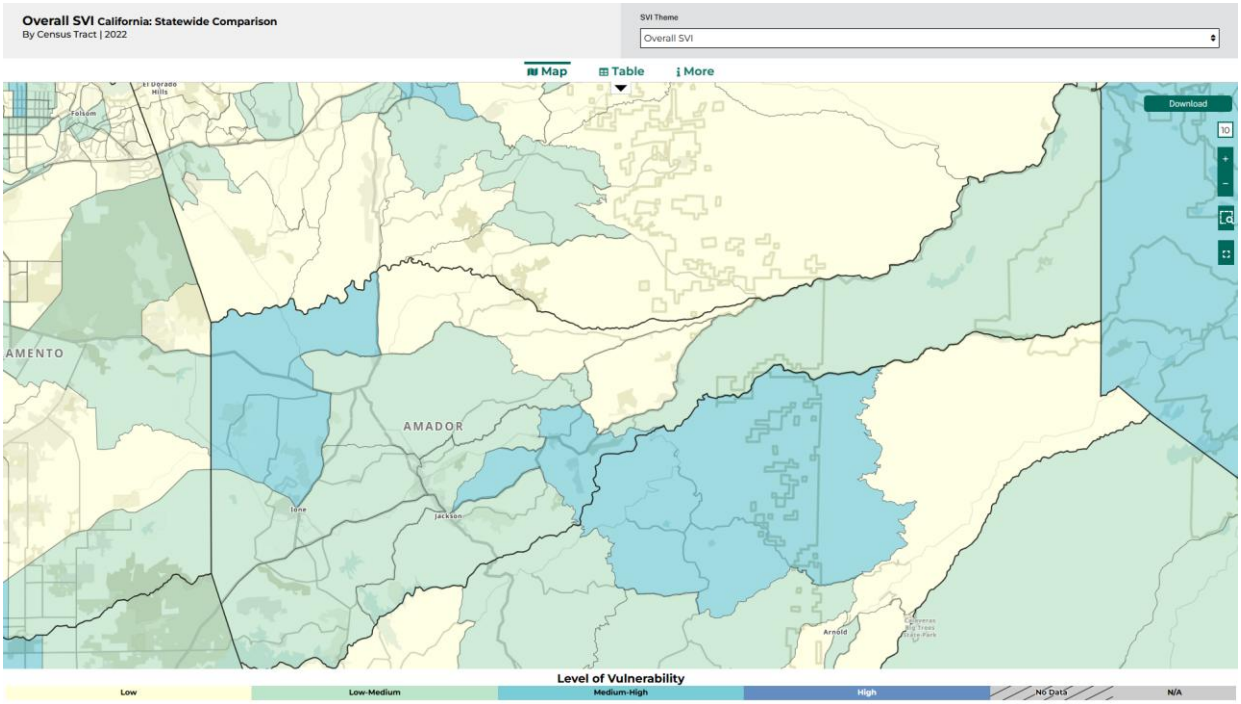
Every community must prepare for and respond to hazardous events, whether a natural disaster like a tornado or disease outbreak, or a human-made event such as a harmful chemical spill. A number of factors, including poverty, lack of access to transportation, and crowded housing may weaken a community's ability to prevent human suffering and financial loss in a disaster. These factors are known as social vulnerability.

Social vulnerability refers to the potential negative effects on communities caused by external stresses on human health. Such stresses include natural or human-caused disasters, or disease outbreaks. Reducing social vulnerability can decrease both human suffering and economic loss. CDC Social Vulnerability Index (CDC SVI) uses 15 U.S. census variables to help local officials identify communities that may need support before, during, or after disasters.

The Agency for Toxic Substances and Disease Registry's (ATSDR) Geospatial Research, Analysis & Services Program (GRASP) created databases to help emergency response planners and public health officials identify and map communities that will most likely need support before, during, and after a hazardous event. CDC SVI uses U.S. Census data to determine the social vulnerability of every census tract. Census tracts are subdivisions of counties for which the Census collects statistical data. The CDC SVI ranks each tract on 15 social factors, including poverty, lack of vehicle access, and crowded housing, and groups them into four related themes. Each tract receives a separate ranking for each of the four themes,

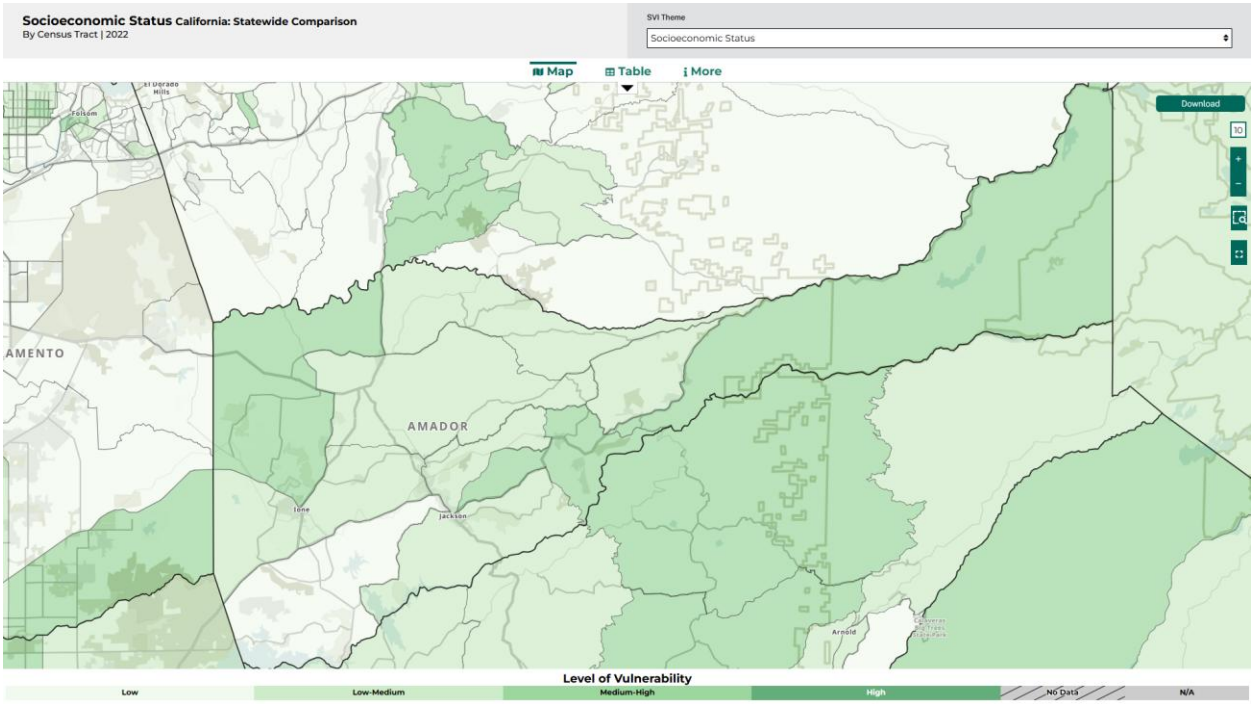
as well as an overall ranking. Maps of the four themes are shown in the Amador County Planning Area below. The overall SVI map is shown in Figure 4-3; the socioeconomic SVI for the Planning Area is shown in Figure 4-4; the household composition SVI is shown in Figure 4-5; the minority and language SVI is shown in Figure 4-6; and the housing and transportation SVI is shown in Figure 4-7. As shown on all of these maps, the County shows only minor changes across the County in social vulnerability.

Figure 4-3 Amador County Planning Area – Overall Social Vulnerability



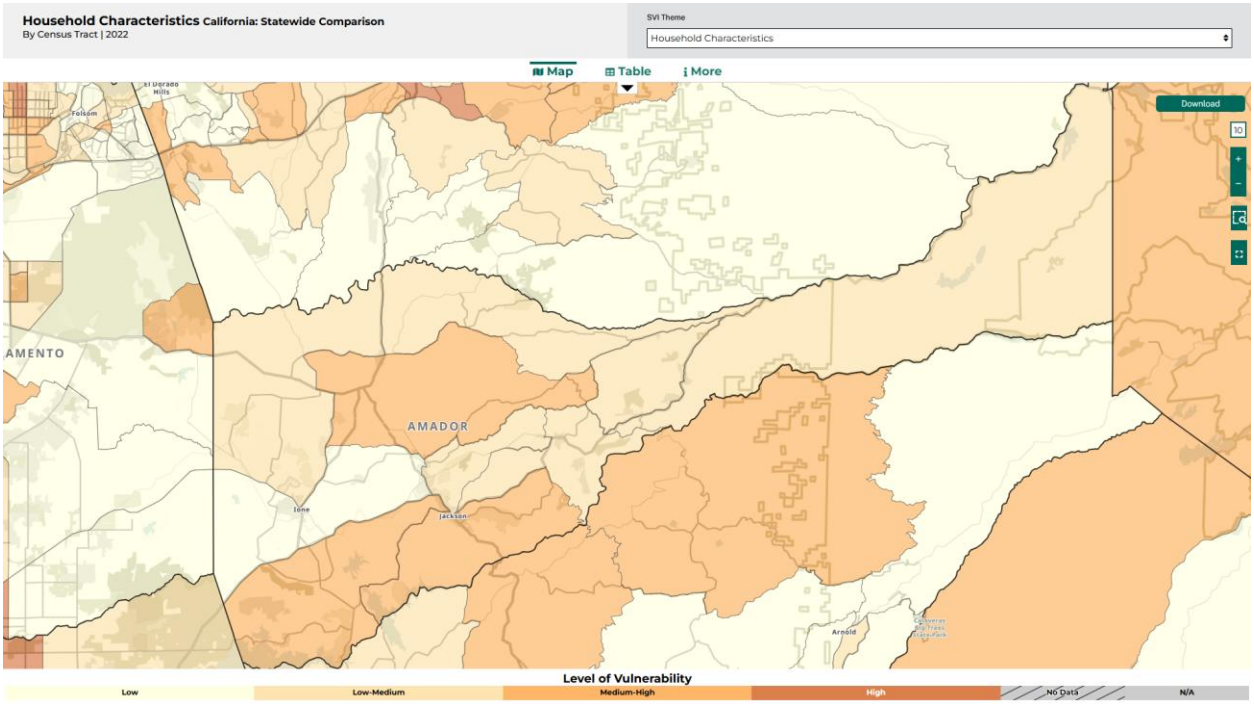
Source: CDC Social Vulnerability Index – map retrieved 12/16/2024.
Level of Vulnerability Rating: **Yellow** – Low; **Green** – Low/Medium; **Aqua** – Medium/High; **Blue** – High; **Grey Hatched** – No Data; **Grey** – Not Available

Figure 4-4 Amador County Planning Area – Socioeconomic Status Vulnerability



Source: CDC Social Vulnerability Index – map retrieved 12/16/2024.
Level of Vulnerability Rating: **Faint Green** – Low; **Light Green** – Low/Medium; **Green** – Medium/High; **Dark Green** – High; **Grey Hatched** – No Data; **Grey** – Not Available

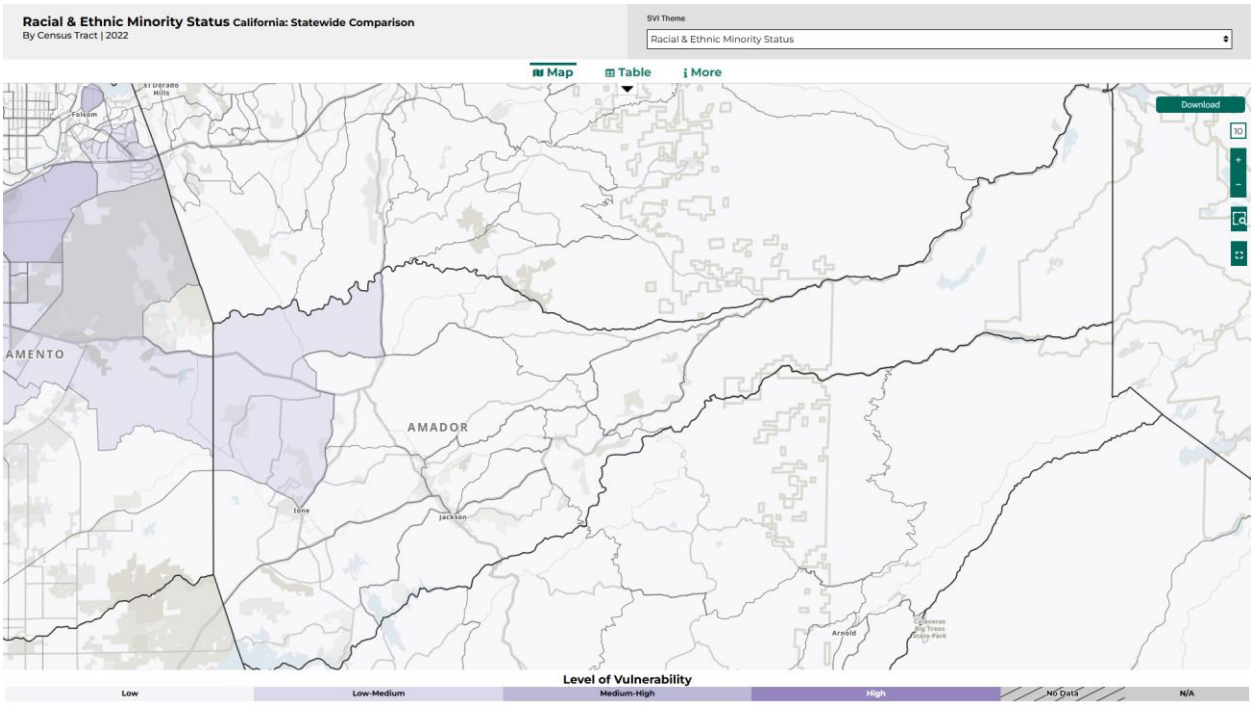
Figure 4-5 Amador County Planning Area – Household Composition and Disabilities Social Vulnerability



Source: CDC Social Vulnerability Index – map retrieved 12/16/2024.

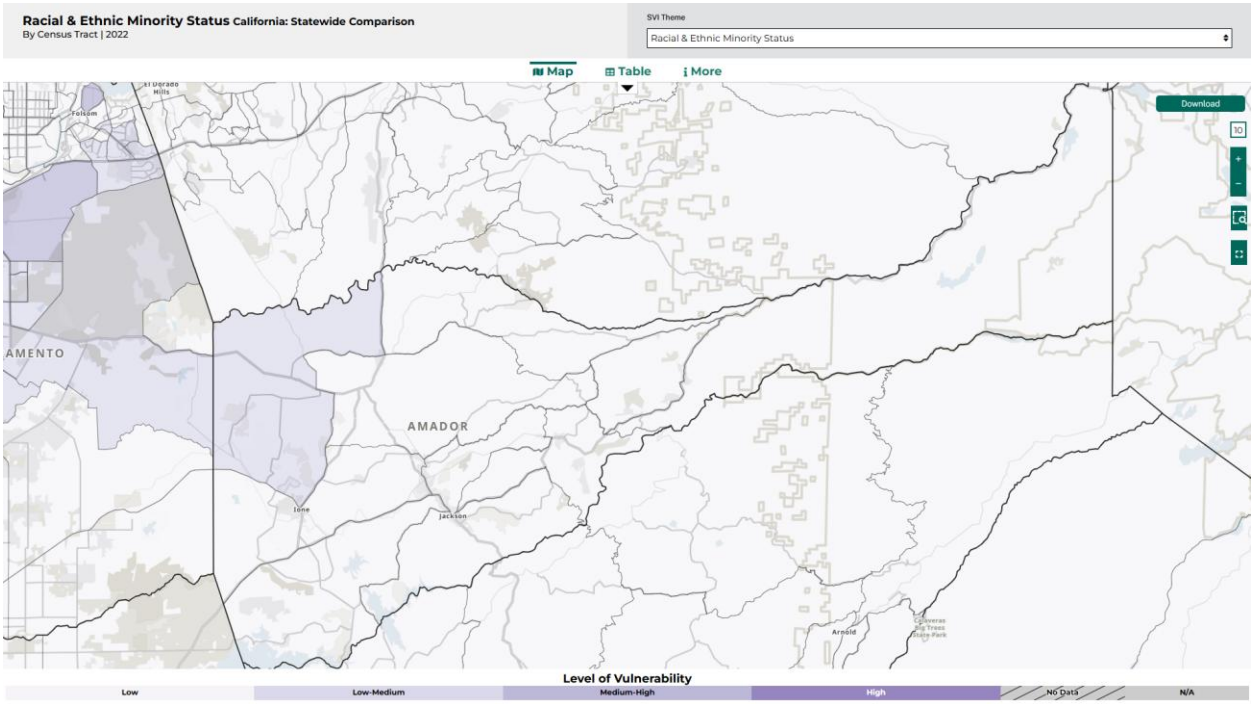
Level of Vulnerability Rating: **Faint Orange** – Low; **Light Orange**– Low/Medium; **Orange** – Medium/High; **Dark Orange** – High; **Grey Hatched** – No Data; **Grey** – Not Available

Figure 4-6 Amador County Planning Area – Minority/Language Social Vulnerability



Source: CDC Social Vulnerability Index – map retrieved 12/16/2024.
Level of Vulnerability Rating: **Faint Purple** – Low; **Light Purple** – Low/Medium; **Purple** – Medium/High; **Dark Purple** – High; **Grey Hatched** – No Data; **Grey** – Not Available

Figure 4-7 Amador County Planning Area – Housing/Transportation Social Vulnerability



Source: CDC Social Vulnerability Index – map retrieved 12/16/2024.
Level of Vulnerability Rating: **Faint Blue** – Low; **Light Blue** – Low/Medium; **Blue** – Medium/High; **Dark Blue** – High; **Grey Hatched** – No Data; **Grey** – Not Available

California DWR Disadvantaged Community Mapping Tool

The State of California's Proposition 1 Disadvantaged Community (DAC) Involvement Program is designated to ensure the involvement of DACs as well as Economically Distressed Areas and Underrepresented Communities, which DWR collectively refers to as DACs. The Cal DWR definition for a Disadvantaged Community is a community with an annual median household income (MHI) that is less than 80% of the Statewide annual MHI (PRC Section 75005(g)), and those census geographies with an annual MHI less than 60% of the Statewide annual MHI are considered "Severely Disadvantaged Communities". Those areas in the Planning Area considered disadvantaged are shown in Figure 4-8.

Figure 4-8 Amador County Planning Area – Disadvantaged Areas

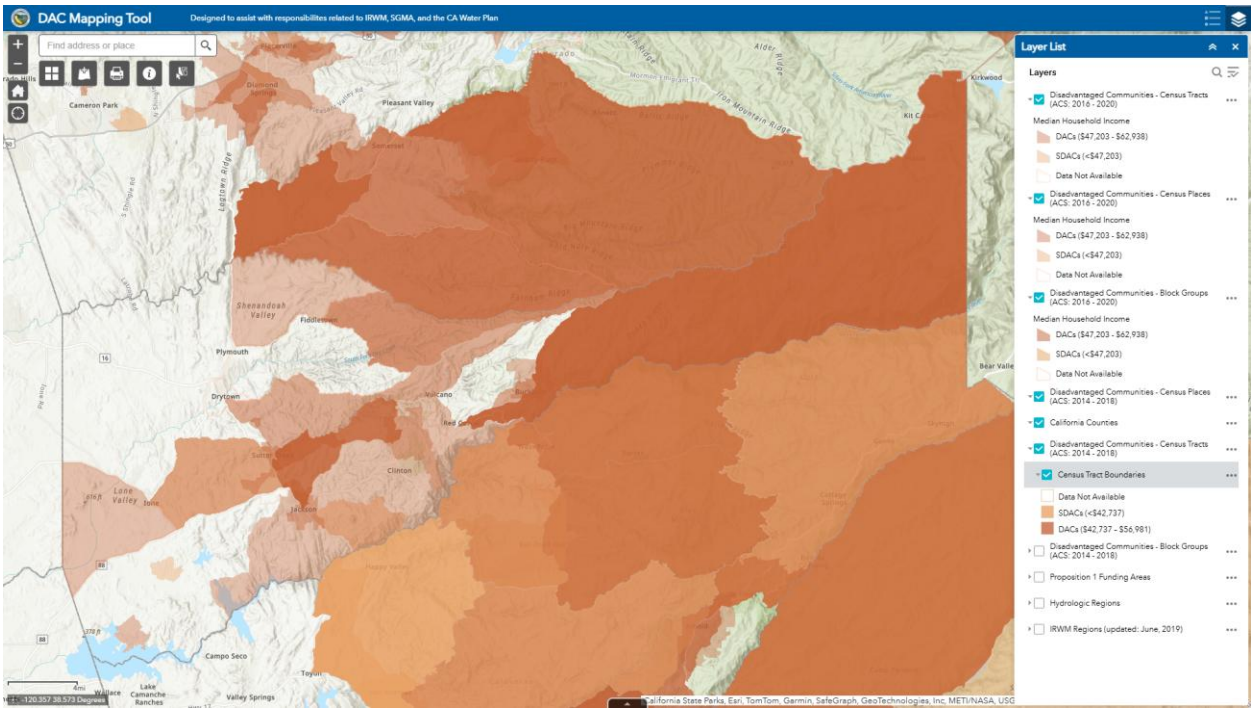
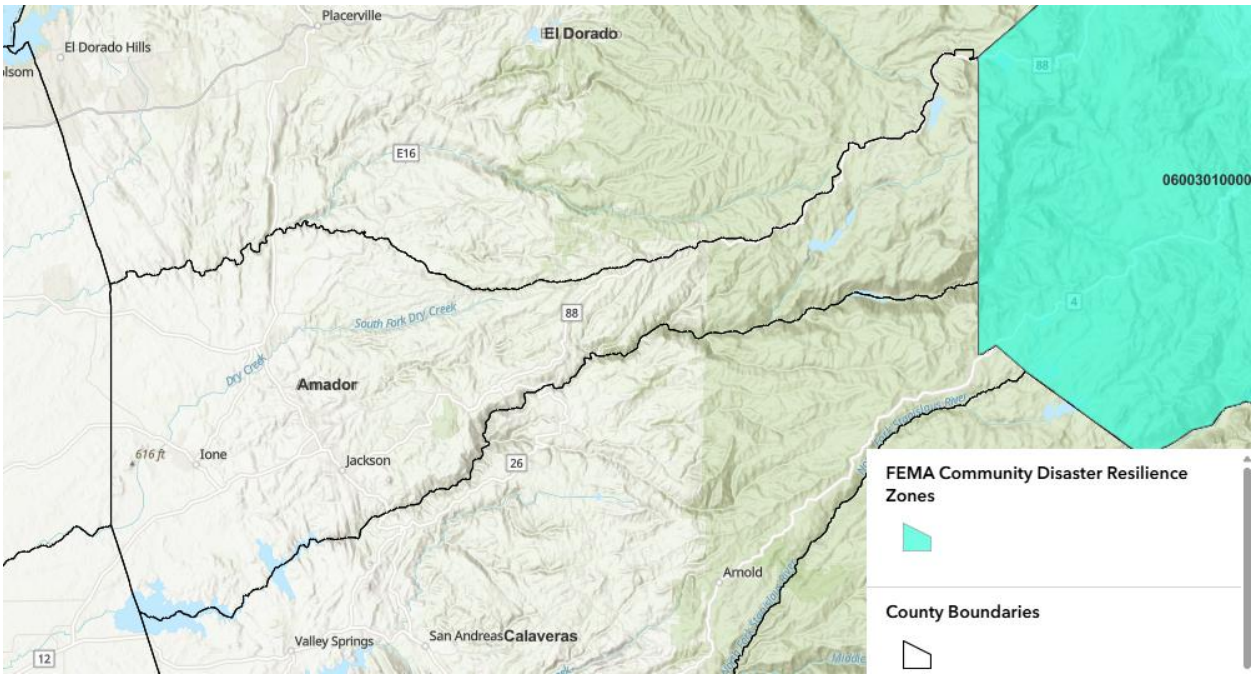

DAC Mapping Tool
Designed to assist with responsibilities related to IRWM, SGMA, and the CA Water Plan
Find address or place
Layer List
Layers
Disadvantaged Communities - Census Tracts (ACS: 2016 - 2020)
Median Household Income
DACs ($47,203 - $62,938)
SDACs (<$47,203)
Data Not Available
Disadvantaged Communities - Census Places (ACS: 2016 - 2020)
Median Household Income
DACs ($47,203 - $62,938)
SDACs (<$47,203)
Data Not Available
Disadvantaged Communities - Block Groups (ACS: 2016 - 2020)
Median Household Income
DACs ($47,203 - $62,938)
SDACs (<$47,203)
Data Not Available
Disadvantaged Communities - Census Places (ACS: 2014 - 2018)
California Counties
Disadvantaged Communities - Census Tracts (ACS: 2014 - 2018)
Census Tract Boundaries
Data Not Available
SDACs (<$42,737)
DACs ($42,737 - $56,981)
Disadvantaged Communities - Block Groups (ACS: 2014 - 2018)
Proposition 1 Funding Areas
Hydrologic Regions
IRWM Regions (updated: June, 2019)
Cameron Park
Pleasant Valley
Shenandoah Valley
Fiddletown
Plymouth
Drytown
Volcano
Clinton
Jackson
Lane Valley
Campo Seco
Valley Springs
Lake Camanche Ranches
Wallace
Kirkwood
Bear Valley
Eastern Ridge
Alder Ridge
Iron Mountain Ridge
Red Corral Ridge
Sutter Creek
Pine Grove
Mokelumne Hill
Jackson Valley
Rancho Arroyo
Rancho Seco
Teyon
Sloughhouse
Latrobe
Somerset
Diamond Springs
Kit Carson
Mormon Emigrant Trail
Shingle Rd
Latrobe Rd

Figure 4-9 Amador County Planning Area – FEMA Community Disaster Resilience Zones



Source: FEMA. Map retrieved 1/29/2025.

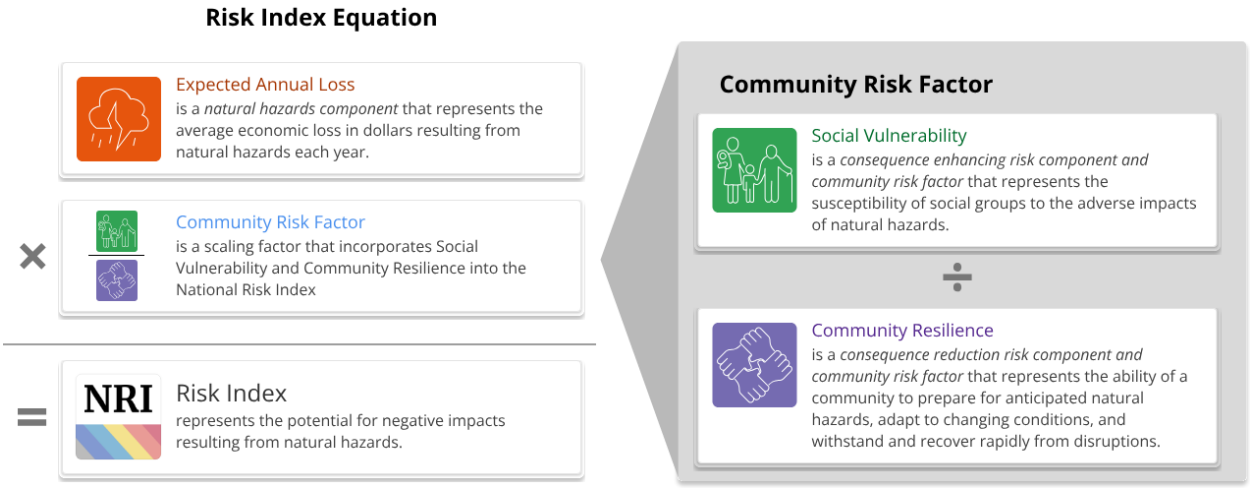
FEMA National Risk Index

Beginning in 2016, FEMA's Natural Hazards Risk Assessment Program (NHRAP) started work on the National Risk Index by adopting an established vision for a multi-hazard view of risk that combines the likelihood and consequence of natural hazards with social factors and resilience capabilities. The goal was to take a broad, holistic view and create a nationwide baseline of natural hazard risk.

A community's susceptibility to natural hazards varies from location to location. The National Risk Index is a dataset and online tool to help illustrate the United States communities most at risk for 18 natural hazards. It was designed and built by FEMA in close collaboration with various stakeholders and partners in academia; local, state, and federal government; and private industry. In the National Risk Index, risk is defined as the potential for negative impacts as a result of a natural hazard.

The risk equation behind the Risk Index includes three components (see Figure 4-10): a natural hazards component (Expected Annual Loss), a consequence enhancing component (Social Vulnerability), and a consequence reduction component (Community Resilience).

Figure 4-10 National Risk Index Equation



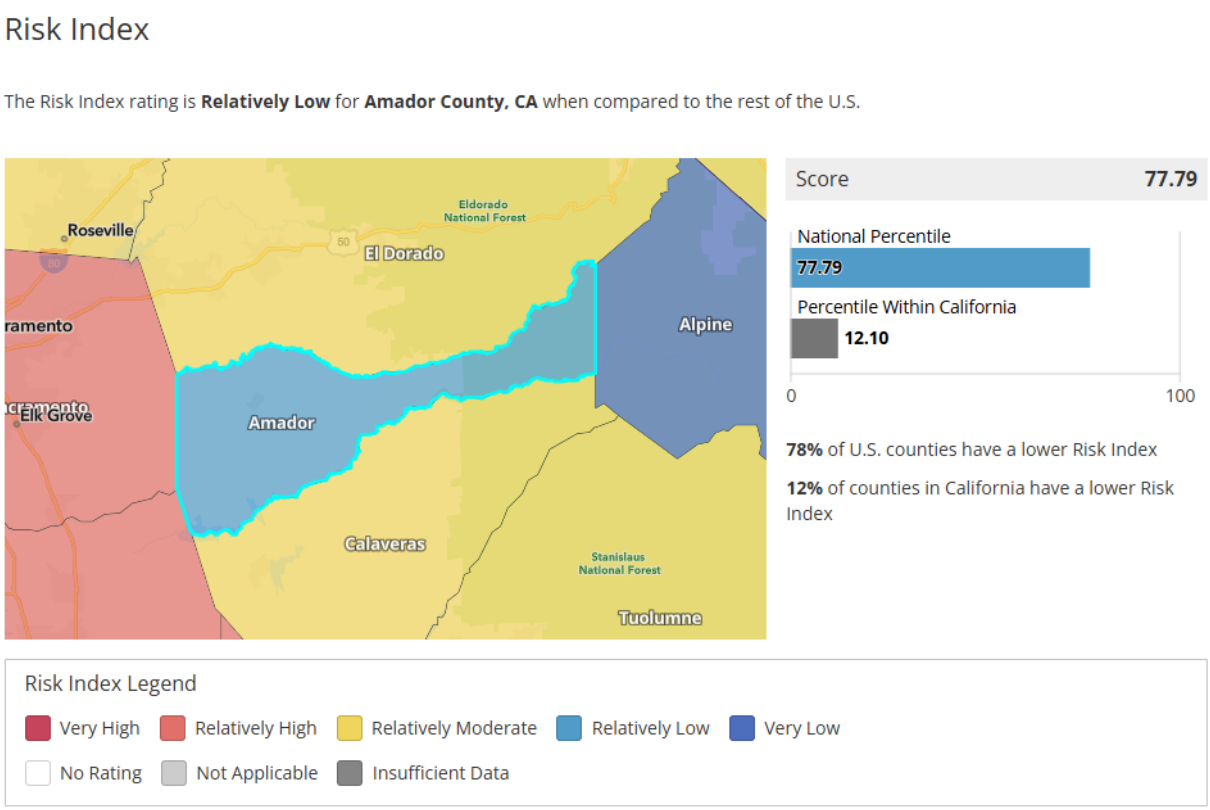
Source: FEMA National Risk Index

Using these three components, composite Risk Index values and hazard type Risk Index values are calculated for each community (county and Census tract) included in the Index. Risk Index values form an absolute basis for measuring Risk within the National Risk Index, and they are used to generate Risk Index percentiles and ratings across communities.

Data from the National Risk Index for the Amador County Planning Area is seen below. Figure 4-11 shows a summary map and score for the County. As shown, Amador County's Risk Index rating is Relatively Low. Figure 4-12 shows the expected annual loss map and score. As shown, Amador County's expected annual loss rating is Relatively Low. Figure 4-13 shows the social vulnerability map and score. As shown, Amador County has a Relatively Moderate social vulnerability. Figure 4-14 shows the community resilience map and score. As shown, communities in Amador County have a Relatively Moderate ability to prepare for anticipated natural hazards, adapt to changing conditions, and withstand and recover rapidly from disruptions.

The Amador County FEMA National Risk Index Report is included in its entirety in Appendix G.

Figure 4-11 FEMA National Risk Index – Summary Map and Score for Amador County

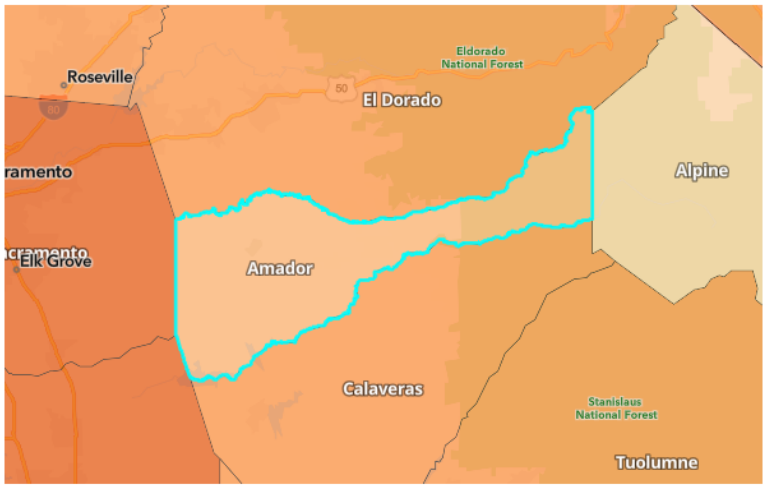


Source: FEMA National Risk Index, retrieved 01/09/2025.

Figure 4-12 FEMA National Risk Index – Expected Annual Loss Map and Score for Amador County

Expected Annual Loss

In **Amador County, CA**, expected loss each year due to natural hazards is **Relatively Low** when compared to the rest of the U.S.



Score **78.06**

National Percentile
78.06

Percentile Within California
17.20

0 100

78% of U.S. counties have a lower Expected Annual Loss

17% of counties in California have a lower Expected Annual Loss

Expected Annual Loss Legend

Very High | Relatively High | Relatively Moderate | Relatively Low | Very Low

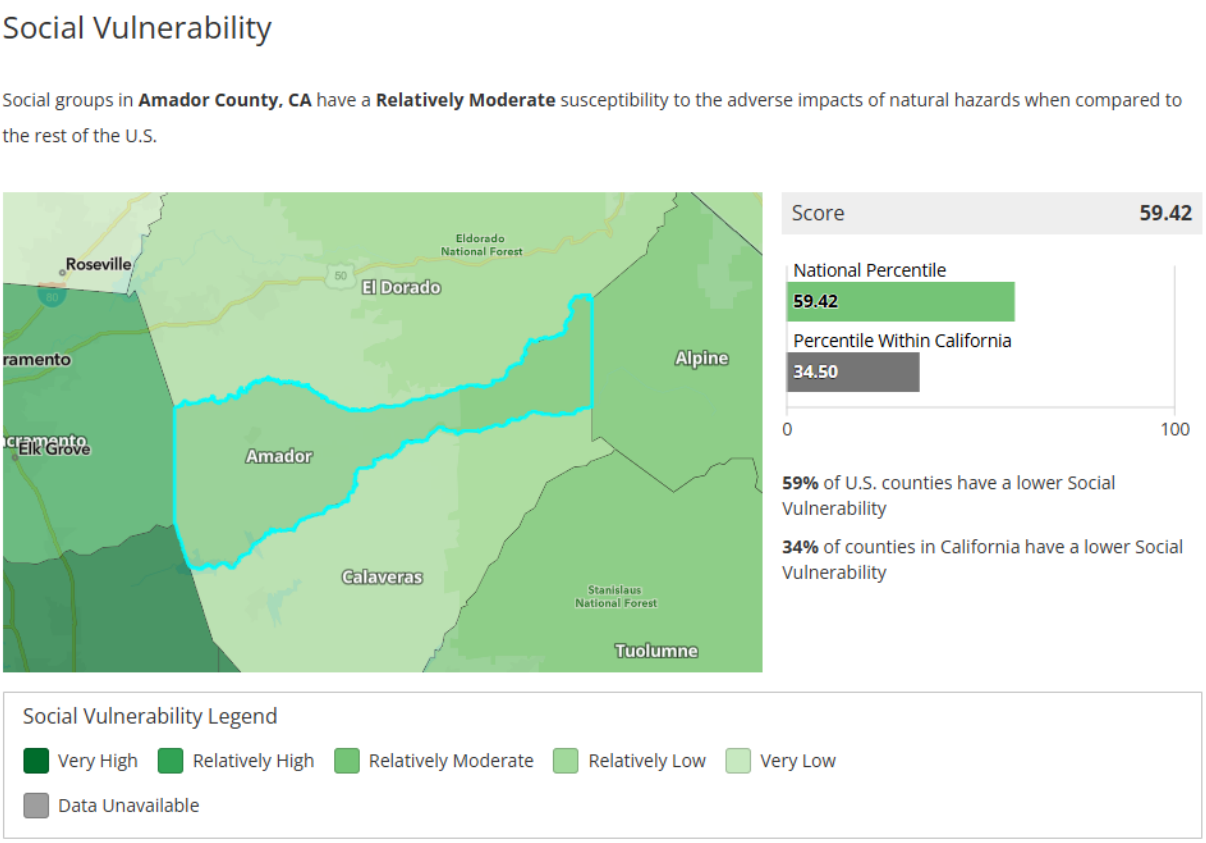
No Expected Annual Losses | Not Applicable | Insufficient Data

Composite Expected Annual Loss	**$16,309,058.75**
Composite Expected Annual Loss Rate National Percentile	**81**

Building EAL	**$8,622,287.36**	Population EAL	**0.20** fatalities
Building EAL Rate	**$1 per $942.43 of building value**	Population EAL Rate	**1 per 203.42K people**
Agriculture EAL	**$5,381,404.03**	Population Equivalence EAL	**$2,305,367.36**
Agriculture EAL Rate	**$1 per $6.61 of agriculture value**		

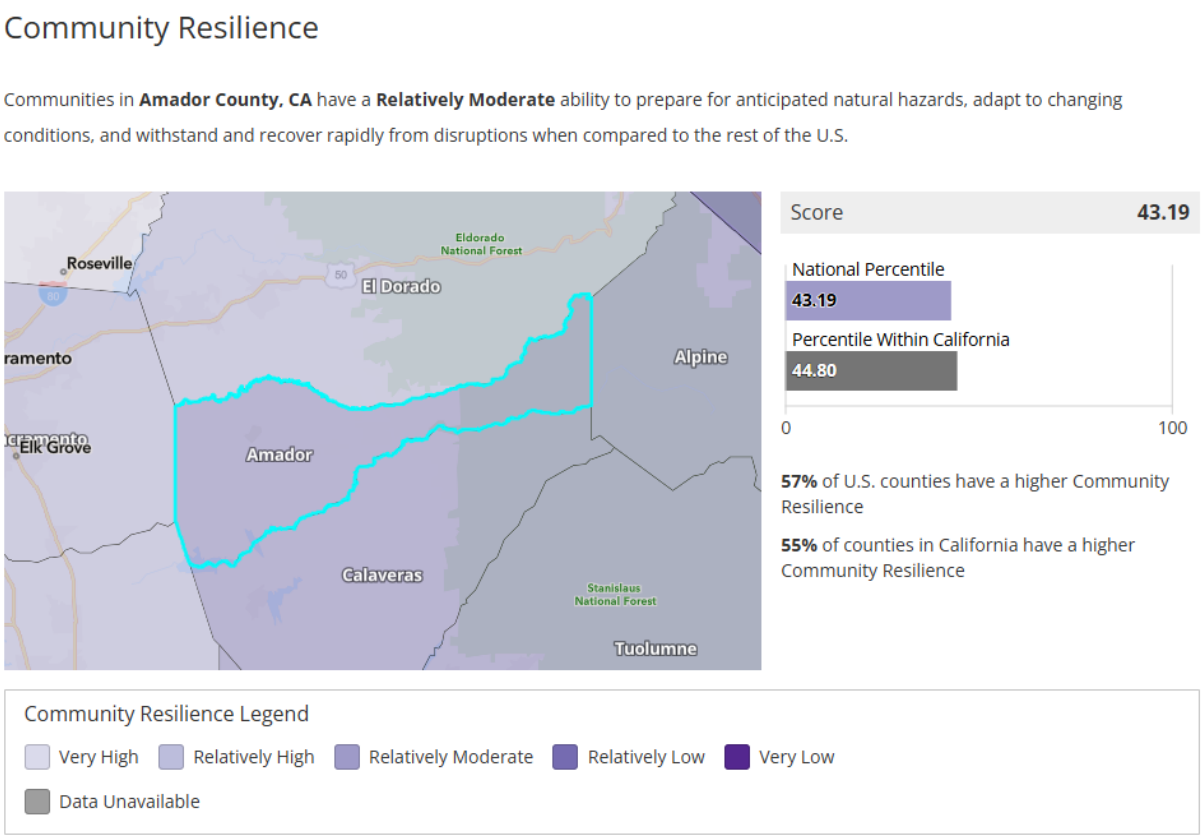
Source: FEMA National Risk Index, retrieved 01/09/2025.

Figure 4-13 FEMA National Risk Index – Social Vulnerability Map and Score for Amador County



Source: FEMA National Risk Index, retrieved 01/09/2025

Figure 4-14 FEMA National Risk Index – Community Resilience Map and Score for Amador County



Source: FEMA National Risk Index, retrieved 01/09/2025.

Local Input

The County noted that there is a somewhat sizable homeless population in Amador County. This causes issues with fire and pandemic as well as with other hazards. Additionally, there are limited transportation services for elderly and other vulnerable populations in rural areas for evacuations and other hazard response needs. There is a migrant population that arrives for summer. Many of these are Spanish speakers, which can also create challenges during hazard events and any necessary evacuations. The County Social Services Director provided information on vulnerable and underserved populations in the County. These can be seen in Table 4-8.

Table 4-8 Amador County Planning Area – Vulnerable and Underserved Population Vulnerabilities and Data

Population	Vulnerabilities	Data/Comments
Foster youth	Dependents of the court who Amador County is responsible for; mental health needs; placement instability; Other counties place foster youth in Amador County but Amador County DSS is unaware of who they are and where they are placed.	Amador County DSS typically has 45-50 children in out of home placement.
In Home Supportive Services recipients	Limited mobility; medical equipment; communication barriers; at risk of out of home care	Amador County has approximately 520 IHSS recipients.
Elderly	Limited mobility, isolated, communication barriers	Per July 2023 census data, approx. 28.1% of Amador County's population identified as 65 years old or older. Higher than the state average.
Adult Protective Services clients	Victims of abuse/neglect; elderly and dependent adults; limited mobility; medical equipment; communication barriers	Amador DSS receives approx. 35-40 reports of elder/dependent adult abuse/neglect each month.
Homeless	Communication barriers; limited alternative resources; isolated; challenge to locate	Although a smaller portion of the population, the homeless face challenges due to a lack of stable shelter options and limited access to emergency services. This makes them particularly vulnerable during extreme weather events or other disasters
People with disabilities	Mobility challenges; cognitive impairments; hearing or vision impaired; communication barriers	May need specialized support during emergencies. In events like prolonged power outages, accessible evacuation routes and shelters are essential.
Non-English speaking	Communication barriers	According to the American Community Survey, 3.4% of Amador County residents speak English less than "very well." The largest demographic of this 3.4% are the 2.2% of Amador County residents who primarily speak Spanish, but speak English less than "very well." California recently passed AB 1638 which requires local governments to provide emergency information in all languages spoken by 5% or more of the population that speak English less than "very well." Although Amador County, as mentioned above, does not meet this threshold, we (using the Amador County Emergency Alerts system) distribute these emergency notifications in English and in Spanish.

Source: Amador County Social Services

Additionally, Amador County Public Health noted that Vulnerable populations face several hazard-related concerns that can significantly impact their health and well-being.

In Amador County, CA, vulnerable populations include:

- Low-Income Families: Economic challenges can limit access to healthcare, healthy food, and other resources.
- Elderly Population: Older adults may have mobility issues and chronic health conditions that require frequent medical attention.
- Children and Adolescents: Young people may lack access to preventive care, mental health services, and educational resources.
- Ethnic and Racial Minorities: Minority populations may experience disparities in healthcare access and outcomes due to language barriers, cultural differences, and systemic racism.
- Individuals with Disabilities: Those with disabilities may face additional barriers to accessing healthcare and other essential services.

The ways they can be impacted include:

- Limited Access to Healthcare: Economic and social barriers can limit access to healthcare in our rural setting, making it difficult for vulnerable populations to receive timely medical treatment and preventive care.
- Displacement and Homelessness: Natural disasters, economic instability, and other factors can lead to displacement and homelessness, which exacerbate health risks and reduce access to essential services in our rural county.
- Mental Health Issues: The stress and trauma from experiencing hazards, displacement, and economic hardship can lead to mental health issues such as anxiety, depression, and PTSD.
- Social Isolation: Elderly individuals and those with disabilities may experience social isolation, which can negatively impact their mental and physical health.
- Lack of Emergency Preparedness: Limited resources and information can hinder the ability of vulnerable populations to prepare for and respond to emergencies, increasing their risk during disasters.

Housing Element Special Populations

The County Planning Team noted that the Amador County 2021-2029 Housing Element discusses special populations in the County. Households with special housing needs often have greater difficulty in finding decent and affordable housing. As a result, these households may experience a higher prevalence of overpaying, overcrowding, and other housing problems. These are discussed below.

Seniors

The number of households with a head of household who is 65 years or older in 2019 increased by about 33.6% or 1,538 households when compared to 2010. The overall population in Amador County increased by approximately 0.3% between 2010 and 2019 with the number of 65+ persons increasing by 38.5%. The continuing growth of 65+ persons in the County indicates a need to provide more services for this segment of the community.

Many of the senior households owned their own homes, with 5,333 households with a householder 65 years of age or older living in owner-occupied units; only 777 of these households lived in rental housing. The 2015-2019 ACS data indicates that 148 or 1.5% of seniors 65 and older live below the poverty level in Amador County. Because seniors tend to live on fixed incomes dictated by Social Security and other retirement benefits, those who do not own their homes are significantly affected by rising housing costs. Also, while some seniors may prefer to live in single-family detached homes, others may desire smaller, more affordable homes with less upkeep, such as condominiums, townhouses, apartments, or mobile homes. According to the DOF E-5 Report, in 2021 about 82.0% of Amador County's housing stock was made up of single-family detached homes, leaving 19.0% of the housing stock for those who choose to or must live in other forms of housing.

Disabled Citizens

A "disability" includes, but is not limited to, any physical or mental disability as defined in California Government Code Section 12926. Physical, mental, and/or developmental disabilities could prevent a person from working, restrict a person's mobility or make caring for oneself difficult. Therefore, disabled persons often require special housing needs related to potential limited earning capacity, the lack of accessible and affordable housing, and higher health costs associated with disabilities. Amador County has 2,550 residents that are defined as disabled according to the ACS Census Data.

The number of people employed with a disability increased by 6.0% from 800 people in 2015 to 848 people in 2019. Additionally, the number of unemployed with disabilities also increased by 3.8% from 290 people in 2015 to 301 in 2019. Similarly, the number of people with a disability not in the labor force increased by about 16.8% from 1,460 persons in 2015 to 1,706 persons in 2019.

A developmental disability is a disability which originates before an individual attains age 18, continues or can be expected to continue indefinitely, and constitutes a substantial handicap for the individual. This term includes the diagnoses of intellectual disability, cerebral palsy, epilepsy, and autism. This term also includes handicapping conditions found to be closely related to mental retardation or requiring treatment similar to that required for persons with an intellectual disability, but does not include other handicapping conditions that are solely physical in nature. While the US Census does not identify the subpopulation that has a developmental disability, the Valley Mountain Regional Center is responsible for serving this population group in 5 counties, including Amador. The data is reported by zip code, and thus is an approximate estimate of the total of >249 in 2021.

Large Family Households

In unincorporated Amador County, 1,006 households have five or more persons. On average, most of these large family households own their homes according to the Census, however, large households that rent have a disproportionate rate of housing problems including overcrowding, units lacking complete kitchen facilities, and units lacking complete plumbing facilities. In many cases, housing units of this size constitute a small portion of the total housing supply, forcing families to continue to live in what may be considered as overcrowded units. There is a need County wide for larger, affordable housing for these larger households.

Female-Headed Households

While the majority of households in the County are either married couple or single person households, 11.3 percent of family households are headed by a single female. These households are homes with children under the age of 18 at home and don't include single male headed households. These households generally have a higher ratio between their income and their living expenses. Therefore, finding affordable, decent, and safe housing is often more difficult for female-headed households. Additionally, female-headed households have special needs involving access to daycare or childcare, health care and other supportive services. With over 6,331 households in unincorporated areas of Amador County, there are 575 households with female heads, making up approximately 9.1% of households in unincorporated areas of Amador County. In 2019, about 27.5% of female-headed families in Amador County had incomes below the poverty line while families in poverty made up only 11.5% of all households in Amador County.

Farmworkers

Amador County is situated in the California Shenandoah Valley in Sierra Nevada Mountains of California. The Shenandoah Valley is one of the principal viticultural regions of California. Agricultural workers play an important role in the region's wine industry. Estimating the size of the agricultural labor force can be problematic as farmworkers are historically undercounted by the census and other data sources. For instance, the U.S. Census Bureau does not track farm labor separate from mining, fishing and hunting, and forestry, nor does the U.S. Census Bureau provide definitions that address the specific nuances of farm labor (e.g., field laborers versus workers in processing plants), length of employment (e.g., permanent or seasonal), or place of work (e.g., the location of the business versus agricultural field).

Although agriculture is an important part of Amador County economy, based on 2015-2019 ACS data, with over 13,665 residents employed in Amador County, only 702 persons (2.1% of Amador County residents) were estimated to be in the agriculture, forestry, fishing, hunting, and mining industry.

Homeless Persons

Homeless individuals and families have perhaps the most immediate housing need of any group. They also have one of the most difficult sets of housing needs to meet, due to both the diversity and complexity of the factors that lead to homelessness, and to community opposition to the siting of facilities that serve homeless clients. Similar to every other community in California, Amador County has a portion of its population experiencing homelessness. Every two years, there is a Point in Time count (PIT) of those who are homeless on a selected day in January. The counts derived from this effort not only establish funding thresholds for federal and state funds, but they also provide a snapshot of who is experiencing homelessness in each community.

The 2022 PIT count was able to count 184 persons in total. Traditionally, the PIT count is considered to likely undercount the number of people who are homeless, since it relies on volunteers canvassing communities to find individuals who are willing to participate in the survey on that one day. Therefore, the number of homeless in Amador County may be somewhat higher than shown. In addition to people and households that are homeless, there are also households at risk of becoming homeless due to various circumstances. The need for one-bedroom affordable units for single individuals will contribute significantly to long-term solutions.

Structures

Structures include buildings used for a variety of purposes and reflect the Amador County Planning Area's existing built environment. Depending on the nature and extent of a hazard event or disaster, all structures may be exposed to some level of risk, where certain buildings or concentrations of buildings are more vulnerable. This section captures the structures, and associated land and contents values, which comprise the Amador County Planning Area's and unincorporated Amador County's existing built environment.

Parcel and Structure Inventory and Assessed Values

An inventory of structures located within the Amador County Planning Area and unincorporated County was developed utilizing data from the Amador County Assessor's Office. It is based on the 2024 Assessor's data/Parcel layer provided by Amador County GIS. This data represents best available data.

While conducting an inventory of structure assets within the Amador County Planning Area is a key element of this asset inventory, understanding the total assessed value of structures and built environment is a starting point to understanding the overall value of identified assets in the Planning Area. When the total assessed values are combined with potential values associated with other community assets such as area populations, public and private critical infrastructure, historic and cultural resources, and natural resources, and other identified assets, the big picture emerges as to what is potentially at risk and vulnerable to the damaging effects of natural hazards within the Amador County Planning Area.

Methodology

The 2024 Amador County Assessor's data and County Parcel layer was utilized as the basis for the inventory of assessed values for both improved and unimproved parcels within the Amador County Planning Area. This data provides the land and improved values assessed for each parcel, along with key information such as property use. Other GIS data, such as jurisdictional boundaries, roads, streams, and area features, was also obtained from Amador County and CalAtlas to support mapping and analysis of the existing built environment.

Data Limitations & Notations

Although based on best available data, the resulting information should only be used as an initial guide to overall values in the Amador County Planning Area. In the event of a disaster, structures and other infrastructure improvements are at the greatest risk of damage. Depending on the type of hazard and resulting damages, the land itself may not suffer a significant loss. For that reason, the values of structures and other improvements are of greatest concern. Also, it is critical to note a specific limitation to the assessed values data within the Amador County Planning Area, created by Proposition 13. Instead of adjusting property values annually, no adjustments are made until a property transfer occurs. As a result, overall property value information is likely significantly low and does not reflect current market, replacement, or true potential loss values for properties within the Amador County Planning Area.

Another limitation to this data is found in the Williamson Act, also known as the California Land Conservation Act of 1965, that enables local governments to enter into contracts with private landowners for the purpose of restricting specific parcels of land to agricultural or related open space use. When the

County enters into a contract with the landowners under the Williamson Act, the landowner agrees to limit the use of the land to agriculture and compatible uses for a period of at least ten years and the County agrees to tax the land at a rate based on the agricultural production of the land rather than its real estate market value. This further affects the County's overall values for assessed taxable lands and structures.

Property Use Categories

The Amador County Planning Area Assessor data included property use categories which provides detailed descriptive information about how each property is generally used, such as residential, commercial, or industrial. The property use codes were refined and categorized into the following property use categories and linked back to the Assessor data. The final property use categories for the Amador County Planning Area include:

- Agricultural
- Commercial
- Industrial
- Miscellaneous
- Residential

Once property uses were grouped into categories, the number of total and improved parcels and land and improved values were inventoried for the Amador County Planning Area by property use.

Estimated Content Replacement Values

The Amador County Planning Area assigned property use categories were used to develop estimated content replacement values (CRVs) that are potentially at loss from hazards. FEMA's standard CRV factors, derived from Hazus, were utilized to develop more accurate loss estimates for the total assets inventory and for all mapped hazard analyses. FEMA's CRV factors estimate content values as a percent of improved structure value by property use. Table 4-9 shows the breakdown of the different property uses in the Amador County Planning Area and their estimated CRV factors.

Table 4-9 Amador County Planning Area – Content Replacement Factors by Property use

Amador County Property Use Categories	Hazus Property Use Categories	Hazus Content Replacement Values
Agricultural	Agricultural	100%
Commercial	Commercial	100%
Industrial	Industrial	150%
Miscellaneous	Miscellaneous	0%
Residential	Residential	50%
Unknown	–	0%

Source: Hazus 6.1

Parcel and Structure Asset Inventory with Values Results

Values associated with land and improved structures were identified and summed in order to determine assessed values at risk in the Amador County Planning Area. Together, the land and improved structure values make up the majority of assessed values associated with each identified parcel or asset. Improved parcel counts were based on the assumption that a parcel was improved if a structure value was present. Content replacement values were then added to the assessed values, as described below, to provide an estimate of land and structure values at risk in the Planning Area.

Table 4-10 shows the total values or exposure for the entire Amador County Planning Area broken out by jurisdiction. The values for unincorporated Amador County are broken out by property use category and are provided in Table 4-11. More information on parcels and structures at risk for each jurisdiction can be found in their respective annexes.

Table 4-10 Amador County Planning Area – Total Parcels and Structures by Jurisdiction

Jurisdiction	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Amador City	180	111	$19,124,377	$21,078,306	$12,365,357	$52,568,040
Ione	2,205	1,976	$223,741,829	$496,467,157	$258,084,980	$978,293,966
Jackson	2,124	1,756	$201,851,988	$567,874,739	$380,312,415	$1,150,039,142
Plymouth	625	488	$85,143,363	$118,367,406	$69,262,141	$272,772,910
Sutter Creek	1,434	1,160	$133,675,205	$331,339,861	$197,619,665	$662,634,731
Unincorporated Amador County	17,828	12,434	$1,687,406,507	$3,026,753,541	$1,764,724,121	$6,478,884,169
Grand Total	**24,396**	**17,925**	**$2,350,943,269**	**$4,561,881,010**	**$2,682,368,677**	**$9,595,192,956**

Source: 2024 Amador County Parcel/Assessor Data

Table 4-11 Unincorporated Amador County – Total Parcels and Structures by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Agricultural	1,789	1,161	$283,023,440	$217,062,083	$217,062,083	$717,147,606
Commercial	436	304	$96,801,856	$290,561,506	$290,561,506	$677,924,868
Industrial	52	30	$35,032,988	$13,475,594	$20,213,391	$68,721,973
Miscellaneous	821	75	$20,963,766	$13,813,018	$0	$34,776,784
Residential	14,555	10,778	$1,213,794,783	$2,473,774,282	$1,236,887,141	$4,924,456,206
Unknown	175	86	$37,789,674	$18,067,058	$0	$55,856,732
Unincorporated Amador County Total	**17,828**	**12,434**	**$1,687,406,507**	**$3,026,753,541**	**$1,764,724,121**	**$6,478,884,169**

Source: 2024 Amador County Parcel/Assessor Data

Critical Facilities and Infrastructure

Beyond just structures, it is important to identify the critical facilities and infrastructure that are critical for life safety and the economy. Critical facilities commonly include all public and private facilities that a community considers essential for the delivery of vital services and for the protection of the community. They usually include emergency response facilities (fire stations, police stations, rescue squads, and emergency operation centers [EOCs]), custodial facilities (jails and other detention centers, long-term care facilities, hospitals, and other health care facilities), schools, emergency shelters, utilities (water supply, wastewater treatment facilities, and power), communications facilities, and any other assets determined by the community to be of critical importance for the protection of the health and safety of the population.

For purposes of this plan, a critical facility is defined as:

> ***Any facility, including without limitation, a structure, infrastructure, property, equipment or service, that if adversely affected during a hazard event may result in severe consequences to public health and safety or interrupt essential services and operations for the community at any time before, during and after the hazard event.***

A critical facility is classified by the following categories: (1) Essential Services Facilities, (2) At-risk Populations Facilities, (3) Hazardous Materials Facilities.

- **Essential Services Facilities** – include, without limitation, public safety, emergency response, emergency medical, designated emergency shelters, communications, public utility plant facilities and equipment, and government operations. Sub-Categories:
  - ✓ Public Safety - Police stations, fire and rescue stations, emergency operations centers
  - ✓ Emergency Response - Emergency vehicle and equipment storage and essential governmental work centers for continuity of government operations.
  - ✓ Emergency Medical - Hospitals, emergency care, urgent care, ambulance services.
  - ✓ Designated Emergency Shelters.
  - ✓ Communications - Main hubs for telephone, main broadcasting equipment for television systems, radio, and other emergency warning systems.
  - ✓ Public Utility Plant Facilities - including equipment for treatment, generation, storage, pumping and distribution (hubs for water, wastewater, power, and gas).
  - ✓ Essential Government Operations - Public records, courts, jails, building permitting and inspection services, government administration and management, maintenance and equipment centers, and public health.
- **At Risk Population Facilities** – include, without limitation, pre-schools, public and private primary and secondary schools, before and after school care centers with 12 or more students, with 12 or more children, group homes, and assisted living residential or congregate care facilities with 12 or more residents.
- **Hazardous Materials Facilities** – include, without limitation, any facility that could, if adversely impacted, release hazardous material(s) in sufficient amounts during a hazard event that would create harm to people, the environment and property.

Note: The Hazardous Materials Facilities, while considered critical facilities for purposes of this Plan Update, are not mapped in this Plan due to the lack of an available GIS layer. In addition to the mapped critical facilities, it should further be noted that additional critical facilities, including infrastructure, utilities, and others have been identified for the Amador County Planning Area but are not included in the mapping and inventory due to privacy and security concerns.

Critical facilities in the Amador County Planning Area are shown on Figure 4-15. A summary of critical facilities in the Planning Area is shown in Table 4-12 and detailed in Table 4-13. Additional details of individual critical facilities can be found in Appendix F of this Plan Update.

Figure 4-15 Amador County Planning Area – Critical Facilities

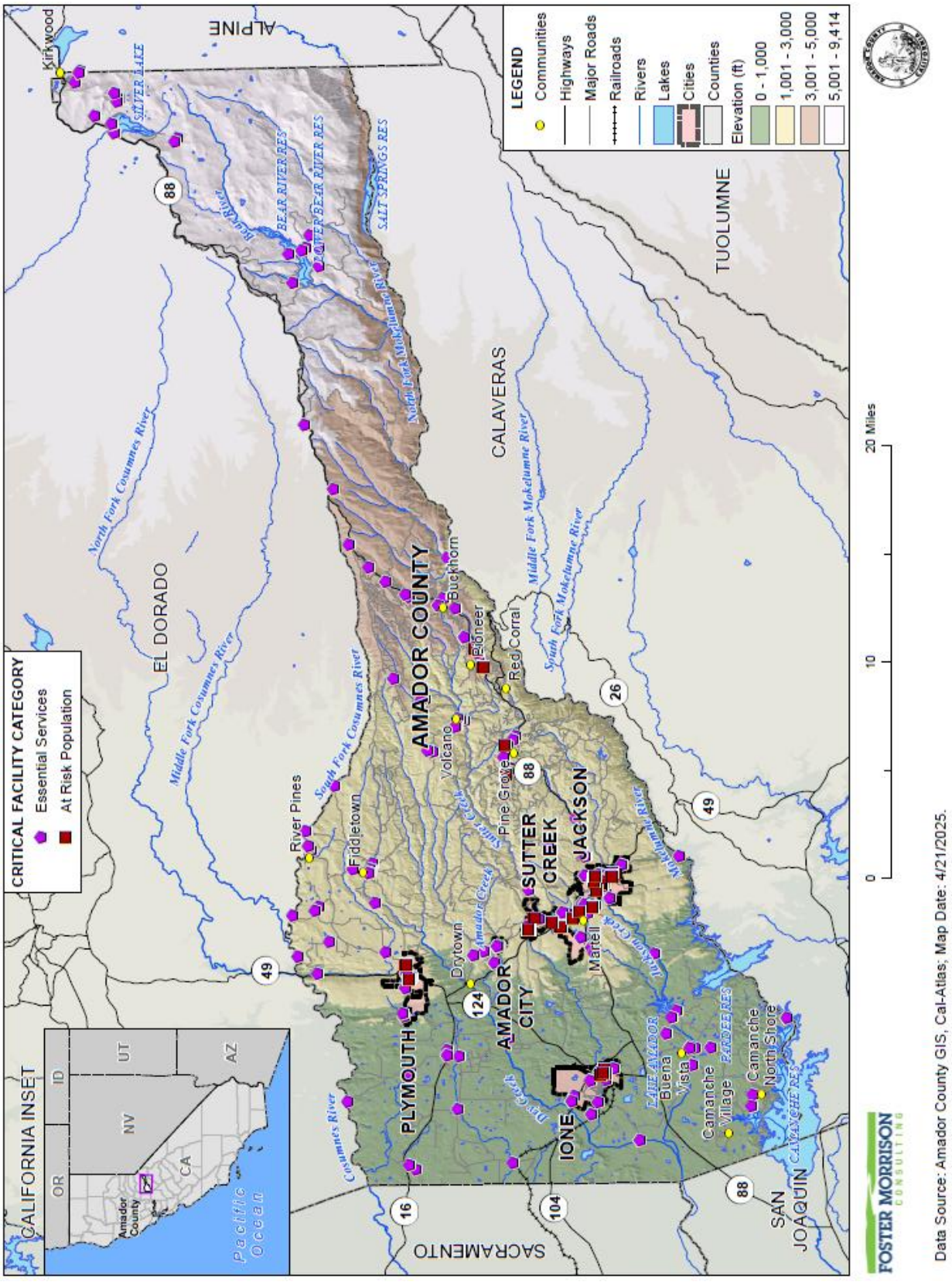


Table 4-12 Amador County Planning Area – Critical Facilities by Jurisdiction and Critical Facility Category

Jurisdiction / Critical Facility Category	Facility Count
City of Amador City	
Essential Services Facilities	3
At Risk Population Facilities	0
City of Amador City Total	**3**
City of Ione	
Essential Services Facilities	13
At Risk Population Facilities	5
City of Ione Total	**18**
City of Jackson	
Essential Services Facilities	35
At Risk Population Facilities	13
City of Jackson Total	**48**
City of Plymouth	
Essential Services Facilities	8
At Risk Population Facilities	1
City of Plymouth Total	**9**
City of Sutter Creek	
Essential Services Facilities	7
At Risk Population Facilities	6
City of Sutter Creek Total	**13**
Unincorporated Amador County	
Essential Services Facilities	138
At Risk Population Facilities	7
Unincorporated Amador County Total	**145**
Unincorporated Alpine County	
Essential Services Facilities	1
At Risk Population Facilities	0
Unincorporated Alpine County Total	**1**
Grand Total	**237**

Source: Amador County GIS

Table 4-13 Amador County Planning Area – Critical Facilities by Jurisdiction and Critical Facility Category and Facility Type

Jurisdiction / Critical Facility Category	Critical Facility Type	Facility Count
Amador City		
Essential Services	Fire Station	1
	Post Office	1
	Public Administration Building	1
	Total	**3**
Amador City Total		**3**
Ione		
Essential Services	Bridge	1
	Clinic	1
	EMS Station	2
	Evacuation Shelter	1
	Fire Station	2
	Library	1
	Other	1
	Police Station	1
	Post Office	1
	Prison	1
	Public Administration Building	1
	Essential Services Total	**13**
At Risk Population	School	5
	At Risk Population Total	**5**
Ione Total		**18**
Jackson		
Essential Services	Civic Center	1
	Clinic	9
	Communications	1
	Community Center	2
	Court House	1
	DMV	1
	EOC	1
	Evacuation Shelter	2
	Fire Station	2
	Government Administration	1
	Healthcare/School Services	1
	Hospital	1

Jurisdiction / Critical Facility Category	Critical Facility Type	Facility Count
	Jail	1
	Library	1
	Police Station	3
	Post Office	1
	Public Administration Building	2
	School District Office	1
	Wastewater Facility	2
	Wastewater Treatment Plant	1
	Essential Services Total	**35**
At Risk Population	Community Center	1
	Other	1
	Residential Care Facility	4
	School	5
	Veterans Services	2
	At Risk Population Total	**13**
Jackson Total		**48**
Plymouth		
Essential Services	Bridge	1
	Clinic	1
	EMS Station	1
	Evacuation Shelter	1
	Fire Station	1
	Library	1
	Post Office	1
	Public Administration Building	1
	Essential Services Total	8
At Risk Population	School	1
	At Risk Population Total	**1**
Plymouth Total		**9**
Sutter Creek		
Essential Services	Community Center	2
	Fire Station	2
	Police Station	1
	Post Office	1
	Public Administration Building	1
	Essential Services Total	**7**
At Risk Population	Residential Care Facility	1

Jurisdiction / Critical Facility Category	Critical Facility Type	Facility Count
	School	5
	At Risk Population Total	**6**
Sutter Creek Total		**13**
Unincorporated Amador County		
Essential Services	Animal Shelter	1
	Bridge	31
	Clinic	4
	Community Center	5
	EMS Station	2
	Evacuation Shelter	1
	Fire Station	15
	Library	2
	Other	5
	Post Office	4
	Public Administration Building	1
	Public Water System	64
	Ranger Station	1
	Veterans Services	1
	Wastewater Facility	1
	Essential Services Total	**138**
At Risk Population	Clinic	1
	School	5
	Veterans Services	1
	At Risk Population Total	**7**
Unincorporated Amador County Total		**145**
Unincorporated Alpine County		
Essential Services	Fire Station	1
	Essential Services Total	**1**
Unincorporated Alpine County Total		**1**
Grand Total		**237**

Source: Amador County GIS

Community Lifelines

Assessing the vulnerability of the Amador County Planning Area to natural hazards and disasters also involves reviewing and inventorying the community lifelines in place that could be affected. It is important to include these items in hazard discussions as the continuous operation of critical government and business

functions is essential to human health and safety and/or economic security. Information on community lifelines include:

- Lifelines are the most fundamental services in the community that, when stabilized, enable all other aspects of society to function.
- FEMA has developed a construct for objectives-based response that prioritizes the rapid stabilization of Community Lifelines after a disaster.
- The integrated network of assets, services, and capabilities that provide lifeline services are used day-to-day to support the recurring needs of the community and enable all other aspects of society to function.
- When disrupted, decisive intervention (e.g., rapid re-establishment or employment of contingency response solutions) is required to stabilize the incident.

For this Plan, Community Lifelines includes the following (as defined by FEMA):

- **Safety and Security** – Law Enforcement/Security, Fire Service, Search and Rescue, Government Service, Community Safety
- **Food, Hydration, Shelter** – Food, Water, Shelter, Agriculture
- **Health and Medical –** Medical Care, Public Health, Patient Movement, Medical Supply Chain, Fatality Management
- **Energy –** Power Grid, Fuel
- **Communications** – Infrastructure, Responder Communications, Alerts Warnings and Messages, Finance, 911 and Dispatch
- **Transportation** – Highway/Roadway/Motor Vehicle, Mass Transit, Railway, Aviation, Maritime
- **Hazardous Material –** Facilities, HAZMAT, Pollutants, Contaminants
- **Water Systems** – Potable Water Infrastructure, Wastewater Management

In the Amador County Planning Area, these community lifelines are all in place and functional as part of regular government operations. It should also be noted that these community lifelines collectively include many of the individual components of other community assets inventoried for this LHMP including structures and critical facilities and infrastructure.

After the HMPC reviewed the list of hazards from Table 4-3, it was determined that most hazards that occur would not overwhelm the community lifelines in the County. A matrix was put together in Table 4-14 for the hazards of concern in the Amador County Planning Area. As shown, only earthquake and wildfire are thought be able to (temporarily) overwhelm the community lifelines in the County. The remaining hazards would likely not overwhelm community lifelines.

Note: This inventory of community lifelines and hazard analysis only occurs in this overall asset inventory for Amador County. To limit redundancy, it is not discussed further in the hazard profiles and vulnerability assessments in Section 4.3 below.

Table 4-14 Amador County Planning Area – Hazards and their Potential to Overwhelm Community Lifelines

Hazard	Potential to Overwhelm Community Lifelines	Hazard	Potential to Overwhelm Community Lifelines
Severe Weather: Extreme Cold, Freeze, and Snow	Limited	Dam Failure	Moderate
Severe Weather: Extreme Heat	Limited	Drought and Water Shortage	Limited
Severe Weather: Heavy Rains and Storms	Limited	Earthquake	High
Severe Weather: High Winds and Tornado	Limited	Flood: 1%/0.2% Annual Chance	Moderate
Agricultural Hazards	Limited	Flood: Localized Flooding	Limited
Avalanche	Limited	Landslide, Mudslide, and Debris Flow	Limited
Climate Change	Limited	Wildfire	High

Source: Amador County Planning Team

Efforts to mitigate potential impacts to community lifelines are key to building resilience. These community lifelines connect to the sectors in the National Mitigation Framework and the Recovery Support Functions under the National Disaster Recovery Framework; the same agencies and departments that support these sectors also often support community lifelines and the recovery mission.

Specific information on these community lifelines in the Amador County Planning Area and how they may be affected by a hazard event or disaster are discussed in more detail in each jurisdictional annex to this Base Plan.

Natural, Historical, and Cultural Resources

Assessing the vulnerability of the Amador County Planning Area 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

Natural resources are important to include in cost/benefit 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 resource assets can lead to opportunities for meeting multiple objectives. For instance, protecting wetlands areas protects sensitive habitat as well as reducing the force of and storing floodwaters.

The County's broad range of elevation and topography results in a rich diversity of natural and biological resources. The western half of the County is characterized by rolling hills covered with oak woodland, grassland, and chaparral. The forested upcountry, which is part of the Eldorado National Forest, has a more rugged topography characterized by steep slopes, deep river canyons, and high mountain peaks covered by forests, montane shrublands, and lakes.

The South Fork Cosumnes River, the North Fork Mokelumne River, Dry Creek, Sutter Creek, Jackson Creek, Lake Camanche, Pardee Reservoir, and Lake Amador all provide vital fish spawning, rearing, and/or migratory habitat for a diverse range of fish.

Deer migration corridors are also a concern in many foothill counties, including Amador County. The County is home to both resident and migratory deer populations, with critical winter range for deer found at elevations between 2,000 and 4,000 feet above sea level, and summer critical habitat at 4,000 to 9,000 feet above sea level.

The vernal pool complexes and Ione chaparral of western Amador County, and the riparian habitats along corridors such as the Cosumnes River, the Mokelumne River, and Dry Creek are examples of some of the sensitive communities found throughout the County. These sensitive communities are a part of the county's biological wealth and are home to some of its unique plant and animal species. Future residential, commercial, and infrastructure development and expansion of agricultural or mining activities have the potential to directly remove, degrade, or fragment these sensitive habitats.

Special Status 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.

The California Natural Diversity Database, a program that inventories the status and locations of rare plants and animals in California, was queried to create an inventory of special status species in Amador County. A summary list of these species is found below in Table 4-15. Appendix E lists the name, federal status, state status, California Department of Fish and Wildlife status, and the California Rare Plant rank of species in Amador County.

Table 4-15 Amador County Planning Area – Summary of Special Status Species

Type	Number
Animals - Amphibians	5
Animals - Birds	52
Animals - Crustaceans	5
Animals - Fish	18
Animals - Insects	10
Animals - Mammals	10
Animals – Mollusks	2
Animals – Reptiles	3
Community – Terrestrial	9
Plants – Vascular	38

Source: California Natural Diversity Database. Retrieved January 2025.

Wetlands

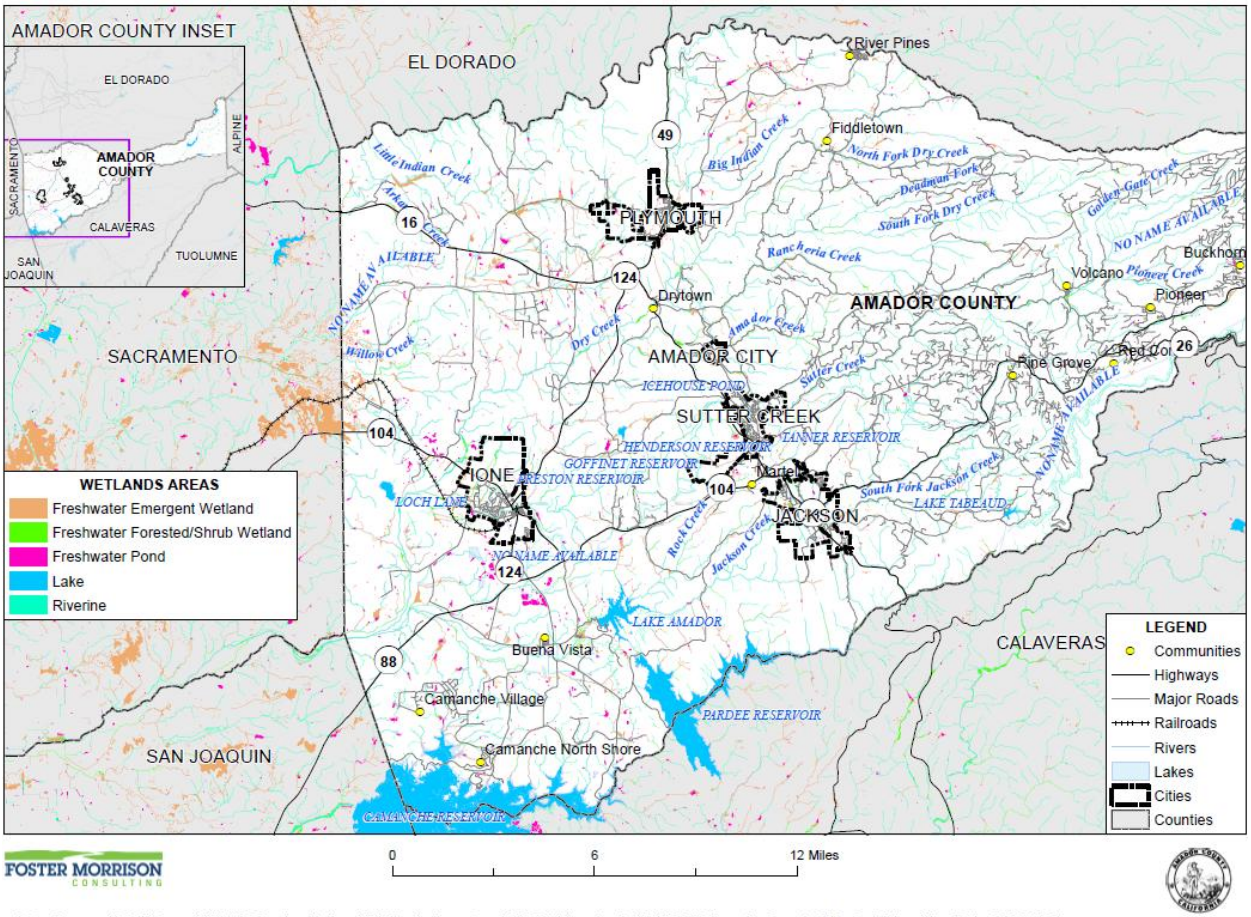
Wetlands are habitats in which soils are intermittently or permanently saturated or inundated. Wetland habitats vary from rivers to seasonal ponding of alkaline flats and include swamps, bogs, marshes, vernal pools, and riparian woodlands. Wetlands are considered to be waters of the United States and are subject to the jurisdiction of the U.S. Army Corps of Engineers (USACE) as well as the California Department of Fish and Wildlife (CDFW). Where the waters provide habitat for federally endangered species, the U.S. Fish and Wildlife Service may also have authority.

Wetlands are a valuable natural resource for communities providing beneficial impact to water quality, wildlife protection, recreation, and education, and play an important role in hazard mitigation. Wetlands provide drought relief in water-scarce areas where the relationship between water storage and streamflow regulation is vital and reduce flood peaks and slowly release floodwaters to downstream areas. When surface runoff is dampened, the erosive powers of the water are greatly diminished. Furthermore, the reduction in the velocity of inflowing water as it passes through a wetland helps remove sediment being transported by the water.

Fresh emergent wetland habitats occur in Amador County on virtually all exposures and slopes, provided a basin or depression is saturated or at least periodically flooded. They are most common on level to gently rolling topography. They are found in various depressions or at the edge of rivers or lakes. Soils are predominantly silt and clay, although coarser sediments and organic material may be intermixed. In some areas organic soils (peat) may constitute the primary growth medium. Climatic conditions are highly variable and range from the extreme summer heat to winter temperatures well below freezing.

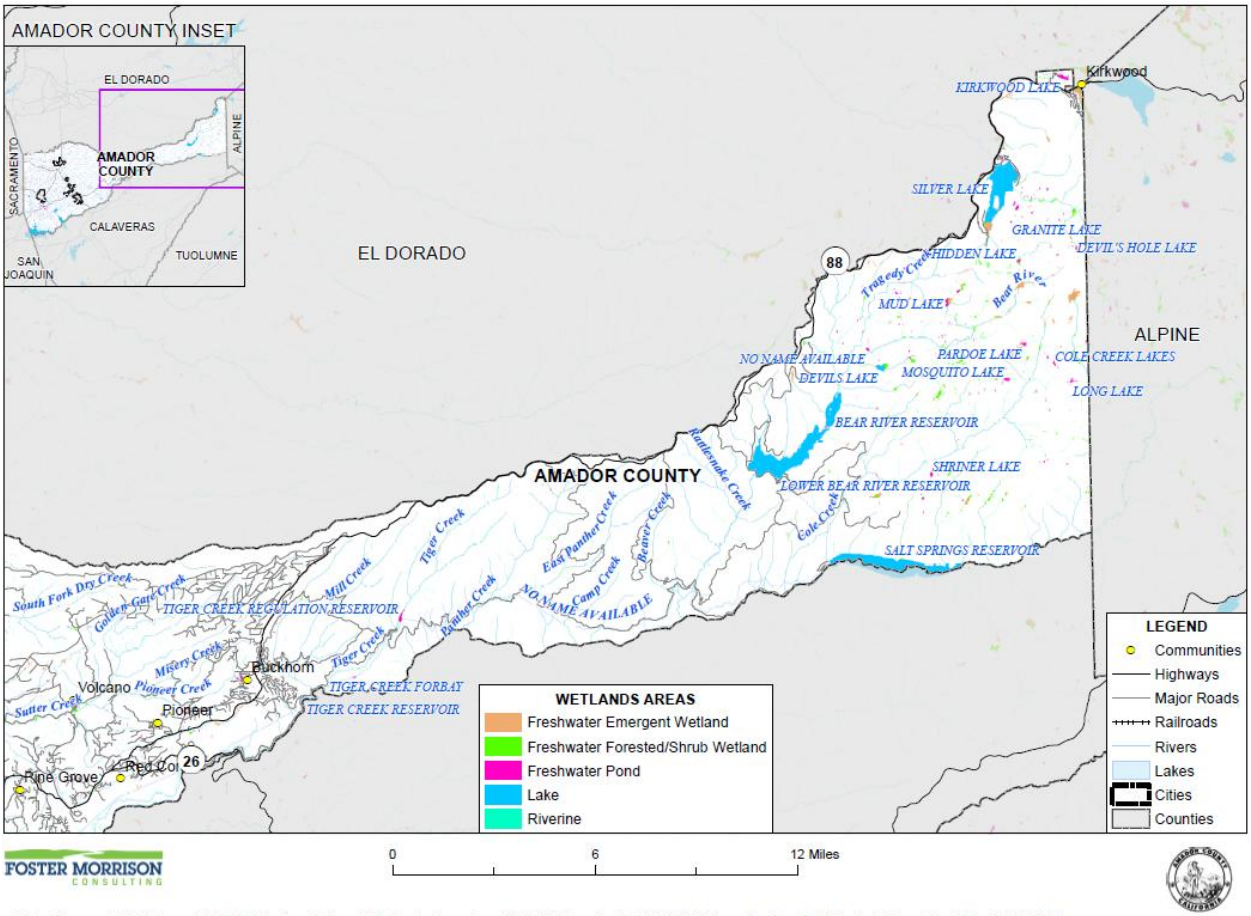
The US Fish and Wildlife Service has maps of wetlands in the United States. Those wetlands that fall in Amador County are shown on Figure 4-16 for the western County and on Figure 4-17 for the eastern County. They are detailed in Table 4-16 and are shown separated by jurisdiction. More information on the locations of wetlands in each City can be found in their respective annexes to this LHMP Update.

Figure 4-16 Amador County Western Planning Area – Wetlands Locations



Data Source: U.S. Fish and Wildlife Service National Wetlands Inventory 10/2024 (downloaded 01/2025), Amador County GIS, Cal-Atlas; Map Date: 2/26/2025.

Figure 4-17 Amador County Eastern Planning Area – Wetlands Locations



Data Source: U.S. Fish and Wildlife Service National Wetlands Inventory 10/2024 (downloaded 01/2025), Amador County GIS, Cal-Atlas; Map Date: 2/26/2025.

Table 4-16 Amador County Planning Area – Wetlands

Wetlands Area Type	Wetlands Count	Wetlands Area (in Acres)
Unincorporated Amador County		
Freshwater Emergent Wetland	2,099	2,074.47
Freshwater Forested/Shrub Wetland	864	880.27
Freshwater Pond	1,385	1,216.43
Lake	48	6,850.05
Riverine	2,298	2,980.06
Unincorporated Amador County Total	**6,694**	**14,001.29**

Source: USFWS October 2024 National Wetlands Inventory

Wetlands Natural and Beneficial Functions

Wetlands are often found in floodplains and depressional areas of a watershed. Many wetlands receive and store floodwaters, thus slowing and reducing downstream flow. Wetlands perform a variety of ecosystem functions including food web support, habitat for insects and other invertebrates, fish and wildlife habitat,

filtering of waterborne and dry-deposited anthropogenic pollutants, carbon storage, water flow regulation (e.g., flood abatement), groundwater recharge, and other human and economic benefits.

Wetlands, and other riparian and sensitive areas, provide habitat for insects and other invertebrates that are critical food sources to a variety of wildlife species, particularly birds. There are species that depend on these areas during all parts of their lifecycle for food, overwintering, and reproductive habitat. Other species use wetlands and riparian areas for one or two specific functions or parts of the lifecycle, most commonly for food resources. In addition, these areas produce substantial plant growth that serves as a food source to herbivores (wild and domesticated) and a secondary food source to carnivores.

Wetlands slow the flow of water through the vegetation and soil, and pollutants are often held in the soil. In addition, because the water is slowed, sediments tend to fall out, thus improving water quality and reducing turbidity downstream.

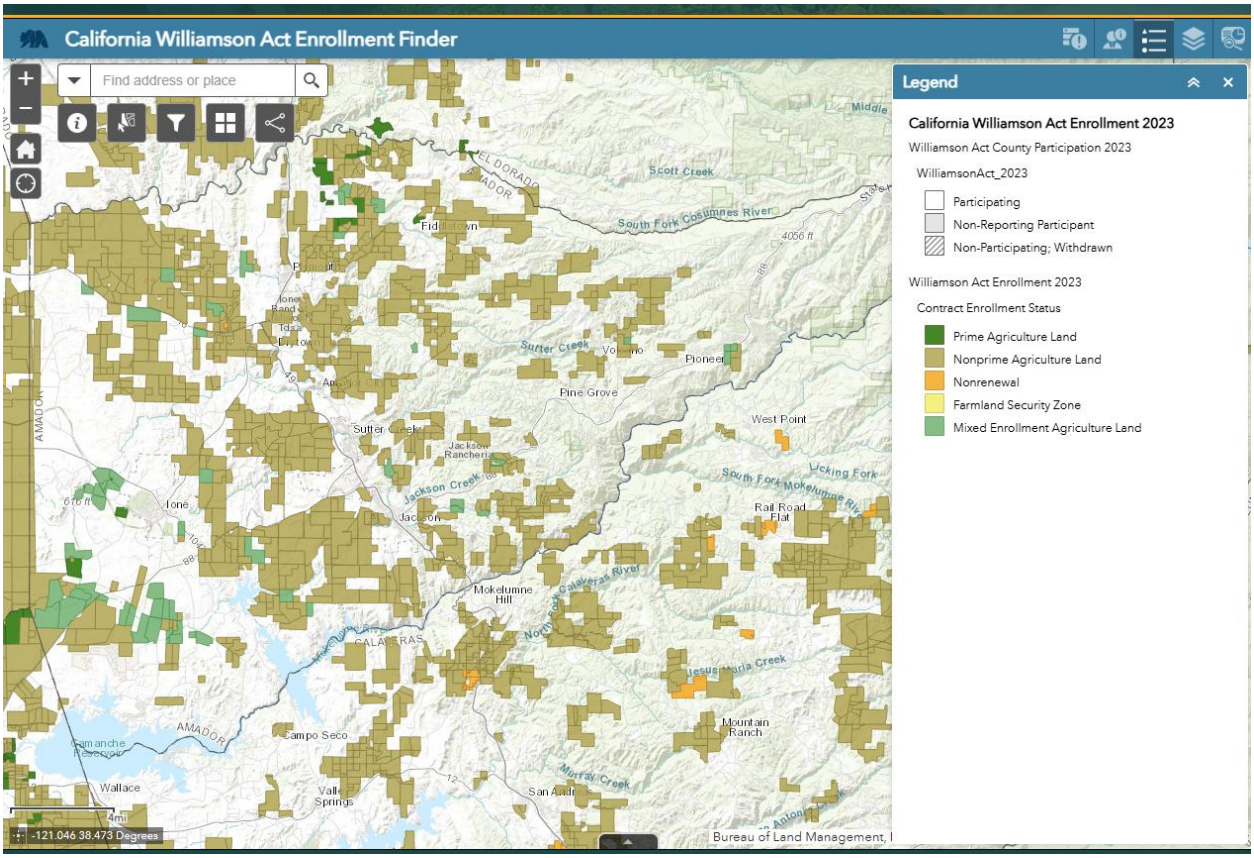
These natural floodplain functions associated with the natural or relatively undisturbed floodplain that moderates flooding, such as wetland areas, are critical for maintaining water quality, recharging groundwater, reducing erosion, redistributing sand and sediment, and providing fish and wildlife habitat. Preserving and protecting these areas and associated functions are a vital component of sound floodplain management practices for the Amador County Planning Area.

Farmlands

Williamson Act

The Williamson Act, also known as the California Land Conservation Act of 1965, enables local governments to enter into contracts with private landowners for the purpose of restricting specific parcels of land to agricultural or related open space use. When the County enters into a contract with the landowners under the Williamson Act, the landowner agrees to limit the use of the land to agriculture and compatible uses for a period of at least ten years and the County agrees to tax the land at a rate based on the agricultural production of the land rather than its real estate market value. This affects the County's overall values for assessed taxable lands. The County has designated areas as agricultural preserves within which the County will enter into contracts for the preservation of the land in agriculture. Locations from the most recent map (dated 2023) can be seen on Figure 4-18 for western Amador County. There are no Williamson Act lands in eastern Amador County.

Figure 4-18 Amador County – Williamson Act Lands



Source: California Department of Conservation. Retrieved 03/11/2025.

State Inventory of Important Farmland

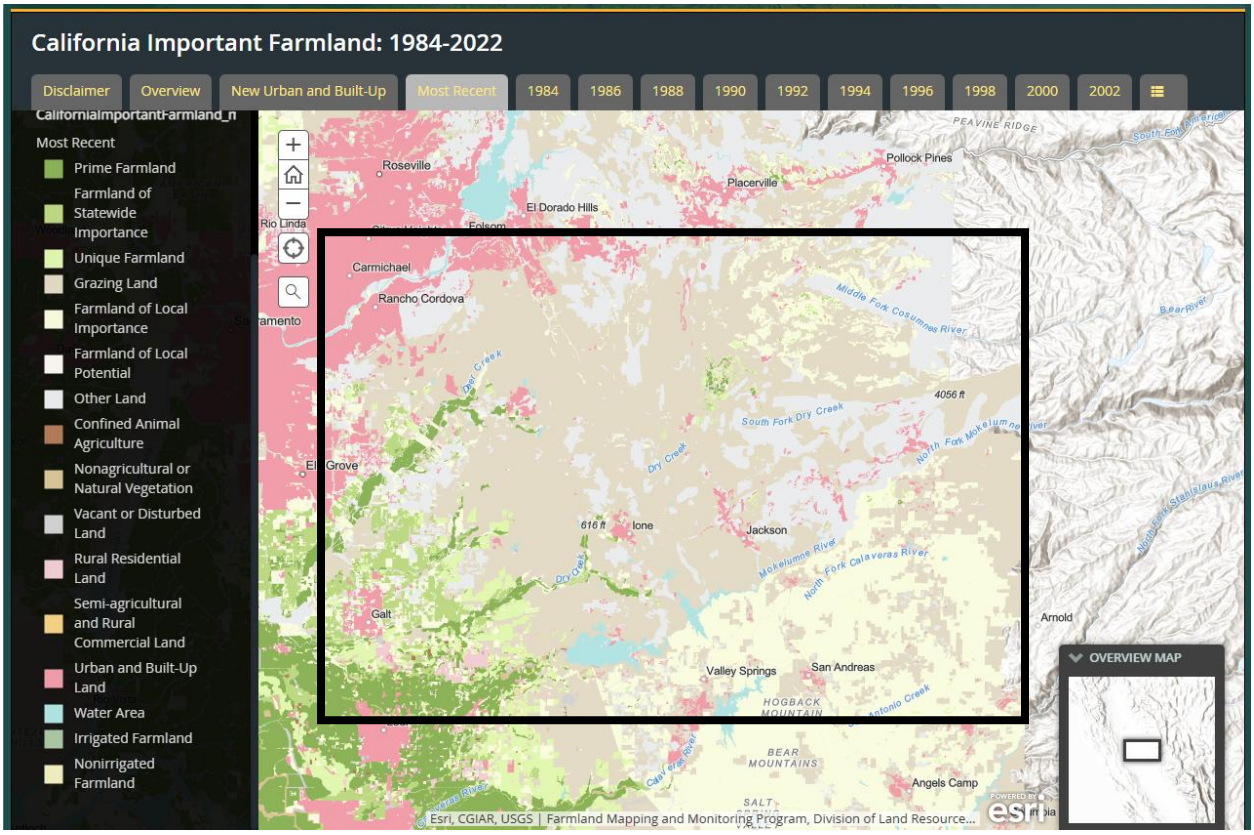
The Farmland Mapping and Monitoring Program was established in 1984 to document the location, quality, and quantity of agricultural lands and conversion of those lands over time. The program provides impartial analysis of agricultural land use changes throughout California. For inventory purposes, several categories were developed to describe the qualities of land in terms of its suitability for agricultural production. The State Department of Conservation utilizes the following classification system:

- The Prime Farmland category describes farmland with the best combination of physical and chemical features able to sustain long term agricultural production. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. Land must have been used for irrigated agricultural production at some time during the four years prior to the mapping date.
- Farmland of Statewide Importance is farmland similar to Prime Farmland but with minor shortcomings, such as greater slopes or less ability to store soil moisture. Land must have been used for irrigated agricultural production at some time during the four years prior to the mapping date.
- Unique Farmland is farmland of lesser quality soils used for the production of the state's leading agricultural crops. This land is usually irrigated but may include non-irrigated orchards or vineyards as found in some climatic zones in California. Land must have been cropped at some time during the four years prior to the mapping date.

- Farmland of Local Importance is either currently producing crops or has the capability of production. This farmland category is determined by each county's board of supervisors and a local advisory committee.

The 2022 maps are the most recent versions. These lands are shown in Figure 4-19.

Figure 4-19 Amador County – Map of Important Farmlands 2022



Source: State of California Department of Conservation. Retrieved 03/11/2025.

Cultural and Historical Resources

Amador County has a large stock of historically significant homes, public buildings, and landmarks. To inventory these resources, the HMPC collected information from a number of sources. The California Department of Parks and Recreation Office of Historic Preservation (OHP) was the primary source of information. The OHP is responsible for the administration of federally and state mandated historic preservation programs to further the identification, evaluation, registration, and protection of California's irreplaceable archaeological and historical resources. OHP administers the National Register of Historic Places, the California Register of Historical Resources, California Historical Landmarks, and the California Points of Historical Interest programs. Each program has different eligibility criteria and procedural requirements.

- The **National Register of Historic Places** is the nation's official list of cultural resources worthy of preservation. The National Register is part of a national program to coordinate and support public and

private efforts to identify, evaluate, and protect historic and archeological resources. 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, which is part of the U.S. Department of the Interior.

- The **California Register of Historical Resources** program encourages public recognition and protection of resources of architectural, historical, archeological, and cultural significance and identifies historical resources for state and local planning purposes; determines eligibility for state historic preservation grant funding; and affords certain protections under the California Environmental Quality Act. The Register is the authoritative guide to the state's significant historical and archeological resources.
- **California Historical Landmarks** are sites, buildings, features, or events that are of statewide significance and have anthropological, cultural, military, political, architectural, economic, scientific or technical, religious, experimental, or other value. Landmarks #770 and above are automatically listed in the California Register of Historical Resources.
- **California Points of Historical Interest** are sites, buildings, features, or events that are of local (city or county) significance and have anthropological, cultural, military, political, architectural, economic, scientific or technical, religious, experimental, or other value. Points designated after December 1997 and recommended by the State Historical Resources Commission are also listed in the California Register.

Historical resources included in the programs above are identified in Table 4-17.

Table 4-17 Amador County Planning Area – Historical Resources

Resource Name (Plaque Number)	National Register	State Landmark	Point of Interest	Date Listed	City/ Community
Amador City (P498)			X	5/5/1977	Amador City
Lancha Plana (30)		X		8/1/1932	Buena Vista
Drytown (31)		X		8/1/1932	Drytown
Oleta (Old Fiddletown) (35)		X		8/1/1932	Fiddletown
Rammed Earth Adobe (P107)			X	12/11/1968	Fiddletown
Fiddletown (N627)	X			6/7/1978	Fiddletown
Community Methodist Church of Ione (506)		X		7/31/1953	Ione
Ione City Centenary Church (N498)	X			5/26/1977	Ione
Five Mile Drive--Sutter Creek Bridge (N1437)	X			4/11/1986	Ione
Scully Ranch (N706)	X			11/21/1978	Ione
D. Stewart Co. Store (788)		X		11/21/1963	Ione
Preston Castle (867)		X		1/11/1974	Ione
Middle Bar (36)		X		8/1/1932	Jackson
Pioneer Hall (34)		X		8/1/1932	Jackson
Jackson Gate (118)		X		3/29/1933	Jackson
Argonaut And Kennedy Mines (786)		X		9/18/1963	Jackson
Amador County Hospital Building (N148)	X			2/23/1972	Jackson

Resource Name (Plaque Number)	National Register	State Landmark	Point of Interest	Date Listed	City/ Community
Site of Jackson's Pioneer Jewish Synagogue (865)		X		11/16/1973	Jackson
Kennedy Mine Tailing Wheels (P397)			X	5/9/1975	Jackson
Kennedy Tailing Wheels (N959)	X			7/7/1981	Jackson
House and Indian Museum, Grace Blair Depue (P582)			X	3/1/1982	Jackson
Depue, Grace Blair, House and Indian Museum (N1101)	X			5/7/1982	Jackson
Saint Sava Serbian Orthodox Church (N1426)	X			3/6/1986	Jackson
Chichizola Family Store Complex (N1788)	X			8/14/1992	Jackson
Jackson Downtown Historic District (N2090)	X			4/14/2000	Jackson
Paugh, William H., House (N2364)	X	X		6/5/2007	Jackson
Butterfield, John A., House (N1461)	X			9/11/1986	Jackson
Butte Store (39)		X		8/1/1932	Jackson
Maiden's Grave (28)		X		8/1/1932	Kirkwood
Old Emigrant Road (662)		X		11/5/1958	Kirkwood
Clinton (37)		X		8/1/1932	Pine Grove
Irishtown (38)		X		8/1/1932	Pine Grove
Plymouth Trading Post (470)		X		8/30/1950	Plymouth
D'Agostini Winery (762)		X		4/28/1961	Plymouth
Sutter Creek (322)		X		7/12/1939	Sutter Creek
Knight's Foundry and Shops (N375)	X			7/1/1975	Sutter Creek
Sutter Creek Grammar School (N456)	X			12/12/1976	Sutter Creek
Knight Foundry (1007)		X		8/21/1992	Sutter Creek
Site of First Amateur Astronomical Observatory of Record in California (715)		X		10/6/1959	Unincorporated County
Volcano (29)		X		8/1/1932	Volcano
Indian Grinding Rock (N74)	X			5/6/1971	Volcano
St. George Hotel (N1301)	X			9/7/1984	Volcano

Source: California Department of Parks and Recreation Office of Historic Preservation. Retrieved 12/3/2024.

It should be noted that these lists may not be complete, as they may not include those currently in the nomination process and not yet listed. Additionally, as defined by the California Environmental Quality Act (CEQA) and 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 CEQA and NEPA. Structural mitigation projects are considered alterations for the purpose of this regulation.

Economic Assets and Community Activities of Value

Assessing the vulnerability of the Amador County Planning Area to natural hazards and disasters also involves inventorying the economic assets and community activities of value to the Amador County Planning Area.

Economic Assets

After a disaster, economic resiliency is one of the major drivers of a speedy recovery. Each community has specific economic drivers. These include:

- Primary Economic Sectors
- Major employers
- Commercial Centers

The HMPC and County Auditor noted that the economic drivers are Government – State & Local and Tourism such as it relates to wineries and grape growers, casinos, retailers, and restaurants. It was also discussed that the airport is an economic asset and could be more susceptible to threats and hazards than currently thought. More information on these drivers related to Tourism include:

- Tourism and Hospitality – Amador County is known for its Gold Rush history, award-winning wineries, outdoor recreation and small towns, making tourism and hospitality key industries. Historic towns like Sutter Creek, Jackson, and Volcano have various sites, museums, and other attractions that draw visitors year-round, which include the Kennedy Mine (Jackson), Preston Castle (Ione), the Knights Foundry (Sutter Creek), the Amador Whitney Museum (Amador City), the Indian Grinding Rock State Historic Park (Pine Grove), Kirkwood Ski Resort, and the Black Chasm Cavern (Volcano).
- Wineries & Vineyards: Amador County is home to 50+ wineries which comprise the Amador Vintners Association. This includes numerous boutique wineries and tasting rooms, which draws both regional and international tourists. In May of 2024, the Amador County Board of Supervisors established the Amador County Wine Heritage District. This district imposes an annual assessment rate of 1% on gross direct-to-consumer sales revenue from winery sales within the county. The funds generated are intended to support marketing, quality enhancement, and educational programs for the wineries. See https://amadorwine.com/ for more information.
- Lodging: Amador County hosts a mix of boutique hotels, historic inns, and bed & breakfasts. Vacation rentals and VRBOs/Airbnbs have increased in popularity. Some wineries and/or vineyards also offer lodging.

Note: This inventory of economic assets is only included in this overall asset inventory for Amador County. To limit redundancy, it is not discussed further in the hazard profiles and vulnerability assessments in Section 4.3 below. However, depending on the type, location, magnitude and extent of future hazard events and disasters, the County's economic assets may be vulnerable.

More information on economic assets for the incorporated jurisdictions in the County can be found in the respective jurisdictional annexes to this Base Plan.

Community Activities of Value

Inventorying economic assets in the Amador County Planning Area and their vulnerability to natural hazards and disasters also involves inventorying activities that have value to the community. This includes activities that are important to a community, like long-standing traditions such as a festival or fair. Some areas rely on seasonal industries to sustain them throughout the year. Many of these activities provide economic benefits to the Planning Area. A hazard event that cancels or shortens these can affect a community's livelihood and can make disaster recovery more difficult or prolonged. This includes activities such as:

- Festivals and Fairs
- Sporting Events
- Tourism

Community Events (include but are not limited to): Amador County Fair (Plymouth), Dandelion Days (Jackson), Sutter Creek Parade of Lights (Sutter Creek), Preston Castle Haunt (Ione), Sutter Creek Duck Race (Sutter Creek), Italian Benevolent Society Crab Feed (Sutter Creek), Ione Rotary Crab Feed (Ione), Amador County Fair Foundation Casino Night (Plymouth), Jackson Lions Club Crab Feed (Jackson), Margaret Dalton Golden Acorn Awards Dinner (Jackson Rancheria Casino), Knight Foundry Dinner (Sutter Creek), Ione Picnic Association Hoedown (Ione), Amador Wedding & Party Showcase (Jackson), Italian Benevolent Society Shrimp Feed (Sutter Creek), Celebrate our Children (Jackson), 49er Wagon Train (throughout the County), Ione Homecoming (Ione), Mother Lode Cruise Car Show (Jackson), Italian Picnic (Sutter Creek), Music at the Mine (Jackson) Picnic in the Park, Beer Fest (Sutter Creek), An Evening Under the Stars (Volcano), Vines & Steins (Ione), Amador Farm Tours & Dinner (Various), Show in the Park (Pioneer), Feast at the Foundry (Sutter Creek), Purple Tie Gala (varies location), Fall Harvest Festivals (Various), Halloween Parade (Jackson), Christmas Delights (Jackson), Sutter Creek Open House (Sutter Creek), Veteran's Day Parade (Jackson), Big Crush Harvest Wine Festival (various wineries), Amador Four Fires Food & Wine Festival (Plymouth) and a multitude of flea markets and farmer's markets throughout the County.

Note: This inventory of community activities of value only occurs in this overall asset inventory for Amador County. To limit redundancy, it is not discussed further in the hazard profiles and vulnerability assessments in Section 4.3 below. However, depending on the type, location, magnitude and extent of future hazard events and disasters, the County's economic assets may be vulnerable.

More information on community activities of value specific to participating jurisdictions can be found in the respective jurisdictional annexes to this Base Plan.

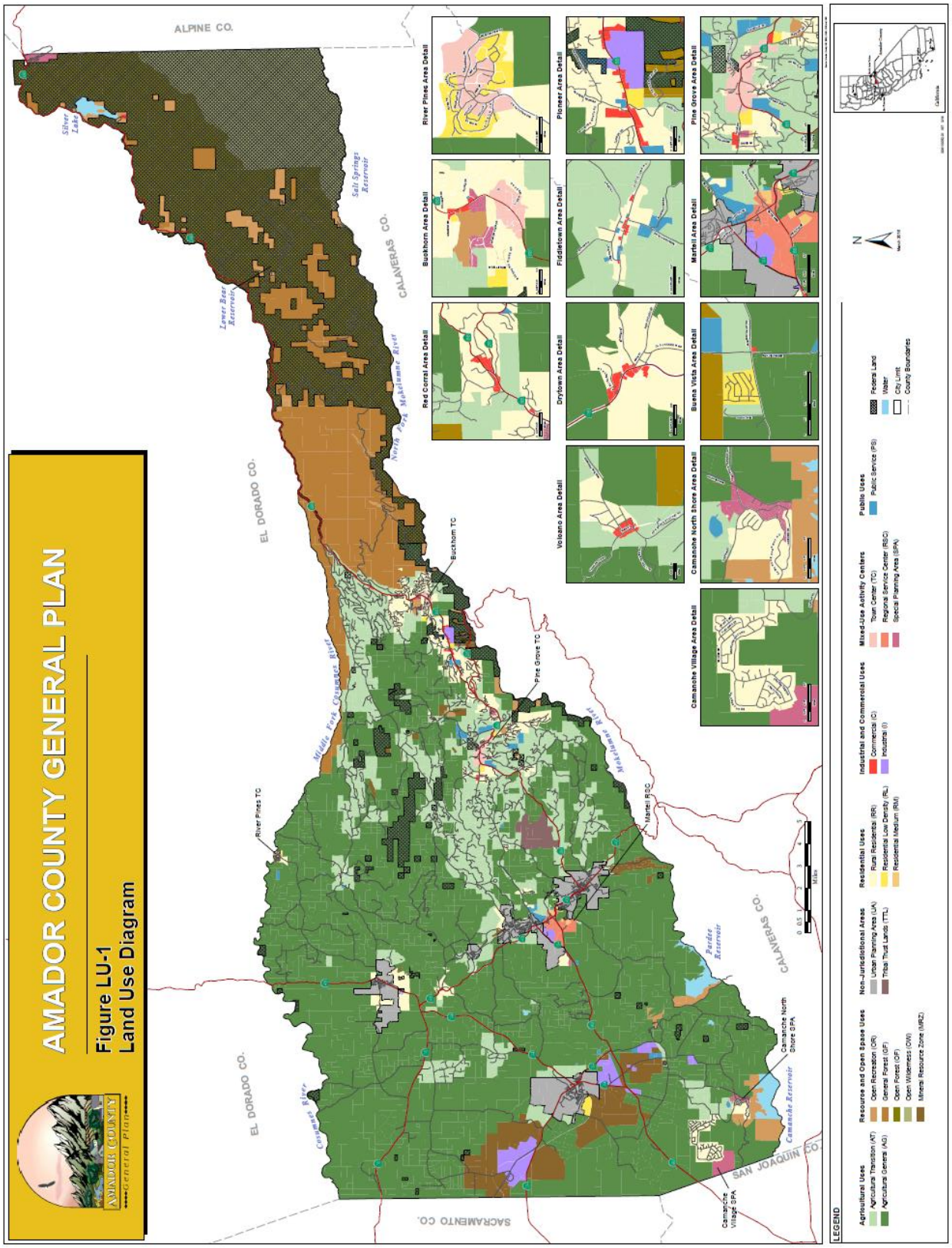
4.2.2. Growth and Development Trends

As part of the planning process, trends in growth and development, both current and future, were examined, both as a whole and in the context of hazard-prone areas, and how the changes in growth and development affect loss estimates and vulnerability over time. This discussion focuses on unincorporated Amador County.

Land Use

The future use of land in the County is fundamental to attaining the vision of a balanced, self-sustaining community. A land use pattern which balances growth between rural and urban areas, as well as providing a balance between housing, employment, natural resources, and services in the County is a key element in maintaining the quality of life and unique character of the County. Descriptions of allowed uses for each classification are detailed in the Amador County General Plan Land Use Element. Figure 4-20 is sourced from this section.

Figure 4-20 Amador County General Plan Land Use



Source: Amador County 2016 General Plan Land Use Element

Population Projections

As indicated in the previous section, Amador County had been steadily growing from 1940 to 2020, with a recent slowing in population growth. Long term forecasts by the California Department of Finance project population growth in Amador County continuing through 2070. Table 4-18 shows the population projections for the County Planning Area as a whole through 2070. As shown, populations are expected to grow slowly over time.

Table 4-18 Population Projections for the Amador County Planning Area (incorporated and unincorporated), 2025-2070

	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070
Amador County	40,289	41,327	43,076	44,815	46,549	48,299	49,927	51,844	53,901	56,182

Source: California Department of Finance, P-2 Report

Development since 2020 Plan

The Amador County Planning Department sought to track total building permits issued since 2020 for unincorporated Amador County. A summary of this development is shown in Table 4-19. Development by known flood and fire hazard areas is shown in Table 4-20. All development in the identified hazard areas, including the 1% annual chance floodplains and high wildfire risk areas, were completed in accordance with the current and applicable development codes and standards in place at the time. Thus, with the exception of more people living in the area potentially exposed to natural hazards, this growth should not cause a significant change in vulnerability of the County to identified priority hazards.

Table 4-19 Unincorporated Amador County Development 2020–2024 Summary

Property Use	2020	2021	2022	2023	2024
Residential	22	44	44	49	36
Commercial	0	3	0	1	3
Industrial	0	0	0	0	0
Other	1322	1329	1421	1294	1193
Total	**1,344**	**1,376**	**1,465**	**1,344**	**1,232**

Source: Amador County Planning Department

Table 4-20 Unincorporated Amador County Development in Hazard Areas since 2020

Property Use	Moderate or Higher Fire Hazard Severity Zones	1% Annual Chance Flood	Landslide Potential Areas	Other
Residential	195	0	0	0
Commercial	7	0	0	0
Industrial	0	0	0	0

Property Use	Moderate or Higher Fire Hazard Severity Zones	1% Annual Chance Flood	Landslide Potential Areas	Other
Other	6559	0	0	0
Total	**6761**	**0**	**0**	**0**

Source: Amador County Planning Department

Additionally, the County Planning Department noted that with respect to the above tables, winery-related permits are considered agricultural and not industrial or commercial. Also, the large number of "other" permits reflects everything from minor repairs and alterations, to major building additions. Another important item is that almost all of the unincorporated area of the County is designated as moderate or higher fire severity, so all of the permits fall in that category.

Future Development Areas

It is important to review future development plans for the County. Future development should be sited in areas that are away from known hazard risks. If this is not possible, mitigation should be done to ensure that future development is protected against future hazard events and disasters.

The County noted five areas where expansion is approved to occur, or is proposed to occur. This includes:

- A - Plymouth Casino – approved commercial area of 130 acres.
- B - SGI Quarry Expansion – proposed industrial area of 50 acres.
- C - Palisades Unit 6 – approved residential area of 13 acres (with 22 planned residences.
- D - Thunder Mountain- approved residential area of 2.5 acres (with 15 planned residences)
- E - Timber Creek Townhomes – approved residential area of 2 acres (with 20 planned residences)

These areas are analyzed in the GIS analysis below.

In addition to the planned areas analyzed below, the Amador County Planning Department Director noted that there are talks about building a Town Center in Pine Grove and in Pioneer, but neither have gotten off the ground and their timeframe is unknown. The Board of Supervisors are currently reviewing plans for a new subdivision that could bring 300-700 new homes along Wicklow Way over the next 30 years. The status and timeframe to start building is unknown at this time. Lastly, there are plans to build a 4-story hotel in Martell (Highway 49/Jackson Gate Road). There is a rock-creek box drain issue that will require some engineering from the developers, but again, a build-start date is unknown.

GIS Analysis

Amador County provided five future development areas which were used as the basis for the inventory of future development for unincorporated Amador County. These were mapped in GIS. Figure 4-21 show the locations of the future development areas. Table 4-21 shows the details of the future development areas by acreage and parcel count.

Figure 4-21 Unincorporated Amador County – Future Development Areas

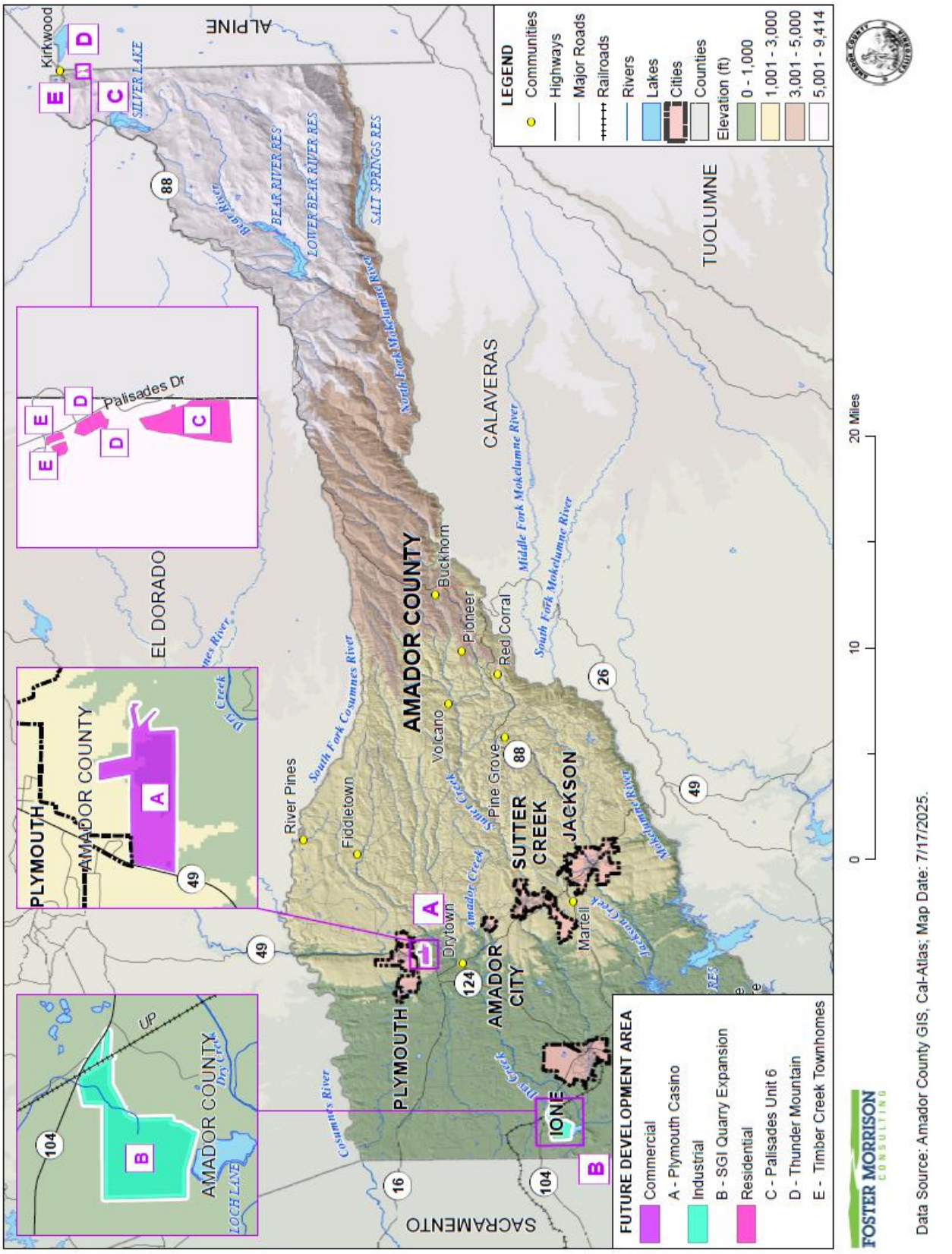


Table 4-21 Unincorporated Amador County – Future Development Parcels and Acres by Property Use

Property Use /Site/Map ID - Future Development	Unimproved Parcel Count	Total Unimproved Acres
Commercial		
A - Plymouth Casino	1	130
Commercial Total	**1**	**130**
Industrial		
B - SGI Quarry Expansion	1	50
Industrial Total	**1**	**50**
Residential		
C - Palisades Unit 6	1	13
D - Thunder Mountain	2	2.5
E - Timber Creek Townhomes	2	2
Residential Total	**5**	**17.5**
Grand Total	**7**	**197.5**

Source: Amador County

4.3 Hazard Profiles and Vulnerability Assessment

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

The hazards identified in Section 4.1 Hazard Identification, are profiled individually in this section. The Hazard Profiles set the stage for the Vulnerability Assessment, where the vulnerability is quantified, as data allows, for each of the identified hazards.

Hazard Profiles Methodology

Each hazard is profiled in the following format:

- **Hazard/Problem Description**—This section gives a description of the hazard and associated issues followed by details on the hazard specific to the Amador County Planning Area and unincorporated Amador County. Where known, this includes information on the hazard extent, location, seasonal patterns, speed of onset/duration, and magnitude and/or any secondary effects.
- **Past Occurrences**—This section contains information on historical incidents, including impacts where known. Hazard research, historical incident worksheets and other input from the Hazard Mitigation Planning Committee were used to capture information on past occurrences.
- **Likelihood of Future Occurrence**—The frequency of past events is used in this section to gauge the likelihood of future occurrences. Where possible, frequency was calculated based on existing data. It was determined by dividing the number of events observed by the number of years on record and multiplying by 100. This gives the percent chance of the event happening in any given year (e.g., three droughts over a 30-year period equates to a 10 percent chance of experiencing a drought in any given year). The likelihood of future occurrences is categorized into one of the following classifications:
  - ✓ **Highly Likely**—Near 100 percent chance of occurrence in next year or happens every year.
  - ✓ **Likely**—Between 10 and 100 percent chance of occurrence in next year or has a recurrence interval of 10 years or less.

- ✓ **Occasional**—Between 1 and 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.

- ➢ **Climate Change**—This section contains the effects of climate change (as applicable). The possible influence of climate change on the hazard is discussed.

Vulnerability Assessment Methodology

With the Amador County Planning Area's hazards identified and profiled, a vulnerability assessment was conducted to describe the vulnerability and impact that each hazard would have on the Amador County Planning Area and specific to each jurisdiction. The vulnerability assessment quantifies, to the extent feasible using best available data, assets at risk to identified hazards and estimates potential losses. This section focuses on the vulnerabilities of the Amador County Planning Area as a whole and specific to unincorporated Amador County. The vulnerability assessment is done in the following format:

- ➢ **General Vulnerability Discussion** – An assessment of the vulnerability of Amador County Planning Area to each hazard is provided in addition to the estimate of the risk of future occurrence. This is followed by a general discussion of the hazard and its vulnerability on the unincorporated Amador County. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential. It is categorized into one of the following classifications:
  - ✓ **Extremely Low**—The occurrence and potential cost of damage to life and property is very minimal to nonexistent.
  - ✓ **Low**—Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.
  - ✓ **Medium**—Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.
  - ✓ **High**—Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.
  - ✓ **Extremely High**—Very widespread with catastrophic impact.
- ➢ **Local Concerns** – This includes information on how unincorporated Amador County is uniquely affected by or vulnerable to each hazard. Information contained in this section also supports the resulting mitigation strategy for the unincorporated County. Local concerns section specific to each of the other participating jurisdictions are included in their jurisdictional annexes to this Plan.
- ➢ **Assets at Risk** – A discussion of the assets at risk follows. This includes sections on: People and Populations; Structures; Critical Facilities and Infrastructure; and Natural, Historic, and Cultural Resources. These are discussed in specific terms for mapped hazards, and in more general terms for those hazards that are unmapped.
  - ✓ **FEMA NRI Hazard Vulnerability** – For each hazard in the FEMA National Risk Index in Amador County, the relevant portions of the hazard analysis done by FEMA is presented. This includes the Hazard Risk Index Rating, Expected Annual Loss Values, Exposure Values, and the Historic Loss Ratio Rating.

- **Impacts** – A discussion on hazard impacts is included. Impacts describe how each hazard can affect the County and its assets. The type and severity of impacts reflect both the potential magnitude of the hazard and the vulnerability of the asset.
- **Future Conditions/Future Development** – A discussion of how future conditions will influence or affect the hazard over time is included here and considers factors related to climate change, changes in population patterns, and changes in land use and development. This section also discusses future development plans relative to each hazard as well as mitigating measures that should be considered in the development process. Future conditions and future development is addressed specifically for mapped hazards, and in more general terms for those hazards that are unmapped.

Existing Built Environment and Assets at Risk

Vulnerability can be quantified in those instances where there is a known, identified hazard area, such as a mapped floodplain. In these instances, the numbers and types of assets subject to the identified hazard can be counted and their values tabulated. Other information can be collected in regard to the hazard area, such as the location of critical facilities, historic structures, and valued natural resources. Together, this information conveys the impact, or vulnerability, of the Amador County Planning Area and unincorporated Amador County to that hazard.

The vulnerability assessment identified five hazards in the Amador County Planning Area for which specific geographical hazard areas have been defined and for which sufficient data exists to support a quantifiable vulnerability analysis. These five hazards are:

- Dam Failure
- Earthquake
- Flood: 1%/0.2%
- Landslide, Mudslides, and Debris Flows
- Wildfire

These hazards were analyzed using GIS, Amador County data, and hazard data.

The vulnerability and potential impacts from the nine priority hazards that do not have specific mapped areas nor the data to support additional vulnerability analysis are discussed in more general terms. These include:

- Agricultural Hazards
- Avalanche
- Climate Change
- Drought and Water Shortage
- Flood: Localized/Stormwater
- Severe Weather: Extreme Cold and Freeze
- Severe Weather: Extreme Heat
- Severe Weather: Heavy Rain and Storms
- Severe Weather: High Winds and Tornadoes

Power Outages/Failure: A Common Vulnerability of all Hazards

An additional impact or vulnerability common to most all hazards is power outage or power failure. The US power grid crisscrosses the country, bringing electricity to homes, offices, factories, warehouses, farms, traffic lights and even campgrounds. According to statistics gathered by the Department of Energy, major blackouts are on the upswing. Over the past two decades, blackouts impacting at least 50,000 customers have increased 124 percent. The electric power industry does not have a universal agreement for classifying disruptions. Nevertheless, it is important to recognize that different types of outages are possible so that plans may be made to handle them effectively. Electric power disruptions can be generally grouped into two categories: intentional and unintentional.

Intentional Disruptions

There are four types of intentional disruptions:

- **Planned**: Some disruptions are intentional and can be scheduled based on maintenance or upgrading needs.
- **Unscheduled**: Some intentional disruptions must be done "on the spot." in response to an emergency.
- **Demand-Side Management**: Some customers (i.e., on the demand side) have entered into an agreement with their utility provider to curtail their demand for electricity during periods of peak system loads.
- **Load Shedding**: When the power system is under extreme stress due to heavy demand and/or failure of critical components, it is sometimes necessary to intentionally interrupt the service to selected customers to prevent the entire system from collapsing, resulting in rolling blackouts.

The California Independent System Operator (CAISO) is tasked with managing the power distribution grid that supplies most of California, except in areas served by municipal utilities. CAISO is thus the entity that coordinates statewide flow of electrical supply. CAISO uses a series of stage alerts to the media based on system conditions. The alerts are:

- Stage 1 – reserve margin falls below 7 percent
- Stage 2 – reserve margin falls below 5 percent
- Stage 3 – reserve margin falls below 1.5 percent

Rotating blackouts become a possibility when Stage 3 is reached. Rotating outages and/or blackouts such as those experienced in 2000/2001 and 2006 can occur due to losses in transmission or generation and/or extremely severe temperatures that lead to heavy electric power consumption. Key California events include the following:

On January 17, 2001, CAISO declared a Stage 3 Emergency and notified the then Governor's Office of Emergency Services that PG&E was dropping firm load of 500 megawatts (MW) in Northern California leading to rolling blackouts. Cal OES, in turn, issued an Electrical Emergency Message to all Emergency Services Agencies to prepare for rolling blackouts. This scenario was repeated the following day, January 18, 2001, and again on March 19, 2001.

A July 2006 heat storm event affected the entire state as well as most of the West, producing record energy demand levels in California. The State was able to avoid rotating outages due to a combination of favorable

factors that included no major transmission outages, lower than typical generator outages, significant customer response to pleas for energy conservation, high imports from the Pacific Northwest despite unusually high loads, outstanding cooperation among western control area operators, and prompt response to fires that potentially threatened major interties. However, the event brought to light the vulnerability of the electric distribution system, as over 3,500 distribution transformers failed, leaving over two million customers without power at various times over the ten-day event, many for several hours and a small minority for up to three days.

In 2020, the state battled both extreme heat and wildfires. As a result of extreme heat, the CAISO declared a Stage 3 emergency. PG&E initiated rotating outages in August at the request of California's grid operator. The outages, which impacted 220,000 customers, occurred during periods of high heat. These rolling blackouts lasted less than a week.

Unintentional Disruptions

Unintentional or unplanned disruptions are outages that come with essentially no advance notice. This type of disruption can be the most problematic. The following are categories of unplanned disruptions:

- Accident by the utility, utility contractor, or others
- Malfunction or equipment failure
- Equipment overload (utility company or customer)
- Reduced capability (equipment that cannot operate within its design criteria)
- Tree contact other than from storms
- Vandalism or intentional damage
- Weather, including lightning, wind, earthquake, flood, and broken tree limbs taking down power lines
- Wildfire that damages transmission lines

Public Safety Power Shutoff

A new intentional disruption type of power shortage/failure event has recently occurred in California. In recent years, several wildfires have started as a result of downed power lines or electrical equipment. This was the case for the Camp Fire in 2018. As a result, California's three largest energy companies (including PG&E), at the direction of the California Public Utilities Commission (CPUC), coordinated to prepare all Californians for the threat of wildfires and power outages during times of extreme weather. To help protect customers and communities during extreme weather events, electric power may be shut off for public safety in an effort to prevent a wildfire. This is called a Public Safety Power Shutoff (PSPS).

Public Safety Power Shutoff Criteria

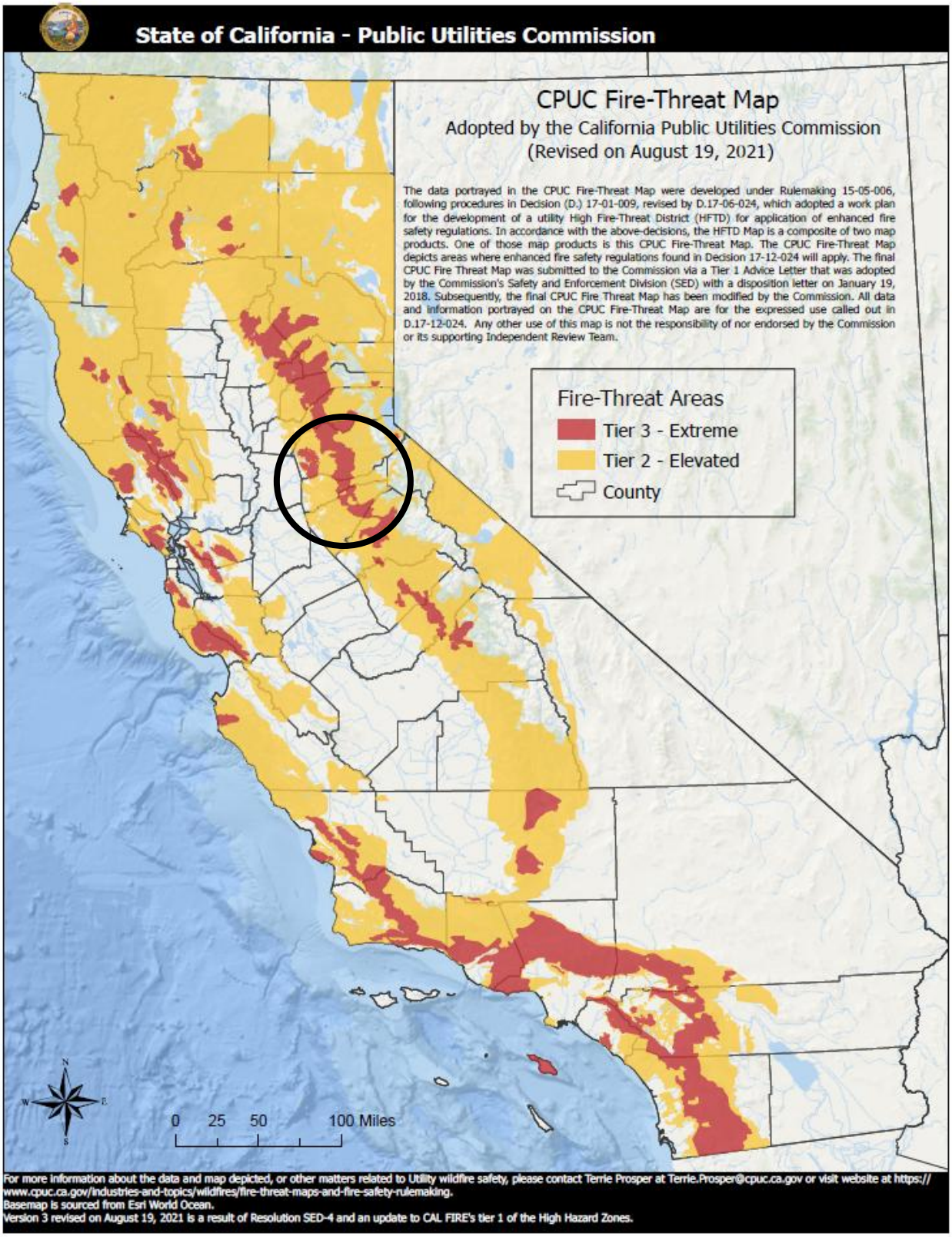
The Wildfire Safety Operations Center (WSOC) monitors fire danger conditions across PG&E's service area, including PSPS conditions. These factors include:

- A Red Flag Warning declared by the National Weather Service
- Low humidity levels generally 20% and below
- Forecasted sustained winds generally above 25 mph and wind gusts in excess of approximately 45 mph, depending on location and site-specific conditions such as temperature, terrain and local climate
- Condition of dry fuel on the ground and live vegetation (moisture content)

- On-the-ground, real time observations from PG&E's WSOC and field observations from PG&E crews

The most likely electric lines to be considered for shutting off for safety will be those that pass through areas that have been designated by the CPUC as at elevated (Tier 2) or extreme (Tier 3) risk for wildfire (seen on Figure 4-22). This includes both distribution and transmission lines. The specific area and number of affected customers will depend on forecasted weather conditions and which circuits PG&E needs to turn off for public safety. Although a customer may not live or work in a high fire-threat area, their power may also be shut off if their community relies upon a line that passes through an area experiencing extreme fire danger conditions. This means that any customer who receives electric service from PG&E should be prepared for a possible PSPS. PSPS events, while preventative in nature, can cause a variety of issues related to the lack of power to those impacted by the PSPS. For the Amador County Planning Area, a significant concern is the impact to their communication systems as well as on other critical infrastructure and services. PSPS events also cause concerns for certain vulnerable populations. As seen on Figure 4-22, Amador County has areas inside the Tier 2 and Tier 3 areas, as well as areas outside of them.

Figure 4-22 State of California Tier 2 and 3 Areas



PG&E noted that extreme weather threats can change quickly. When possible, PG&E will provide customers with advance notice prior to turning off the power, as well as updates until power is restored. Timing of notifications (when possible) are:

- Approximately 48 hours before power is turned off
- Approximately 24 hours before power is turned off
- Just before power is turned off
- During the public safety outage
- Once power has been restored

Power outages that affect Amador County residents do happen, though these outages are becoming less frequent and are not sustained as long as past years. This is due to PG&E's hardening and undergrounding projects along with its enhanced vegetation management practices. During these outages, PG&E provides contacts and tools to assist the residents and officials with current outage information for planning purposes. PG&E works with county officials to assist and help mitigate outages affecting the residents of Amador County.

Public Safety Power Shutoffs (PSPS) are another tool that PG&E uses to help eliminate and minimize ignitions caused by objects coming in contact with electrical circuits and causing fires. Severe weather, such as high winds, low humidity, and dry vegetation are some of the key elements to trigger a PSPS event in high fire threat areas (Tier 2 & Tier 3). By proactively shutting off power in areas that are very prone and susceptible to catastrophic wildfires, PG&E can help minimize the chance of a fire caused by electrical infrastructure. PG&E doesn't take lightly the shutting off power to residents, business, and critical customers and has a strict protocol for these actions.

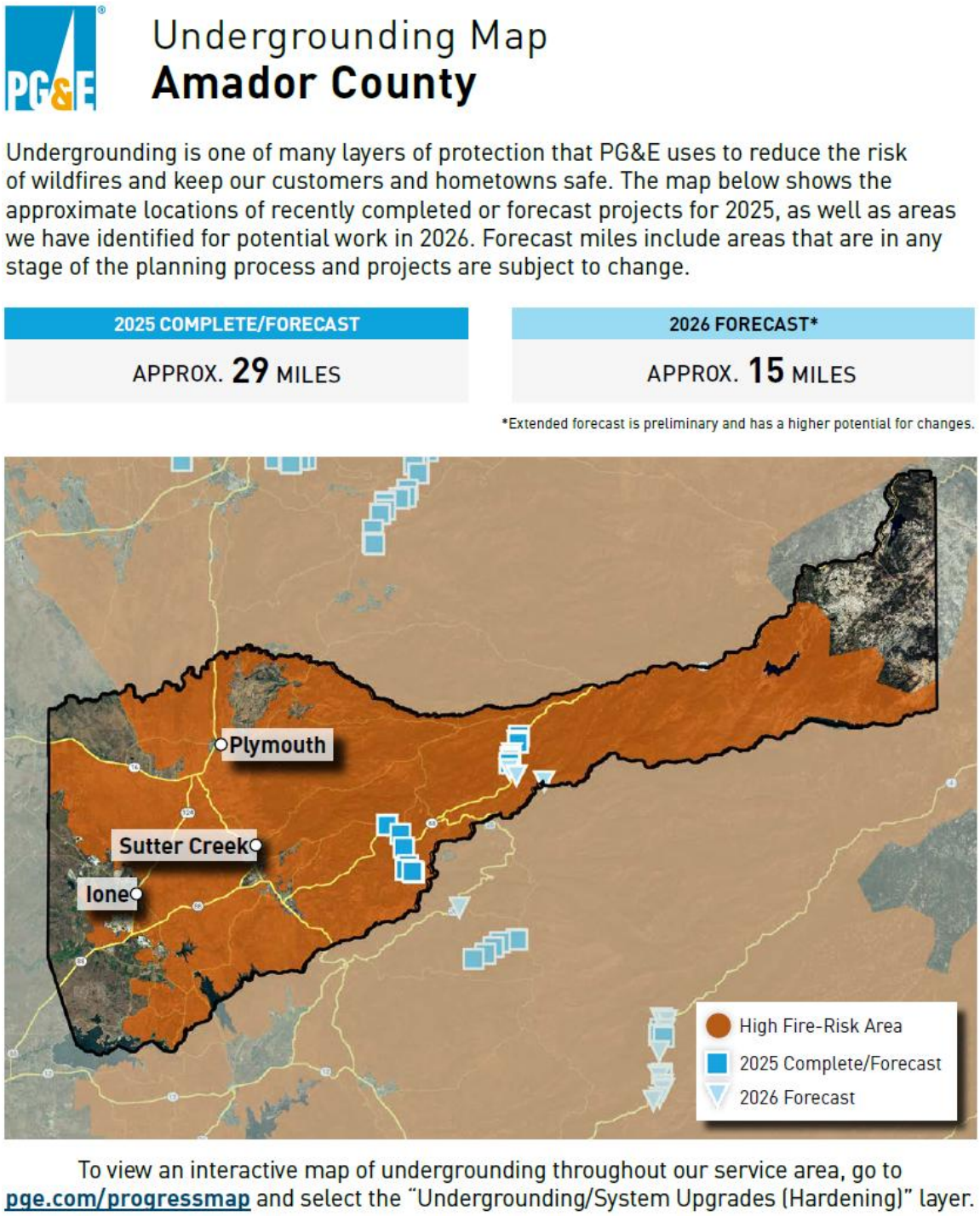
When a PSPS is forecasted, PG&E will notify County Emergency Management Agencies so they may monitor and make any plans they see needed. Customers affected will also get notified so they may also take steps to plan and make arrangements they deem necessary for the event. PG&E will support the customers with Community Resource Centers (CRC) near the affected areas of the PSPS and offer other programs to qualified customers. We will also work with the public safety agencies in the area to help mitigate any other issues related to the PSPS event. PG&E offers many tools to help assist the agencies in monitoring and planning for these events. The County noted that there have been events in the past where wildfires have not occurred, but wildfire conditions were high. During these times of high winds, high temps, and high wildfire risk, a PSPS occurred in the County. These events are discussed below and in each jurisdiction's respective annex to this Base Plan:

- Oct 9 – 12, 2019; 16,400 customers impacted.
- Oct 23 – 25, 2019; 10,400 customers impacted.
- Oct 26 - Nov 1, 2019; 18,800 customers impacted.

A search of the CPUC PSPS Dashboard showed no events since October of 2021. The HMPC noted no events between 2019 and 2021. It should be noted that "customers" in PG&E vernacular refer to both households or business addresses.

PG&E has started to underground more power lines to reduce wildfire risks. The most recent map for Amador County showing this progress is included in Figure 4-23.

Figure 4-23 Amador County – PG&E Undergrounding



Source: PG&E – January 2025.

It was also noted that PG&E is working to enhance its power network with Enhanced Powerline Safety Settings (EPSS) capable lines. EPSS are advanced safety settings. They allow PG&E powerlines to automatically turn off power within one-tenth of a second. This can happen when there is a hazard, like a tree branch falling into a powerline, which can cause a fire. These settings are in high fire-risk and surrounding areas. These have not yet been installed in and near the Amador County area, as PG&E focuses on other very high fire hazard areas in its service territory first. It is thought these EPSS capable lines will eventually come to the Amador County Planning Area.

Climate Change and Power Outages/Failures (Energy Shortage)

Changing climate is expected to bring more frequent and intense natural disasters. Key climate parameters are starting to move outside of historically observed variability at a rate that makes historical data a poor predictor of future climate. For example, the warmest years on record in California occurred in 2014, 2015, 2016, and 2019. 2023 was a remarkably hot year as well. In addition, the 2016-2017 year broke the record as the wettest ever recorded in the northern Sierra Nevada Mountains.

Changes in temperatures, precipitation patterns, extreme events, and sea level rise have the potential to decrease the efficiency of thermal power plants and substations, decrease the capacity of transmission lines, render hydropower less reliable, spur an increase in electricity demand, and put energy infrastructure at risk of flooding.

With climate warming, higher costs from increased demand for cooling in the summer are expected to outweigh the decreases in heating costs in the cooler seasons. Hotter temperatures in California will mean more energy (typically measured in "cooling-degree days") needed to cool homes and businesses both during heat waves and on a daily basis, during the daytime peak of the diurnal temperature cycle. During future heat waves, historically cooler coastal cities (e.g., San Francisco and Los Angeles) are projected to experience greater relative increases in temperature, such that areas that never before relied on air conditioning will experience new cooling demands.

Secondary impacts of energy shortages are most often felt by vulnerable populations. For example, those who rely on electric power for life-saving medical equipment, such as respirators, are extremely vulnerable to power outages. Also, during periods of extreme heat emergencies, the elderly and the very young are more vulnerable to the loss of cooling systems requiring power sources.

Additional impacts from a power disruption can also affect remote areas. This can affect evacuation messaging and coordination difficulties, and a reduction in firefighting capabilities due to lack of water access in more remote areas (especially for those on wells).

Hazard Profiles and Vulnerability Assessment by Hazard

The following sections provide the hazard profile and vulnerability assessments for each of the hazards identified in Section 4.1 Hazard Identification. ***The severe weather hazards are discussed first to paint the picture of the Amador County's Planning Area's climate and hazard environment which often lead to other hazards such as flood and wildfire. The remainder of the hazards follow alphabetically.***

Data Sources

In general, information provided by the County, participating jurisdictions, and the HMPC is integrated into this section with information from other data sources. The data sources listed below formed the basis for this Hazard Profiles portion of the plan. Where data and information from these studies, plans, reports, and other data sources were used, the source is referenced as appropriate throughout this risk assessment.

- 2014 California Natural Resources Report
- 2016 Amador County General Plan Conservation Element
- 2016 Amador County General Plan Safety Element
- 2017 California Adaptation Planning Guide
- 2020 Amador County LHMP Update
- 2020 US Census Bureau Average Household Size
- 2021 California Climate Adaptation Study
- 2023 Amador County Crop Report
- 2023 State of California Hazard Mitigation Plan
- 2024 Amador County Flood Insurance Study
- 2024 Amador County Parcel/Assessor Data
- Amador County Agricultural Commissioner
- Amador County Agricultural Commissioner Crop Reports (2020-2023)
- Amador County Archives
- Amador County Digital Flood Insurance Rate Map
- Amador County Emergency Operations Plan
- Amador County Fire Hazard Protection Plan Addendum, 2010
- Amador County Geographic Information Services
- Amador County Office of Emergency Management
- American Society of Civil Engineers
- Bureau of Land Management
- Cal Adapt – Extended Drought Scenarios
- CAL FIRE
- CAL FIRE (FHSZ SRA 2024, FHSZ FRA 2007)
- CAL FIRE (LRA 2025)
- Cal-Adapt
- Cal-Adapt – Number of Extreme Heat Days by Year
- Cal-Adapt – Precipitation: Decadal Averages Map
- Cal-Adapt – Temperature: Decadal Averages Map
- Cal-Adapt 2017/2023
- Cal-Adapt Climate Projections
- California Climate Adaptation Strategy
- California Department of Conservation's Farmland Mapping and Monitoring Program
- California Department of Public Health
- California Department of Water Resources
- California Department of Water Resources 2012-2016 California Drought: Historical Perspective
- California Department of Water Resources Best Available Maps
- California Department of Water Resources Division of Safety of Dams
- California Division of Mines and Geology

- California Geological Survey
- California Invasive Plant Council
- California Natural Resource Agency
- California Office of Emergency Services
- California Public Utilities Commission
- California's Adaptation Planning Guide: Understanding Regional Characteristics
- Center for Western Weather and Water Extremes
- Climate Change and Health Profile Report – Amador County
- Design-Magnitude Avalanche Mapping and Mitigation Analyses
- DSOD/Cal OES/NID Dam Status 1/25
- Federal Emergency Management Agency – DFIRM 1/20/2016
- Federal Emergency Management Agency – Disaster Declaration Database
- Federal Emergency Management Agency – National Flood Hazard Layer
- Federal Emergency Management Agency – Wind Zones in the United States
- Federal Emergency Management Agency: Building Performance Assessment: Oklahoma and Kansas Tornadoes
- Fire and Resource Assessment Program
- Foxweather.com
- Geology Open File Report 84-52 (1994)
- Hazus-MH 6.1
- Intergovernmental Panel on Climate Change
- Jackson Valley Irrigation District
- Multi-Hazard Identification and Risk Assessment, FEMA 1997
- National Aeronautics and Space Administration
- National Avalanche Center
- National Center for Atmospheric Research
- National Climate Assessment
- National Climatic Data Center Storm Events Database.
- National Drought Mitigation Center
- National Earthquake Information Center
- National Flood Insurance Program
- National Integrated Drought Information System
- National Inventory of Dams
- National Oceanic and Atmospheric Administration
- National Oceanic and Atmospheric Administration Storm Prediction Center
- National Oceanic and Atmospheric Administration's National Climatic Data Center
- National Park Service
- National Performance of Dams Program
- National Weather Service
- National Weather Service HeatRisk
- National Weather Service XMAC site
- Public Policy Institute of California
- Sierra Avalanche Center
- Smoke Impacts CA: 2020 Lessons – 2021 Actions
- State of California Department of Conservation Farmland Mapping and Monitoring Program
- Susceptibility to Deep-Seated Landslides map – CSG Map Sheet 58 (05/2011)

- UC Davis Health (Phillips MC, LaRocque RC, Thompson GR. Infectious Diseases in a Changing Climate. *JAMA.* 2024;331(15):1318–1319. doi:10.1001/jama.2023.27724)
- University of California, Berkeley's Department of Environmental Science, Policy, and Management
- US Army Corps of Engineers
- US Department of Agriculture
- US Department of Agriculture – Farm Service Agency Secretarial Disasters Declarations
- US Drought Monitor
- US Farm Service Agency
- US Fish and Wildlife Service
- US Forest Service
- US Geological Survey Earthquake Intensity Zonation and Quaternary Deposits, Miscellaneous Field Studies Map 9093, 1977
- US Geological Survey Emergency Assessment of Post-Fire Debris Flow Hazards
- US Geological Survey National Earthquake Information Center
- US Geological Survey Open File Report 2015-3009
- Vaisala National Lightning Detection Network
- Western Regional Climate Center

4.3.1. Severe Weather: General

Severe weather is generally any destructive weather event, but usually occurs throughout the Amador County Planning Area as temperature extremes, localized storms that bring heavy rain and strong winds, and other extreme weather events.

The National Oceanic and Atmospheric Administration's (NOAA's) National Climatic Data Center (NCDC) has been tracking severe weather since 1950. Their Storm Events Database contains data on the following: all weather events from 1993 to current (except from 6/1993-7/1993); and additional data from the Storm Prediction Center, which includes tornadoes (1950-1992), thunderstorm winds (1955-1992), and hail (1955-1992). This database contains 1,145 severe weather events that occurred in Amador County between January 1, 1950, and July 31, 2024. Table 4-22 summarizes these events.

Table 4-22 NCDC Severe Weather Events for Amador County 1950-7/31/2024*

Event Type	Number of Events	Deaths	Deaths (indirect)	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Avalanche	5	2	0	3	0	$0	$0
Blizzard	5	0	0	0	0	$0	$0
Cold/Wind Chill	41	0	0	0	0	$0	$0
Debris Flows	1	0	0	0	0	$100,000	$0
Dense Fog	18	9	9	44	19	$3,210,000	$0
Dense Smoke	2	0	0	0	0	$0	$0
Drought	158	0	0	0	0	$0	$1,500,000,000
Excessive Heat	43	12	2	2	0	$0	$0

Event Type	Number of Events	Deaths	Deaths (indirect)	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Extreme Cold/Wind Chill	3	0	0	0	0	$0	$0
Flash Flood	3	0	0	0	0	$0	$0
Flood	40	3	0	0	0	$4,450,000	$7,800,000
Frost/Freeze	17	0	0	0	0	$700,000	$25,000,000
Funnel Cloud	3	0	0	0	0	$0	$0
Hail	2	0	0	0	0	$0	$0
Heat	81	2	3	18	3	$0	$0
Heavy Rain	6	0	0	0	0	$0	$0
Heavy Snow	131	3	3	2	1	$1,225,000	$0
High Wind	91	3	0	6	0	$17,276,000	$48,000
Strong Wind	66	6	1	4	3	$6,219,100	$0
Thunderstorm Wind	3	0	0	0	0	$3,000	$0
Wildfire	48	5	0	32	32	$1,225,000	$0
Winter Storm	272	1	1	3	1	$191,000	$0
Winter Weather	106	1	3	0	2	$100	$0
Total	**1145**	**47**	**22**	**114**	**61**	**$34,599,200**	**$1,532,848,000**

Source: NCDC

*Note: Losses reflect totals for all impacted areas, some of which fell outside of Amador County

The NCDC table above summarizes severe weather events that occurred in Amador County. Only a few of the events actually resulted in federal and state disaster declarations. It is further interesting to note that different data sources capture different events during the same time period, and often display different information specific to the same events. While the HMPC recognizes these inconsistencies, they see the value this data provides in depicting the County's "big picture" hazard environment.

As previously mentioned, most all of Amador County's federal and state disaster declarations have been a result of severe weather. For this Plan Update, severe weather is discussed in the following subsections:

- Severe Weather: Extreme Cold, Freeze, and Snow
- Extreme Heat
- Heavy Rains and Storms
- High Winds and Tornadoes

Due to size of the County and changes in elevation (i.e., from approximately 250 feet to almost 10,000 feet above mean sea level (msl)) and climate, weather conditions can vary greatly across the County. For purposes of this Plan, the County will be divided into two distinct sections, as applicable: western Amador County, which is predominantly below an elevation of 2,000 feet above msl, is generally below the snowfall line, and includes the land to the west (including all incorporated communities); and eastern Amador County, which is generally above 2,000 feet above msl, and receives snowfall. The profiles that follow provide information, where possible, from two weather stations located in these two different parts of the

County: Sutter Hill Ranger Station (elevation: 1,580 feet above msl) in west Amador County and Twin Lakes Weather Station (elevation: 7,840 feet above msl), in eastern Amador County.

4.3.2. Severe Weather: Extreme Cold, Freeze, and Snow

Hazard Profile

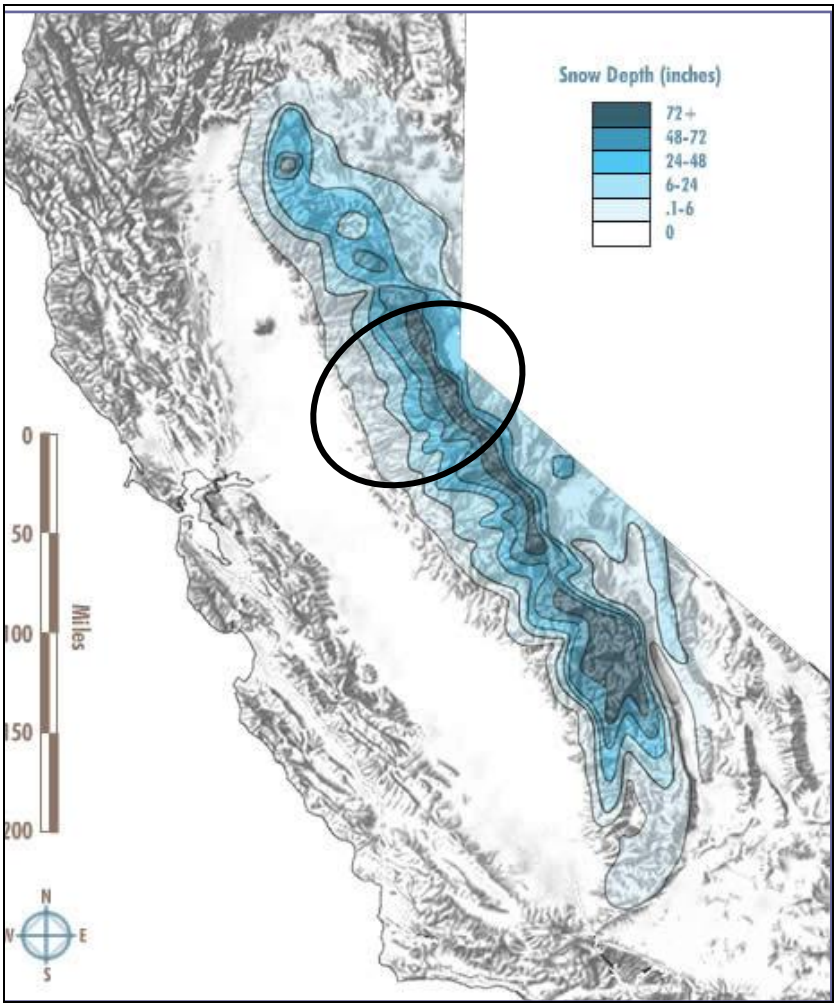
This hazard profile contains multiple sections that detail how this hazard can affect the Amador County Planning Area and unincorporated Amador County. These sections include a hazard/problem description; description of location and extent; past occurrences of this hazard; likelihood of future occurrences; and how climate change can affect or influence this hazard.

Hazard/Problem Description

According to the National Weather Service (NWS) and the Western Regional Climate Center (WRCC), extreme cold often accompanies a winter storm (and snow event) or is left in its wake. Prolonged exposure to cold can cause frostbite or hypothermia and can be 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. Freezing temperatures can cause significant damage to the agricultural industry. The effects of freezing temperatures on agriculture in Amador County are discussed further in Section 4.3.6 Agricultural Hazards.

Snowfall in the Sierras increases with elevation. The lower foothills rarely receive any measurable snow. Middle elevations receive a mix of snow and rain during the winter. Above about 6,000 ft., the majority of precipitation falls as snow. It is not unusual, in some locations, to have ten feet of snow on the ground for extended periods. Figure 4-24 shows the average maximum measured snow depth in the Sierra Nevada for the month of March (the month of greatest average snow depths).

Figure 4-24 Average Maximum Snow Depths of Sierra Nevada Mountains in March



Source: http://www.sierranevadaphotos.com. This image is no longer available publicly. It was retrieved for the 2015 and 2020 Amador County LHMPs.

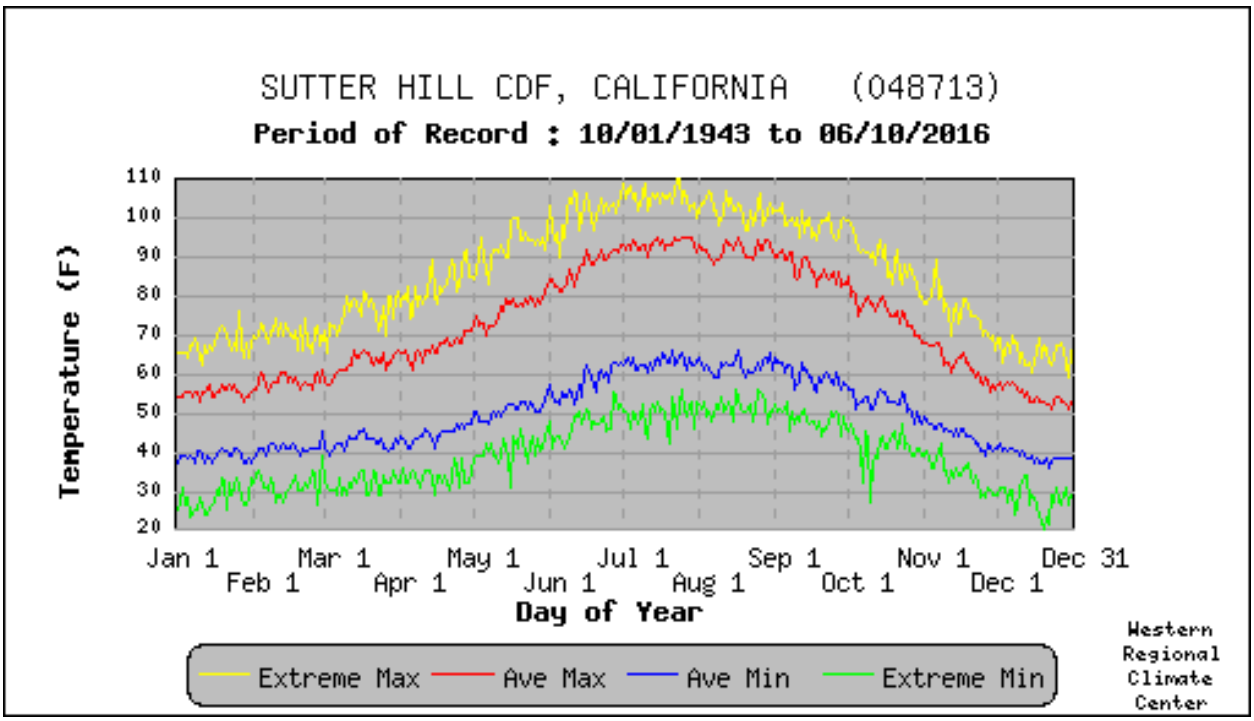
As discussed in Section 4.3.1 above, due to size of the County and changes in elevation and climate, weather conditions can vary greatly across the County. The profiles that follow provide information, where possible, from two weather stations located in these two different parts of the County: Sutter Hill Ranger Station (elevation: 1,580 feet above msl) in western Amador County and Twin Lakes Weather Station (elevation: 7,840 feet above msl), in eastern Amador County.

In addition to this difference in elevation in the County, it should be noted that the WRCC and NWS maintain data on weather normal and extremes in the western United States. Each of these data sources maintain data in slightly different ways. Data from the WRCC stopped being collected in April of 2016. NWS covers the entire time period to present. Therefore, both data sets are shown below. WRCC and NWS data for both the western and eastern County is summarized below.

Western Amador County—Sutter Hill Ranger Station Weather Station (WRCC), Period of Record 1943 to 2016

According to the WRCC, in western Amador County monthly average minimum temperatures from November through April range from the upper-30s to mid-50s. The lowest recorded daily extreme was 20°F on December 20, 1998. In a typical year, minimum temperatures fall below 32°F on 5.2 days with no days falling below 0°F. Table 4-23 shows the record low temperatures by month for western Amador County. Average daily temperatures for western Amador County are shown in Figure 4-25.

Figure 4-25 Western Amador County – Sutter Hill Ranger Station (WRCC) Daily Temperature Averages and Extremes 1943 to 2016



Source: Western Regional Climate Center. Retrieved 3/10/2025.

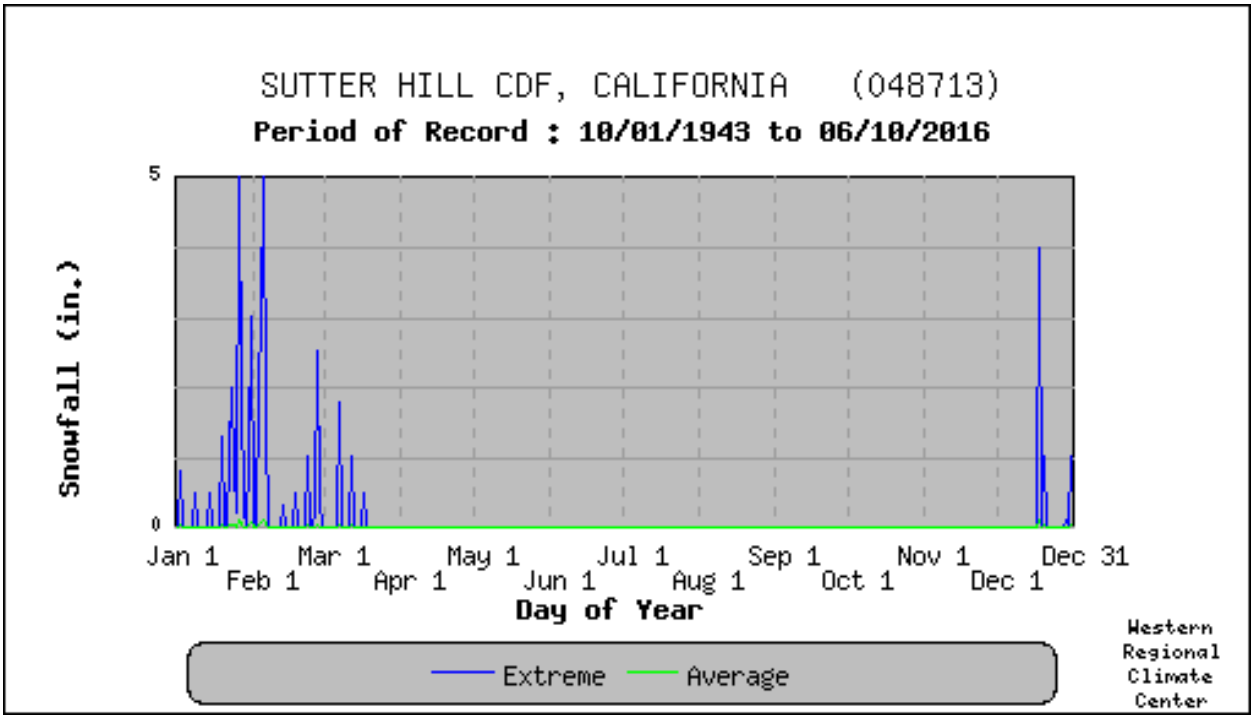
Table 4-23 Western Amador County – Sutter Hill Ranger Station (WRCC) Record Low Temperatures 1943 to 2016

Month	Record Low	Date	Month	Record Low	Date
January	23°	1/6/2007	July	42°	7/16/1999
February	26°	2/27/2011	August	47°	8/2/2010
March	28°	3/5/2009	September	44°	9/20/2004
April	29°	4/15/2009	October	32°	10/7/2011
May	31°	5/16/1999	November	28°	11/26/2006
June	41°	6/02/1999	December	20°	12/20/1998

Source: Western Regional Climate Center

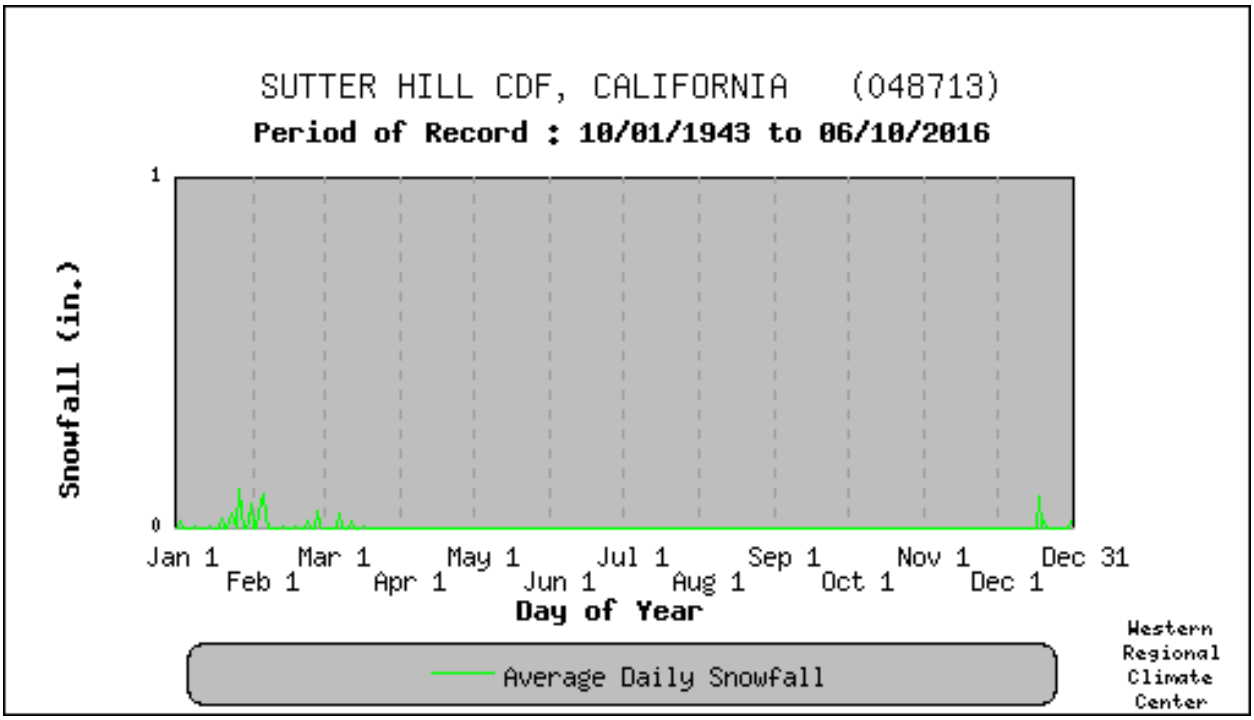
According to the WRCC, average snowfall on the western side of the County is 1.42 inches, as shown in Figure 4-26. The highest annual snowfall fell in 1967, when 9.0 inches fell. Highest monthly snowfall accumulation came in February of 1948, when 6.5 inches fell. Average snow depths in January through March are minimal. This can be seen in Figure 4-27.

Figure 4-26 Western Amador County – Sutter Hill Ranger Station (WRCC) Snowfall Averages and Extremes 1943 to 2016



Source: Western Regional Climate Center. Retrieved 3/10/2025.

Figure 4-27 Western Amador County – Sutter Hill Ranger Station (WRCC) Snow Depth Averages and Extremes 1943 to 2016



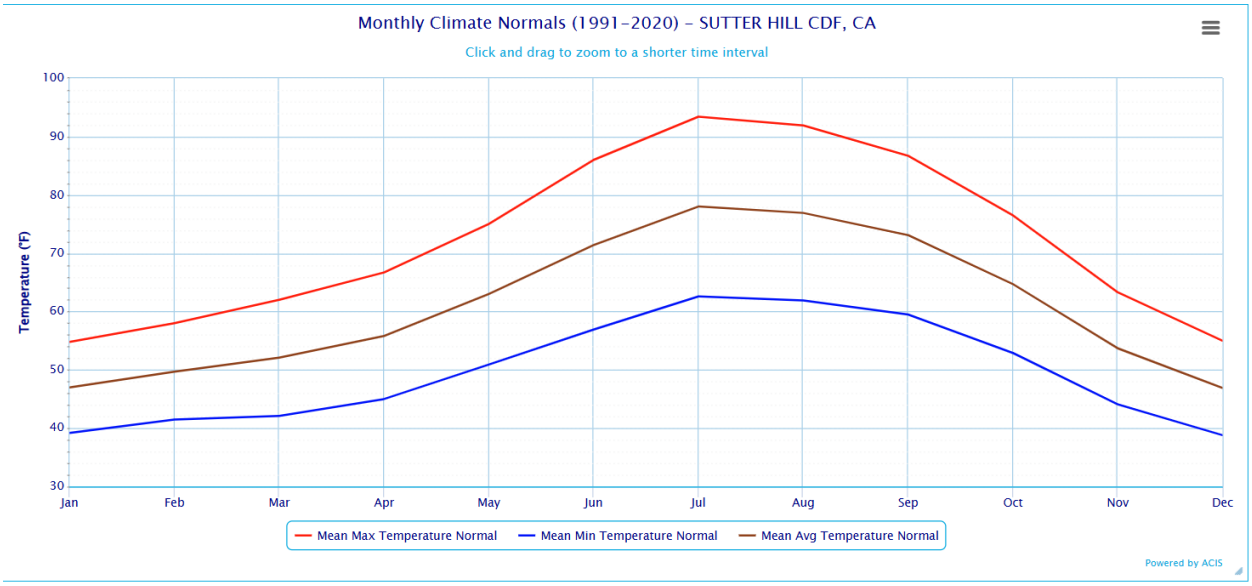
Source: Western Regional Climate Center. Retrieved 3/10/2025.

Western Amador County—Sutter Hill Ranger Station Weather Station (NWS), Period of Record 1943 to 2025

Note: While the overall period of record for this NWS station is 1943 to 2025, not all data is recorded for those dates. Snowfall is covered from 1943 to November 2024. Snow depth is covered from January 1947 to November 2024. Extreme temperatures are covered from December 1968 to February 2025.

According to the NWS, monthly average minimum temperatures in the coldest months (December through February) range from the mid-40s to mid-50s. The lowest recorded daily extreme was 20°F on December 20, 1998. Figure 4-28 shows the average daily low temperatures and extremes for the County. Table 4-24 shows the record low temperatures for the County.

Figure 4-28 Western Amador County – Sutter Hill Ranger Station (NWS) Daily Temperature Averages and Extremes, 1991-2020



Month	Mean Max Temperature Normal (°F)	Mean Min Temperature Normal (°F)	Mean Avg Temperature Normal (°F)
January	54.8	39.2	47.0
February	58.0	41.5	49.7
March	62.0	42.1	52.1
April	66.7	45.0	55.8
May	75.0	50.9	63.0
June	86.0	56.9	71.4
July	93.4	62.6	78.0
August	91.9	61.9	76.9
September	86.7	59.5	73.1
October	76.5	52.9	64.7
November	63.3	44.1	53.7
December	55.0	38.8	46.9
Annual	72.4	49.6	61.0

Source: National Weather Service XMAC site. Retrieved 3/12/2025

Table 4-24 Western Amador County – Sutter Hill Ranger Station (NWS) Record Low Temperatures 1968 to 2025

Temperature	Date
20.0°	12/20/1998
21.0°	12/22/1998
22.0°	12/19/2006
23.0°	12/20/2008
23.0°	1/6/2007
23.0°	12/18/2006
23.0°	12/21/1968
24.0°	3/2/2023
24.0°	2/25/2023

Temperature	Date
24.0°	12/8/2009

Source: National Weather Service XMAC site. Retrieved 3/12/2025

Table 4-25 shows historical data of the highest daily snowfall on January 26, 1957, when 5.0 inches fell. The maximum snow depth came on the same day, with a depth of 4.0 inches. This can be seen in Table 4-26. There was no available data for monthly average snowfall.

Table 4-25 Western Amador County –Sutter Hill Ranger Station (NWS) Highest Daily Snowfall 1943 to 2025

Snowfall in Inches	Date
5.0	1/26/1957
5.0	2/5/1948
4.0	12/18/1967
3.0	1/31/1968
3.0	2/4/21946
2.5	2/27/1951
2.0	1/27/1968
2.0	2/3/1949
2.0	1/23/1949
1.8	3/7/1952

Source: National Weather Service XMAC site. Retrieved 3/12/2025

Table 4-26 Western Amador County – Sutter Hill Ranger Station (NWS) Maximum Snow Depth 1947 to 2025

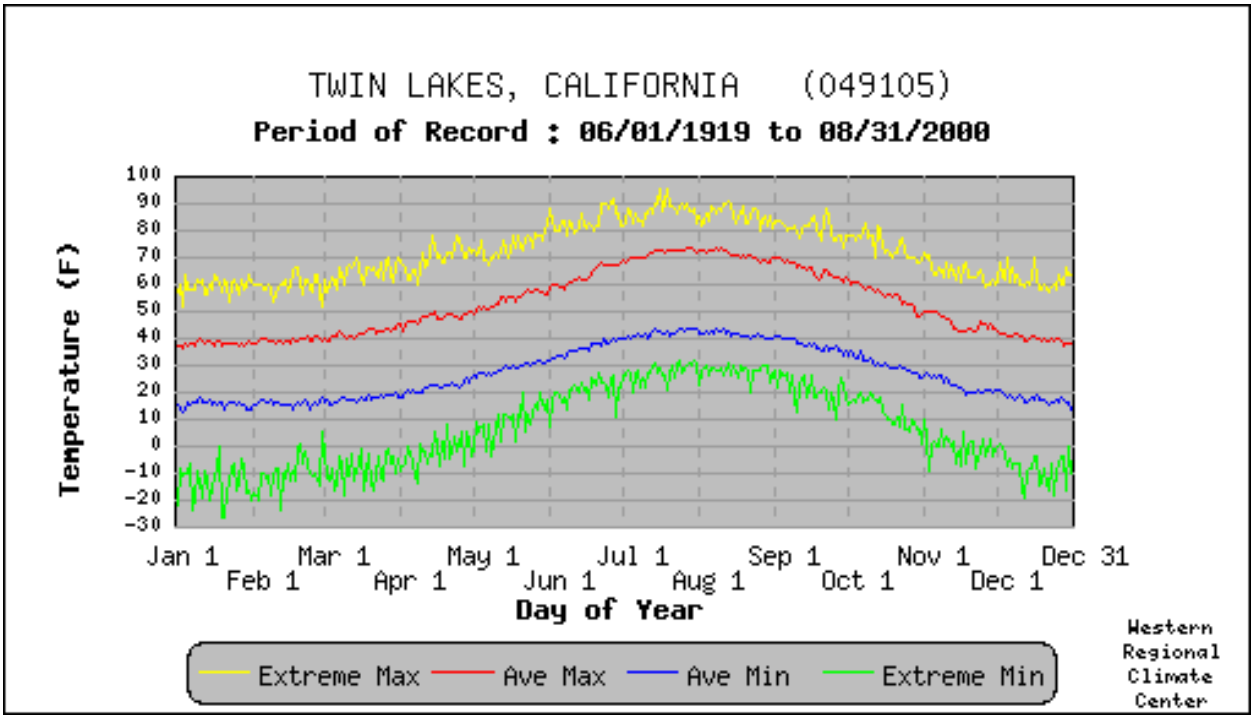
Snow Depth in Inches	Date
4.0	1/26/1957
4.0	1/24/1949
4.0	2/6/1948
4.0	2/5/1948
3.0	1/23/1949
2.0	12/18/1967
2.0	1/27/1957
2.0	3/7/1952
2.0	2/3/1949
2.0	1/28/1947

Source: National Weather Service XMAC site. Retrieved 3/12/2025

Eastern Amador County—Twin Lakes Weather Station (WRCC), Period of Record 1919 to 2000

According to the WRCC, in eastern Amador County monthly average minimum temperatures from November through April range from the mid-10s to mid-20s. The lowest recorded daily extreme was -26°F on January 19, 1937. In a typical year, minimum temperatures fall below 32°F on 231.4 days with 8.5 days falling below 0°F. Table 4-27 shows the record low temperatures by month for eastern Amador County. Average daily temperatures for eastern Amador County are shown in Figure 4-29.

Figure 4-29 Eastern Amador County— Twin Lakes (WRCC) Daily Temperature Averages and Extremes 1919 to 2000



Source: Western Regional Climate Center. Retrieved 3/11/2025.

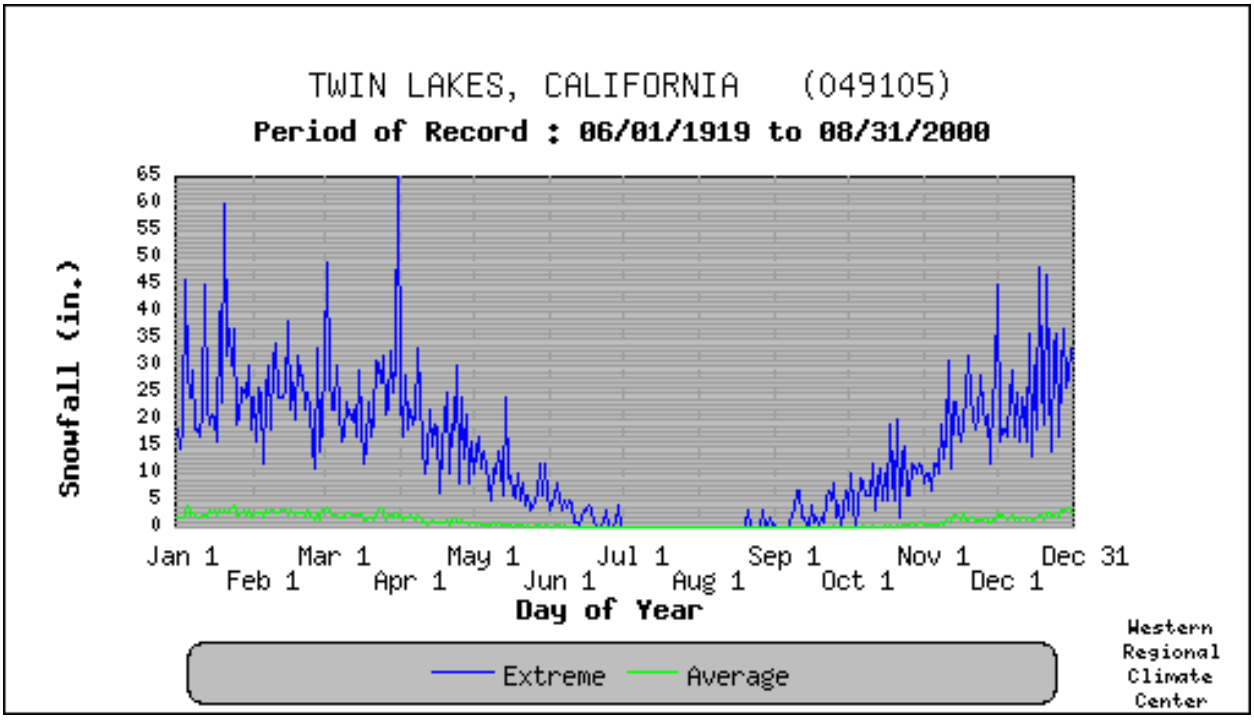
Table 4-27 Eastern Amador County – Twin Lakes (WRCC) Record Low Temperatures 1919 to 2000

Month	Record Low	Date	Month	Record Low	Date
January	-26°	1/19/1937	July	19°	7/1/1997
February	-24°	2/12/1949	August	20°	8/22/1947
March	-18°	3/9/1935	September	7°	9/25/1934
April	-14°	4/8/1929	October	1°	10/31/1935
May	-4°	5/8/1933	November	-9°	11/3/1935
June	7°	6/1/1929	December	-19°	12/12/1932

Source: Western Regional Climate Center

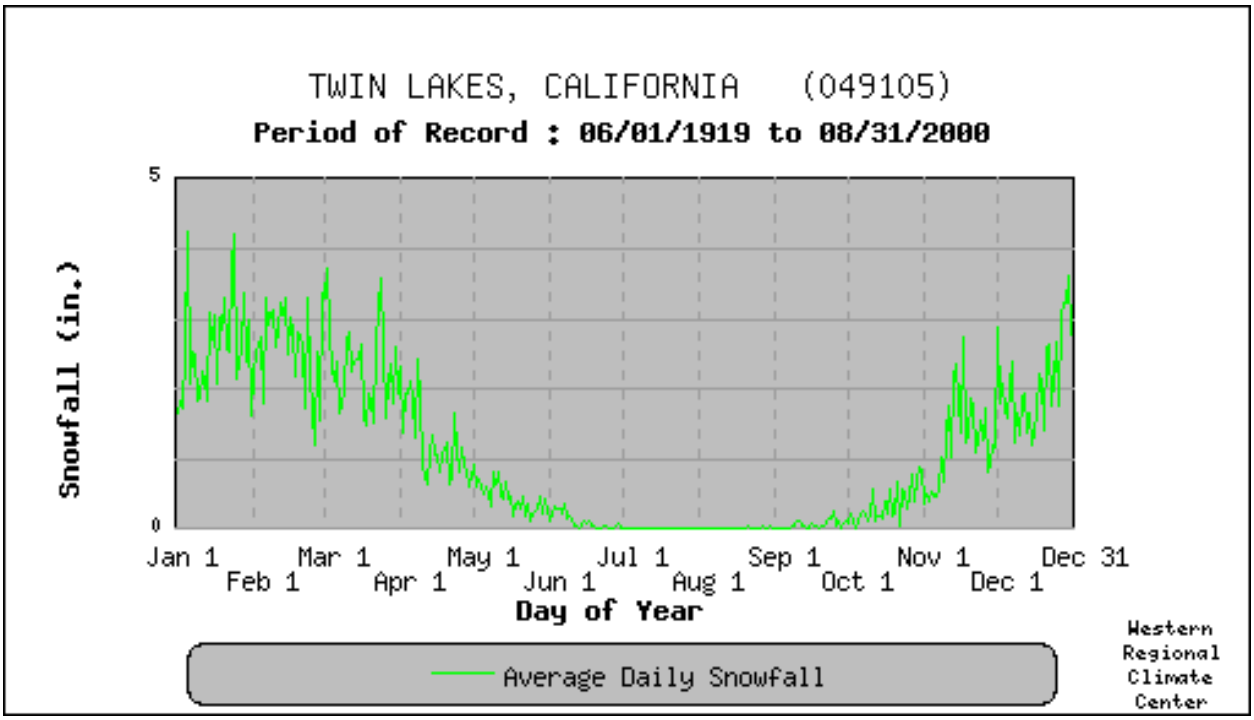
According to the WRCC, average snowfall on the eastern side of the County is 380.2 inches, as shown in Figure 4-26. The highest annual snowfall fell in 1982, when 693.4 inches fell. Highest monthly snowfall accumulation came in February of 1920, when 266.0 inches fell. Average snow depths in January through March vary from 48 to 76 inches. This can be seen in Figure 4-27.

Figure 4-30 Eastern Amador County – Twin Lakes (WRCC) Snowfall Averages and Extremes 1919 to 2000



Source: Western Regional Climate Center. Retrieved 3/11/2025.

Figure 4-31 Eastern Amador County – Twin Lakes (WRCC) Snow Depth Averages and Extremes 1919 to 2000



Source: Western Regional Climate Center. Retrieved 3/11/2025.

Eastern Amador County—NWS Twin Lakes Weather Station, Period of Record 1919 to 2000

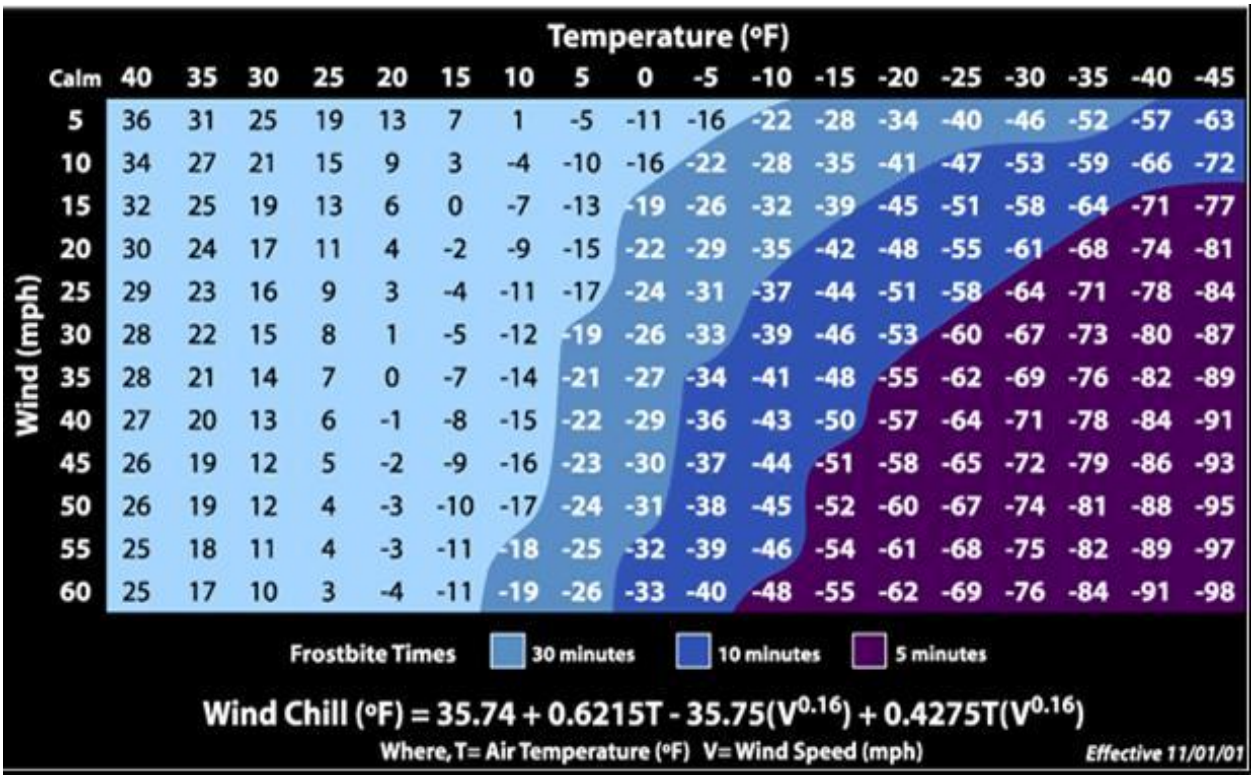
While the western Amador County weather station presented data using graphs, no graphing data was available for the Twin Lakes Weather station.

Location and Extent

Extreme cold and freeze events occur on a regional basis. Extreme cold can occur in any location of the County. All portions of the County are at risk to extreme cold, with the upper elevations of the County at greater risk.

In 2001, the NWS implemented an updated Wind Chill Temperature index (shown in Figure 4-32), which is reproduced below. This index was developed 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.

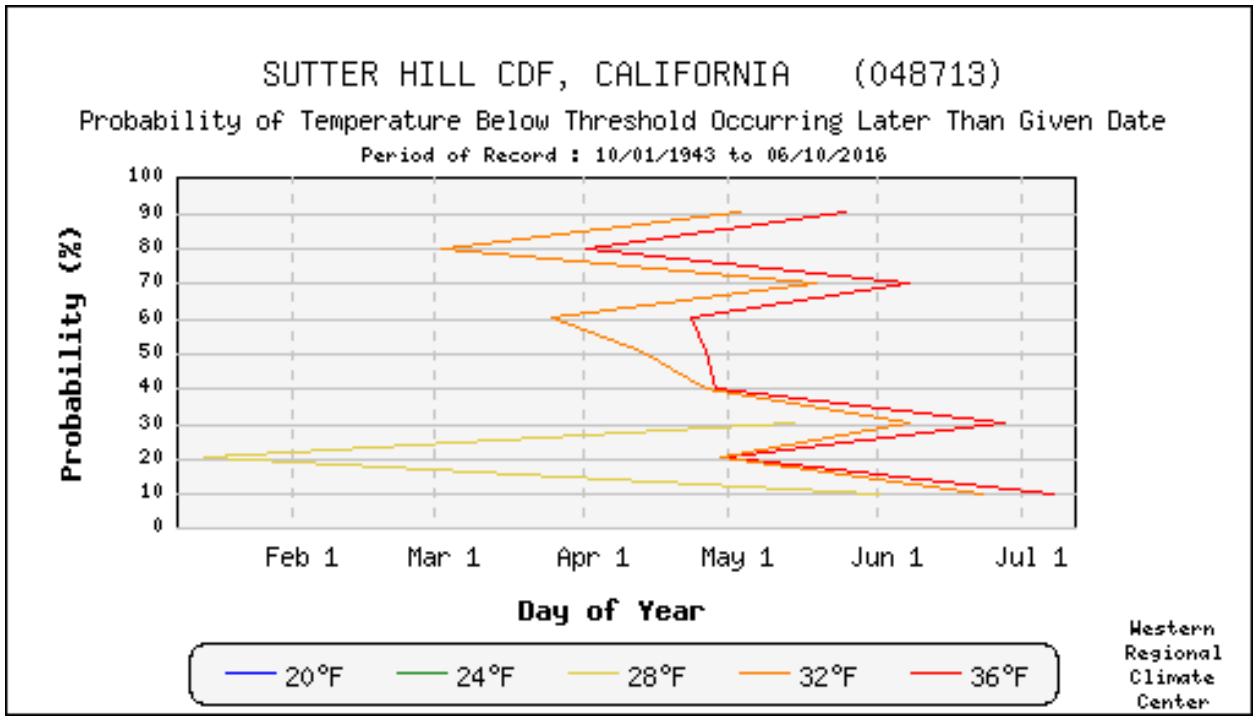
Figure 4-32 Wind Chill Temperature Chart



Source: National Weather Service

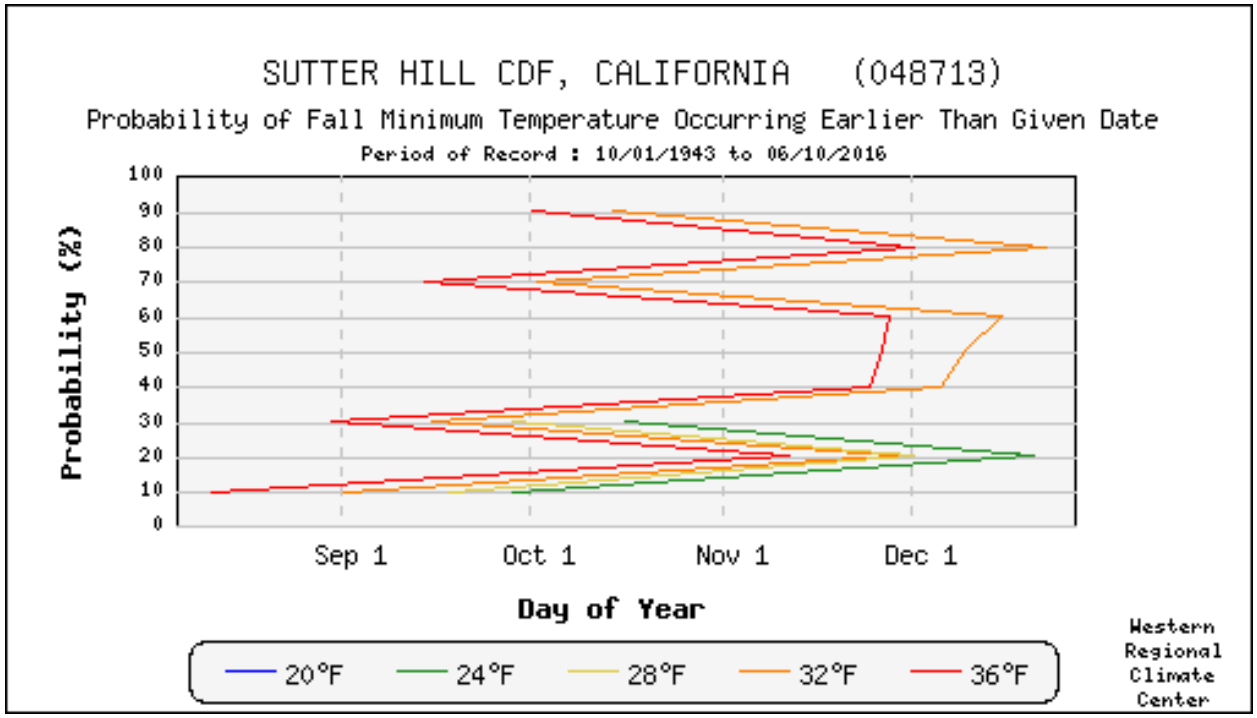
Extreme cold can affect agricultural products in the County. Freeze damages reduce the values of agricultural crops (discussed further in Section 4.3.6). While there is no scale (i.e. Richter, Enhanced Fujita) to measure the effects of freeze, temperature data from the County from the WRCC indicates that there are 25.1 days that fall below 32°F. ***Note***: there are no National Weather Service XMAC freeze probabilities, so only the WRCC is captured below. Freeze has a slow onset and can be generally be predicted in advance for the County. Freeze events can last for hours (in a cold overnight), or for days to weeks at a time. Figure 4-33 and Figure 4-34 show the probabilities in the western County of freeze for both spring and fall. There has not been a past occurrence of freeze in the months of May through September.

Figure 4-33 Western Amador County – Sutter Hill Ranger Station (WRCC) Spring Freeze Probabilities 1943 to 2016



Source: Western Regional Climate Center. Retrieved 3/11/2025.

Figure 4-34 Western Amador County – Sutter Hill Ranger Station (WRCC) Fall Freeze Probabilities 1943 to 2016

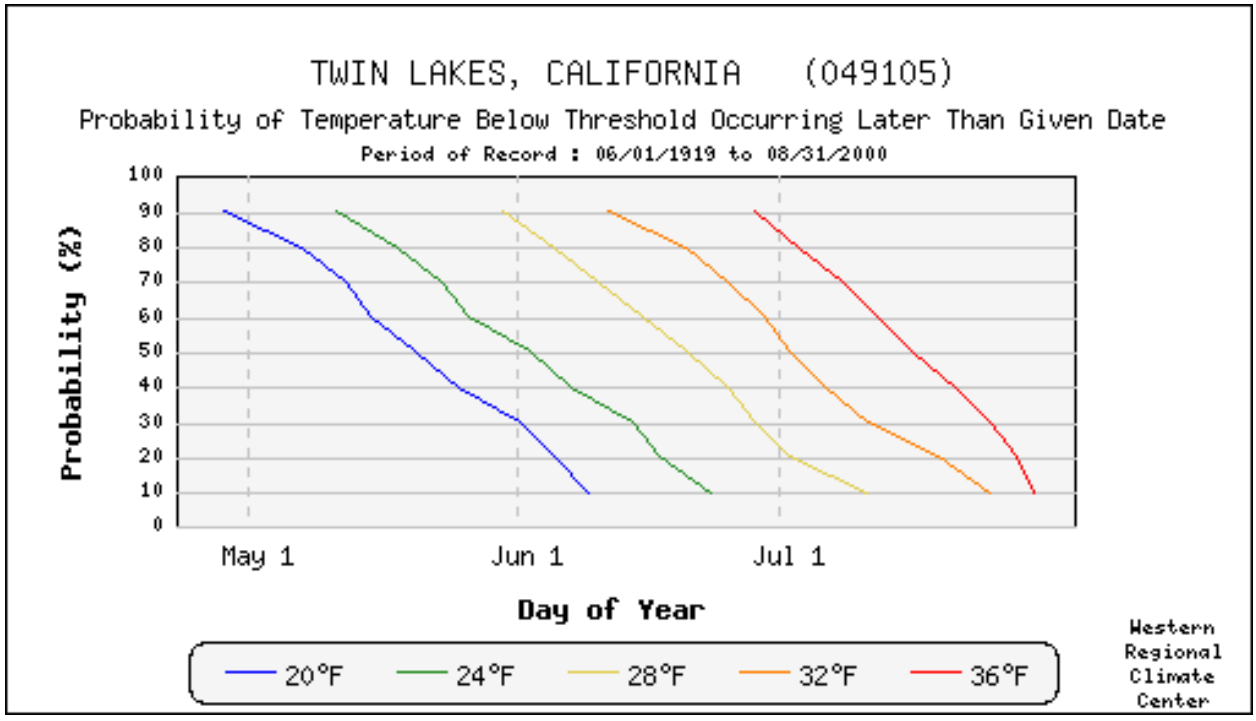


Source: Western Regional Climate Center. Retrieved 3/11/2025.

Figure 4-35 and Figure 4-36 show the probabilities in the eastern County of freeze for both spring and fall. There have been multiple past occurrences of freeze in the months of May through September. Average number of days below 32° by month are:

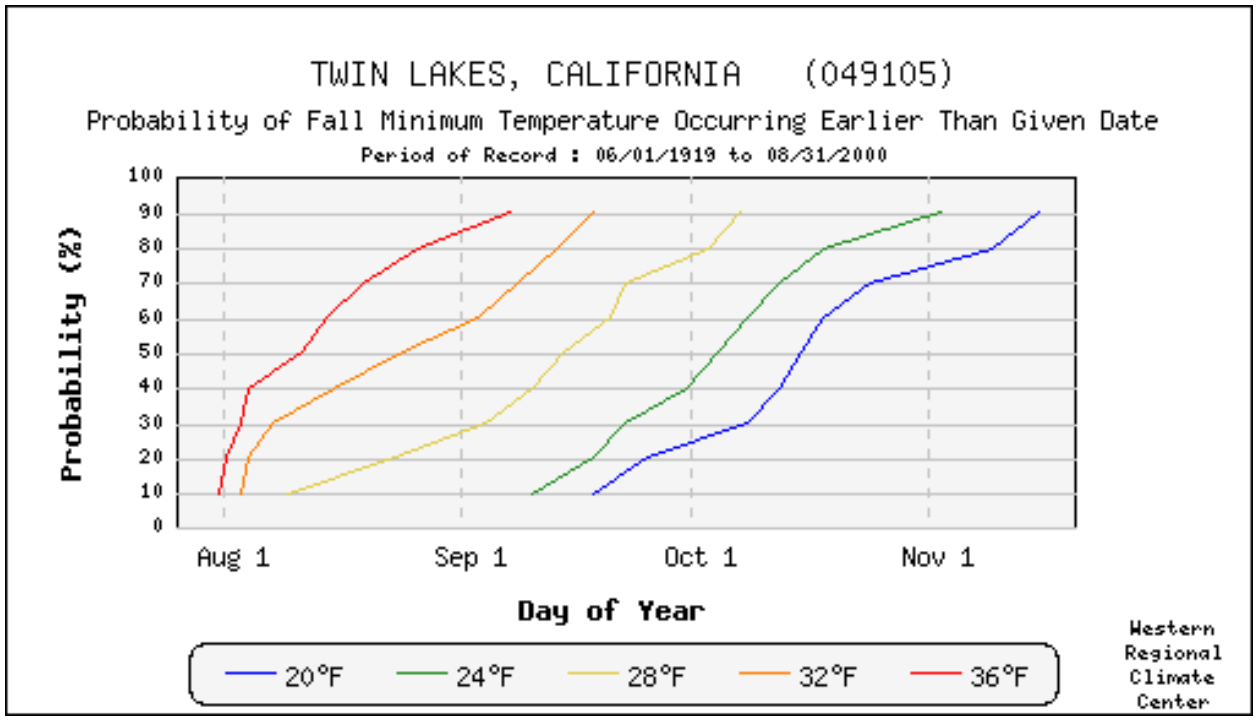
- May – 20.9 days
- June – 9.2 days
- July – 1.8 days
- August – 2.2 Days
- September – 6.5 days

Figure 4-35 Eastern Amador County – Twin Lakes (WRCC) Spring Freeze Probabilities 1919 to 2000



Source: Western Regional Climate Center. Retrieved 3/11/2025.

Figure 4-36 Eastern Amador County – Twin Lakes (WRCC) Fall Freeze Probabilities 1919 to 2000



Source: Western Regional Climate Center. Retrieved 3/11/2025.

Past Occurrences

Disaster Declaration History

The County has had no past federal and one past state disaster declaration for extreme cold and freeze. Table 4-28 shows the dates of the disaster declarations. More information on USDA disaster declarations (twice in 2022) from cold and freeze can be found in Table 4-48 in the Past Occurrences in Section 4.3.6.

Table 4-28 Amador County – Federal and State Disaster Declarations for Freeze 1950-2025

Disaster Type	State Declarations		Federal Declarations	
	Count	Years	Count	Years
Freeze	1	2007	0	

Source: Cal OES, FEMA

NCDC Events

The NCDC data shows 575 extreme cold, freeze, and snow incidents for Amador County since 1993. Information for these events is shown in Table 4-29.

*Table 4-29 NCDC Cold and Freeze Events for Amador County 1950-7/31/2024**

Event Type	Number of Events	Deaths	Deaths (indirect)	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Blizzard	5	0	0	0	0	$0	$0
Cold/Wind Chill	41	0	0	0	0	$0	$0
Extreme Cold/Wind Chill	3	0	0	0	0	$0	$0
Frost/Freeze	17	0	0	0	0	$700,000	$25,000,000
Heavy Snow	131	3	3	2	1	$1,225,000	$0
Winter Storm	272	1	1	3	1	$191,000	$0
Winter Weather	106	1	3	0	2	$100	$0
Total	**575**	**5**	**7**	**5**	**4**	**$2,116,100**	**$25,000,000**

Source: NCDC

*Note: Losses reflect totals for all impacted areas, some of which fell outside of Amador County

Hazard Mitigation Planning Committee Events

The HMPC noted that the heavy levels of snow in eastern Amador County combined with other inclement weather in the western portion of Amador County create many issues that impact the area. Extreme weather events associated with snow and blizzard events include those listed in previous tables and occur almost on an annual basis. Winter storms occur countywide and involve heavy rains, snow, ice, and high winds causing downed trees and power lines, power outages, accidents, and road closures. There are typically few injuries and limited damages. Most problems arise from snow packed roads, as well as downed trees and power lines. There have been instances where the Amador County Road Department crews have plowed non-stop for 72+ hours.

Specific events include the following:

In February of 2019, snowstorms occurred near Pioneer in Amador County. An elderly woman was trapped in her house without electricity. Amador County Sherriff's Deputies dug through knee high snow in order to remove the wheelchair bound woman from her home.

2023 - a hard freeze occurred in 2023, affected the Shenandoah area.

March 2023 Snow Deluge: The 2023 water year was marked by an extraordinary snow season across California, driven by cold temperatures and frequent atmospheric rivers. While specific snowfall totals for Amador County are not detailed, the Sierra Nevada, including areas near Amador, saw snowpack levels at 186–269% of normal.

In late February to early March 2024, large winter weather events occurred, but the County had prepared well for the incidents.

April 4, 2024, a cold spring storm prompted the Amador County Unified School District to close schools due to expected snowfall and hazardous road conditions. While exact snowfall amounts are not specified,

this event indicated measurable snow accumulation, likely in the range of a few inches to a foot in higher elevations like Pioneer.

Amador County Public Works noted no other incidents since 2020 where damages, injuries, or deaths occurred.

Likelihood of Future Occurrence

Highly Likely—Extreme cold, freeze, and snow are likely to continue to occur annually in the Amador County Planning Area, especially in the eastern portion of the County. In a typical year, minimum temperatures fall below 32°F on 231.4 days in eastern Amador County. Snow falls in the County every year. There have been 575 NCDC events since 1993. This equates to a likelihood of future occurrences being considered highly likely.

It is likely that climate change will decrease the chance of future occurrence as well as future impacts. More information on climate change and extreme cold, freeze, and snow can be found in the next section. More information on future impacts can be found in the Future Conditions/Future Development section of the Vulnerability Assessment below.

Climate Change and Extreme Cold and Freeze

According to the 2021 California Climate Adaptation Study (CAS), freezing spells are likely to become less frequent in California as climate temperatures increase. If emissions increase, freezing events could occur only once per decade in large portion of the State by the second half of the 21st century. According to a California Natural Resources Report in 2014, it was determined that while fewer freezing spells would decrease cold related health effects, too few freezes could lead to increased incidence of disease as vectors and pathogens do not die off. Recent studies, including a 2024 review from UC Davis Health, note that shorter, warmer winters reduce natural die-off of vectors and pathogens, increasing risks of diseases like Lyme disease, malaria, and fungal infections. Warmer conditions allow vectors to remain active longer, even into winter months, and expand into new regions.

Vulnerability Assessment

Vulnerability—Medium

Extreme cold, freeze, and snow events happen in the Amador County Planning Area each year. It can impact key assets in the Planning Area. The whole of the Planning Area has some measure of vulnerability to extreme cold, freeze, and snow. An assessment of a community's vulnerability to this hazard begins with an understanding of local exposure to unincorporated Amador County and the Amador County Planning Area. This is included in the Local Concerns section below. After that, vulnerability is discussed in multiple sections that detail how this hazard can affect both the entire Amador County Planning Area as well as the unincorporated portions of Amador County. How the hazard affects the other participating jurisdictions can be found in their respective annexes to this LHMP Update. These sections below include assets at risk, impacts, and how future development may affect the vulnerability of the County to this hazard.

Local Concerns (unincorporated Amador County)

The unincorporated County has specific concerns regarding this hazard. These concerns form a portion of the basis for the mitigation strategy and mitigation actions that seek to reduce risk and vulnerabilities to this hazard.

The varying elevations in the County, in part, determine the extent to which a given area is affected by freeze, cold, and snow. The agricultural industry is especially vulnerable to extreme temperatures. Freezing temperatures can cause significant loss to crops. Historically, extreme cold and freeze have caused losses to agricultural crops and have resulted in USDA disaster declarations including the two noted above in the Past Occurrences section.

Heavy snow events occur on an annual basis in the higher elevations of the County. Snow removal is an ongoing issue in the upcountry areas of the eastern County. Snow removal is constant during the snowiest months, with the County and other agencies providing snow removal on public roads. Individuals and road associations are a primary snow removal resource for all the private roads. Impacts to the County as a result of winter snowstorms include damage to infrastructure, utility outages, road closures, traffic accidents, and interruption in business and school activities. Also of concern as described below is the impact to populations with additional needs such as the elderly, low income individuals, and those requiring the use of medical equipment, should the power go out. Delays in emergency response services can be of significant concern during large storm events. Further, there are economic impacts (tree clearing, damage to buildings, and snow clearing) associated with areas prone to heavy snow. Although the eastern portion of the County is the most vulnerable to the effects of snow, snowfall occurring in the lower elevations can create significant issues, as they may not be as prepared for snowfall.

Local concerns for each of the jurisdictions can be found under the Local Concerns heading in each respective jurisdictional annex to this LHMP Update.

Assets at Risk

Assets at risk from extreme cold, freeze, and snow include people and populations; structures; critical facilities and infrastructure; and natural, historic, and cultural resources. These are discussed in the following sections for the Amador County Planning Area and unincorporated Amador County.

Additionally, for each hazard in the FEMA National Risk Index in Amador County, the relevant portions of the hazard analysis done by FEMA is presented below. This includes the Hazard Risk Index Rating, Expected Annual Loss Values, Exposure Values, and the Historic Loss Ratio Rating. These are presented for the Amador County Planning Area as a whole.

People and Populations

All populations within the Amador County Planning Area are vulnerable to extreme cold and freeze, but this hazard generally affects people spending large amounts of time outside to a greater extent. Prolonged exposure to cold can cause frostbite or hypothermia and can be life-threatening. Vulnerable populations to cold, freeze, and snow include the unhoused; individuals who exercise or train outdoors; outdoor workers; individuals that lack the resources to afford heat; and the young, old, or medically fragile individuals that

are more susceptible to cold related impacts. In addition to vulnerable populations, pets and livestock are at risk to freeze, cold, and snow.

Structures

Structures in the Amador County Planning Area have some measure of risk from extreme cold, freeze, and snow. Buildings in the upper elevations of the County can be affected directly by freeze; pipes that feed buildings can be damaged during periods of extreme cold and cause water damage and other related impacts to a structure. High snow loads that accumulate on roofs can impact structures. Structures can also be damaged by downed trees and power lines during freeze and winter storm events.

Critical Facilities and Infrastructure

Winter storms (though rare in the County) typically involve snow and ice, occasionally accompanied by high winds and cold temperatures, 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 County. Depending on the facility type and function, critical facilities and infrastructure may be affected directly by freeze and extreme cold and winter weather events. Damage to pipes that feed buildings can be damaged during periods of extreme cold. Other equipment may also be affected. Infrastructure such as roads, highways, and bridges can become slippery, causing accidents and road closures.

Natural, Historic, and Cultural Resources

Depending on how low the temperatures go and the duration of an extreme cold, freeze or snow event, natural resources in the Amador County Planning Area may be affected. During periods of freeze, trees in the Planning Area may be damaged. This is especially true if a freeze occurs during a winter storm with winds and precipitation. Other natural resources like wildlife may be at risk during a period of freeze. While it is rare for buildings to be affected directly by freeze, damages to pipes that feed historic buildings can be damaged during periods of extreme cold and cause additional impacts to the structures.

FEMA NRI Hazard Vulnerability Assessment

The FEMA NRI was queried for additional specific data on Amador County's vulnerability to Extreme Cold, Freeze, and Snow. The NRI contains data and analysis for 18 separate natural hazards. The NRI hazards related to Amador County's Extreme Cold, Freeze, and Snow hazards are: cold wave, ice storm, and winter weather. As shown in Table 4-30, while cold waves and ice storms are expected to cause no expected annual losses and are given no historic loss ratio, winter weather could cause a total of $18,927 in expected annual losses, with a rating of relatively low. Winter weather has a relatively moderate rating for both social vulnerability and community resilience, with a risk index score of 25.9 out of 100. According to the NRI, there have been 132 events on record between the years 2005-2021, with an average of 8.1 events per year

Table 4-30 Amador County Planning Area – Cold Wave, Ice Storm, and Winter Weather Vulnerability Ratings from FEMA NRI

NRI Hazard	Hazard Risk Index Rating*	Expected Annual Loss Values (total)**	Exposure Value (total)***	Historic Loss Ratio Rating
Cold Wave	0	$0	$0	–
Ice Storm	0	$0	$0	–
Winter Weather	25.9	$ 18,927	$477,114,646,325	Very Low

Source: FEMA NRI Report, retrieved 4/1/2025.

*Hazard Risk Index is calculated using data for only a single hazard type, and reflect a communities expected annual loss value, community risk factors, and the adjustment factor used to calculate the risk value.

**Expected annual loss represents the average economic loss in dollars resulting from natural hazards each year.

***Exposure is a natural hazard consequence factor that is the representative value of buildings, populations, or agriculture potentially exposed to a natural hazard occurrence.

Additional information on the FEMA NRI can be found in Section 4.2 and Appendix G.

Impacts from Severe Weather: Extreme Cold, Freeze, and Snow

Extreme cold, freeze, and snow can affect critical facilities and infrastructure, down trees, break pipes, and can be a life safety issue. Transportation networks, communications, and utilities infrastructure are often the most vulnerable physical assets in the Amador County Planning Area. Infrastructure such as roads and utilities are at risk to freezing temperatures and snow, causing failures and hazardous road conditions. When extreme cold is coupled with high winds and freezing storms, power lines may be downed, resulting in power outages and an interruption of utilities and critical services. During periods of extremely low or prolonged cold temperatures, other impacts to the Planning Area include can include interruption in business and school activities.

The elderly, the young, and those experiencing medical issues are often more vulnerable to temperature extremes, but anyone can be affected. Exposure to cold temperatures can cause hypothermia and frostbite. Those exercising or recreating outdoors, outdoor workers, and the unhoused may be at higher risk.

Impacts to identified assets at risk to this hazard and the overall vulnerability of the County may be affected in the future by climate change (which was discussed in the hazard profile section above), changes in population patterns, and changes in land use and development. The influencing effects of these factors on this hazard are discussed further in the Future Conditions/Future Development discussion below.

Future Conditions/Future Development

Future hazard conditions may be affected by climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. Findings on these factors for Amador County include the following:

- Climate change is unlikely to exacerbate extreme cold, freeze, and snow and their associated impacts to the County.

- The population of Amador County is expected to slowly increase as time progresses. Future population growth should be considered, as having more or less people in a community affects the overall hazard vulnerability to the County. Changes in populations patterns should also be considered. Especially vulnerable individuals to this hazard include older adults, children, outdoor workers, , those below the poverty line and the unhoused. During hazard events, existing inequities can get worse, and these groups are the most likely to be affected and may require extra assistance. Planning for population changes will help to decrease the County's overall vulnerability. Changes in population and population patterns may or may not increase the impacts and vulnerability of the County to this hazard depending on the location and nature of population growth and continued planning for future hazard conditions.
- Land use planning should be proactive to address future hazard conditions. County building codes are in effect to reduce this risk and should be updated as necessary to continue to address future freeze, extreme cold, and snow conditions. Due to adherence to protective building codes, changes in land use and development will likely not increase the impacts and associated vulnerabilities of the County to this hazard.

Future development built to code should be able to withstand extreme cold, freeze, and heavy snow. Current building codes provide such provisions for new construction. Older buildings and infrastructure should be evaluated to ensure that extreme cold and freeze will not cause negative impacts. Future development considerations should be ongoing and proactive. Ensuring that comprehensive land use planning is conducted, regulatory requirements such as building codes are followed, and varying needs for different demographic groups that reside within the County are considered can help make for a more resilient community.

4.3.3. Severe Weather: Extreme Heat

Hazard Profile

This hazard profile contains multiple sections that detail how this hazard can affect the Amador County Planning Area. These sections include a hazard/problem description; description of location and extent; past occurrences of this hazard; and how climate change can affect or influence this hazard.

Hazard/Problem Description

According to information provided by FEMA, extreme heat is defined as temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks. Heat kills by taxing the human body beyond its abilities. In a normal year, about 175 Americans succumb to the demands of summer heat. In the 40-year period from 1936 through 1975, nearly 20,000 people were killed in the United States by the effects of heat and solar radiation. In the heat wave of 1980, more than 1,250 people died. Recently in California, records were set across the state during a July 2024 heat event. 2024 was considered the hottest on record. Extreme heat as it affects agriculture in Amador County is discussed further in the agricultural hazard discussion in Section 4.3.6.

Heat disorders generally have to do with a reduction or collapse of the body's ability to shed heat by circulatory changes and sweating or a chemical (salt) imbalance caused by too much sweating. When heat gain exceeds a level at which the body can remove it, or when the body cannot compensate for fluids and salt lost through perspiration, the temperature of the body's inner core begins to rise, and heat-related illness

may develop. Elderly persons, small children, those on certain medications or drugs, and persons with weight and alcohol problems are particularly susceptible to extreme heat. Extreme heat can also affect the agricultural industry.

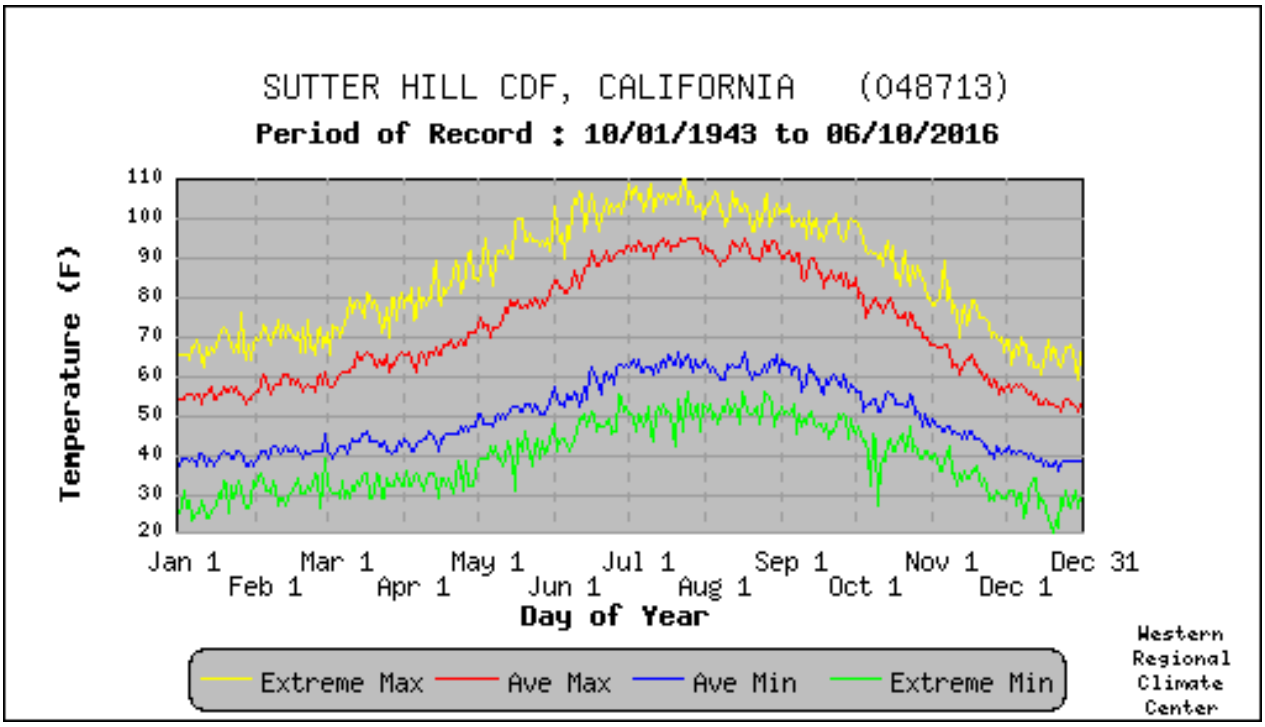
Location and Extent

Extreme heat events occur on a regional basis. Extreme heat can occur in any location of the County. All portions of the County are at risk to extreme heat. Extreme heat occurs throughout the Planning Area primarily during the summer months. The WRCC and NWS maintain data on weather normal and extremes in the western United States. Each of these data sources maintain data in slightly different ways. Data from the WRCC stopped being collected in April of 2016. NWS covers the entire time period to present. Therefore, both data sets are shown below. WRCC and NWS data for the County is summarized below.

Western Amador County —Sutter Hill Ranger Weather Station (WRCC), Period of Record 1948 to 2016

According to the WRCC, in western Amador County, monthly average maximum temperatures in the warmest months (May through October) range from the mid-70s to the low 90s. The highest recorded daily extreme was 110°F on July 14, 2006. In a typical year, maximum temperatures exceed 90°F on 69.3 days. Figure 4-37 shows the average daily high temperatures and extremes for the County. Table 4-31 shows the record high temperatures by month for the western County.

Figure 4-37 Western Amador County – Sutter Hill Ranger Station (WRCC) Daily Temperature Averages and Extremes 1943 to 2016



Source: Western Regional Climate Center. Retrieved 3/19/2025

Table 4-31 Western Amador County – Sutter Hill Ranger Station (WRCC) Record High Temperatures 1943 to 2016

Month	Record High	Date	Month	Record High	Date
January	68°	1/17/2007	July	110°	7/14/2006
February	73°	2/4/2009	August	107°	8/9/1998
March	81°	3/30/2004	September	104°	9/2/1998
April	92°	4/28/2004	October	99°	10/2/2001
May	100°	5/17/2008	November	89°	11/27/2010
June	106°	6/16/2012	December	70°	12/26/2000

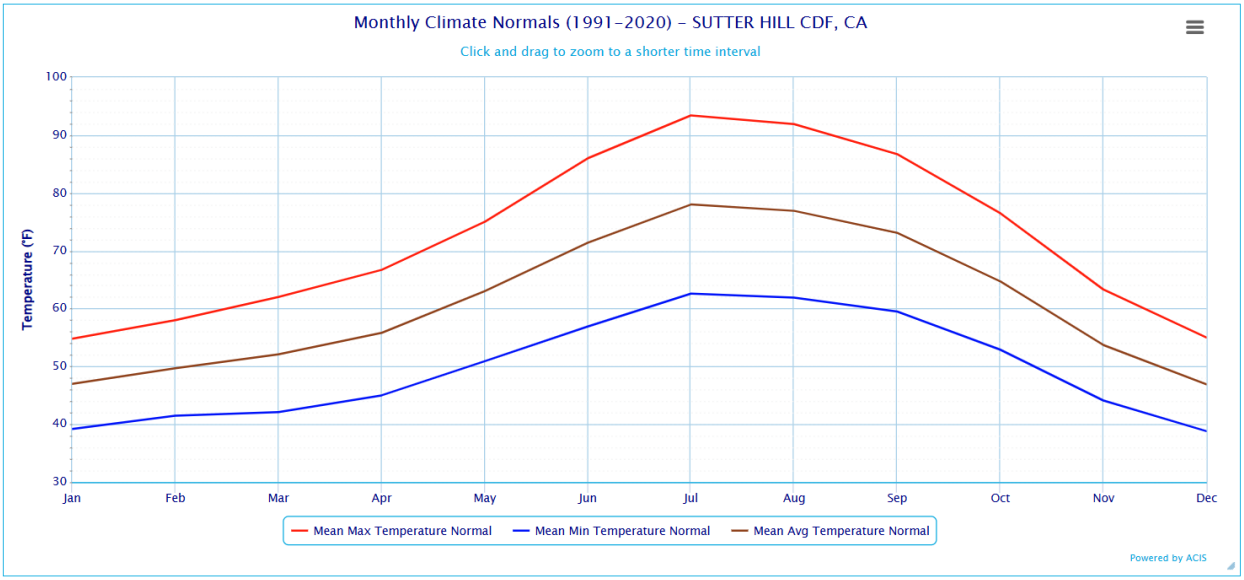
Source: Western Regional Climate Center

Western Amador County—Sutter Hill Ranger Station Weather Station (NWS), Period of Record 1943 to 2025

Note: While the overall period of record for this NWS station is 1943 to 2025, not all data is recorded for those dates. Extreme temperatures are covered from December 1968 to February 2025.

According to the NWS, monthly average maximum temperatures in the warmest months (May through October) range from the mid-70s to the low 90s. The highest recorded daily extreme was 110°F on July 24, 2006. Figure 4-38 shows the average daily high temperatures and extremes for the County. Table 4-24 shows the record low temperatures for the western County.

Figure 4-38 Amador County – Sutter Hill Ranger Station (NWS) Daily Temperature Averages and Extremes, 1991-2020



Month	Mean Max Temperature Normal (°F)	Mean Min Temperature Normal (°F)	Mean Avg Temperature Normal (°F)
January	54.8	39.2	47.0
February	58.0	41.5	49.7
March	62.0	42.1	52.1
April	66.7	45.0	55.8
May	75.0	50.9	63.0
June	86.0	56.9	71.4
July	93.4	62.6	78.0
August	91.9	61.9	76.9
September	86.7	59.5	73.1
October	76.5	52.9	64.7
November	63.3	44.1	53.7
December	55.0	38.8	46.9
Annual	72.4	49.6	61.0

Source: National Weather Service XMAC site. Retrieved 3/12/2025

Table 4-32 Western Amador County – Sutter Hill Ranger Station (NWS) Record High Temperatures 1968 to 2025

Temperature	Date
110.0°	7/24/2006
110.0°	7/23/2006
109.0°	7/1/2015
109.0°	7/10/2002
108.0°	7/11/2021
108.0°	8/29/2017
108.0°	7/4/2017
107.0°	7/17/2023
107.0°	7/10/2021

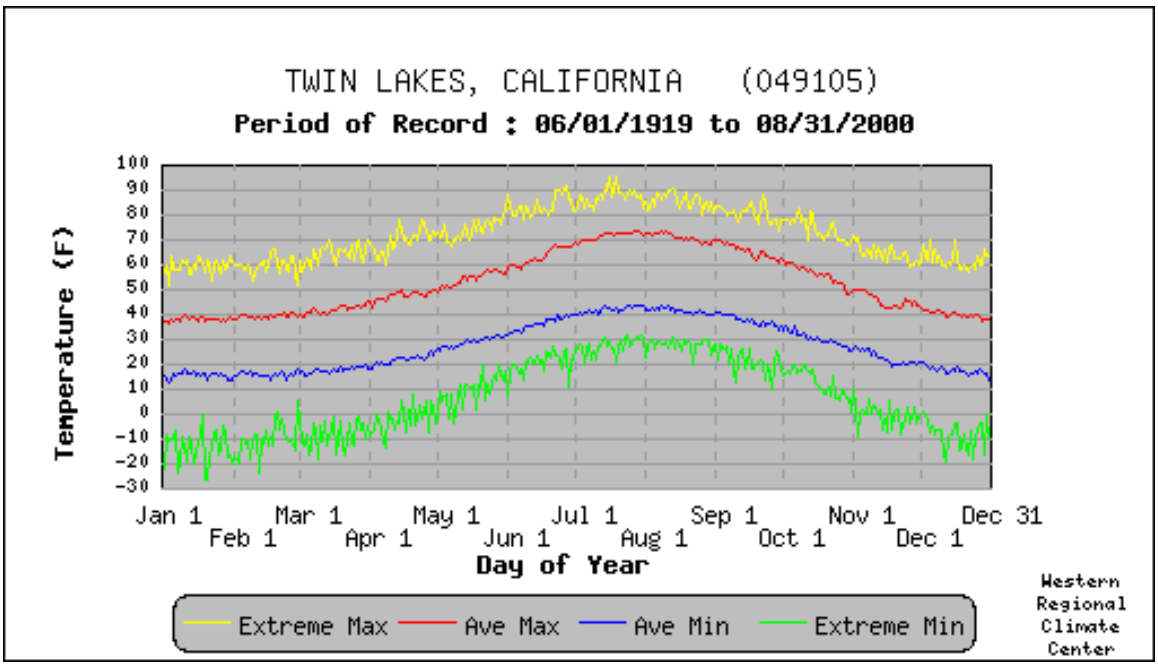
Temperature	Date
107.0°	6/19/2021

Source: National Weather Service XMAC site. Retrieved 3/12/2025

Eastern Amador County—WRCC Twin Lakes Weather Station, Period of Record 1919 to 2000

According to the WRCC, in eastern Amador County, monthly average maximum temperatures in the warmest months (May through October) range from the mid-50s to the low 70s. The highest recorded daily extreme was 95°F on July 7,1998. In a typical year, maximum temperatures exceed 90°F on 0.3 days. Figure 4-39 shows the average daily high temperatures and extremes for the eastern portion of the County. Table 4-33 shows the record high temperatures by month for the eastern County.

Figure 4-39 Eastern Amador County – Twin Lakes (WRCC) Daily Temperature Averages and Extremes 1919-2000



Source: Western Regional Climate Center, www.wrcc.dri.edu/. Retrieved 3/12/2025

Table 4-33 Eastern Amador County – Twin Lakes (WRCC) Record High Temperatures 1919 to 2000

Month	Record High	Date	Month	Record High	Date
January	74°	1/9/1928	July	95°	7/17/1998
February	76°	2/11/1980	August	91°	8/13/1929
March	70°	3/27/1926	September	88°	9/22/1928
April	78°	4/14/1926	October	83°	10/8/1928
May	82°	5/31/1926	November	72°	11/1/1966
June	92°	6/27/1926	December	74°	12/27/1975

Source: Western Regional Climate Center. Retrieved 3/12/2025.

Eastern Amador County—Amador Twin Lakes Weather Station (NWS), Period of Record 1919 to 2000

While the western weather station presented data using graphs, no averaging graphing data was available for the Twin Lakes Weather station.

Heat emergencies are often slower to develop, taking several days of continuous, oppressive heat before a significant or quantifiable impact is seen. Heat waves do not strike victims immediately, but rather their cumulative effects slowly take the lives of vulnerable populations. Heat waves do not generally cause damage or elicit the immediate response of floods, fires, earthquakes, or other more "typical" disaster scenarios. While heat waves are obviously less dramatic, they are potentially deadlier. According to the 2018/2023 California State Hazard Mitigation Plan, the worst single heat wave event in California occurred in Southern California in 1955, when an eight-day heat wave resulted in 946 deaths.

The NWS has in place a system to initiate alert procedures (advisories or warnings) when extreme heat is expected to have a significant impact on public safety. The expected severity of the heat determines whether advisories or warnings are issued. The NWS HeatRisk forecast provides a quick view of heat risk potential over the upcoming seven days. The heat risk is portrayed in a numeric (0-4) and color (green/yellow/orange/red/magenta) scale which is similar in approach to the Air Quality Index (AQI) or the UV Index. This can be seen in Table 4-34.

Table 4-34 National Weather Service HeatRisk Categories

Category	Level	Meaning
Green	0	No Elevated Risk
Yellow	1	Low Risk for those extremely sensitive to heat, especially those without effective cooling and/or adequate hydration
Orange	2	Moderate Risk for those who are sensitive to heat, especially those without effective cooling and/or adequate hydration
Red	3	High Risk for much of the population, especially those who are heat sensitive and those without effective cooling and/or adequate hydration
Magenta	4	Very High Risk for entire population due to long duration heat, with little to no relief overnight

Source: National Weather Service

The NWS office in Sacramento can issue the following heat-related advisory as conditions warrant.

- **Heat Advisories** are issued during events where the HeatRisk is on the Orange/Red threshold (Orange will not always trigger an advisory)
- **Excessive Heat Watches/Warnings** are issued during events where the HeatRisk is in the Red/Magenta output

Past Occurrences

Disaster Declaration History

There have been no FEMA or Cal OES disasters related to extreme heat, as shown in Table 4-4.

There have been no USDA disaster declarations for extreme heat.

NCDC Events

The NCDC data shows 124 extreme heat incidents for Amador County since 1993. Information for these events are shown in Table 4-35.

*Table 4-35 NCDC Extreme Heat Events in Amador County 1993 to 7/31/2024**

Event Type	Number of Events	Deaths	Deaths (indirect)	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Excessive Heat	43	12	2	2	0	$0	$0
Heat	81	2	3	18	3	$0	$0
Total	**124**	**14**	**5**	**20**	**3**	**$ 0**	**$ 0**

Source: NCDC

*Deaths, injuries, and damages are for the entire event, and may not be exclusive to the County.

Hazard Mitigation Planning Committee Events

The HMPC noted some extreme heat events in Amador County. These include the following events:

July 21, 2016 – Information on the Amador County website was found on an extreme heat event in July of 2016. Amador County Public Health and the Amador County Sheriff's Office of Emergency Services urge residents to prepare for extreme temperatures predicted to reach over 100 degrees this weekend. The National Weather Service indicates that temperatures will climb and remain above 100° into next week.

September 2017 – The Amador County Sheriff's Office of Emergency Services urged residents to be prepared for an Excessive Heat Warning issued by the National Weather Services for this Labor Day weekend. High temperatures were seen in Amador County, as well as in much of central California.

August 31, 2022 - Governor Gavin Newsom declared a state of emergency due to extreme heat across California, including Amador County. Lower elevations likely saw temperatures of 100–105°F during peak hours (2:00 p.m. to 10:00 p.m.), straining the electrical grid and prompting the use of backup generators.

July 2023 was one of the hottest months globally, with California breaking or tying 358 maximum temperature records. Nearby Redding hit 119°F, and Palm Springs reached 124°F. Amador County's lower areas likely saw 105–110°F, with higher elevations like Pioneer in the mid-90s, under widespread heat advisories

The HMPC noted that extreme heat is a yearly event, but could not recall any other specific incidents since 2020 that caused damages, injuries, or deaths.

Likelihood of Future Occurrence

Highly Likely—Temperature extremes are likely to continue to occur annually in the Amador County Planning Area. Temperatures at or above 90°F are common most summer days in the western portion of the County. More information on climate change and extreme heat can be found in the next section. More information on future impacts can be found in the Future Conditions/Future Development section of the Vulnerability Assessment below.

Climate Change and Extreme Heat

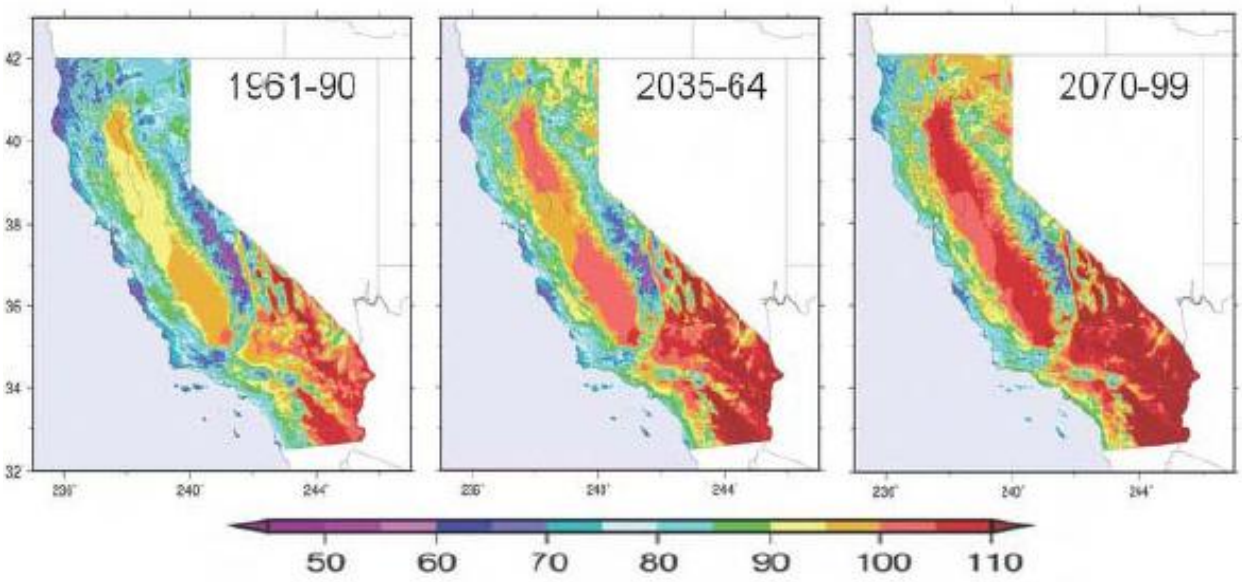
Climate change and its effect on extreme heat in the County has been discussed by three sources:

- California Climate Adaptation Strategy (CAS) – 2021 (as well as the 2024 Draft CAS)
- Climate Change and Health Profile Report –Amador County
- Cal-Adapt

Climate Adaptation Strategy

The 2021 CAS (as well as the 2024 Draft CAS), citing a California Energy Commission study, states that "over the past 15 years, heat waves have claimed more lives in California than all other declared disaster events combined." This study shows that California is getting warmer, leading to an increased frequency, magnitude, and duration of heat waves. These factors may lead to increased mortality from excessive heat, as shown in Figure 4-40.

Figure 4-40 California Historical and Projected Temperature Increases – 1961 to 2099



Source: Dan Cayan; California Climate Adaptation Strategy

As temperatures increase, California and Amador County will face increased risk of death from dehydration, heat stroke, heat exhaustion, heart attack, stroke and respiratory distress caused by extreme heat. According to the 2021 CAS (as well as the 2024 Draft CAS) report and the 2023 State of California Hazard Mitigation Plan, by 2100, hotter temperatures are expected throughout the state, with projected increases of 3-5.5°F (under a lower emissions scenario) to 8-10.5°F (under a higher emissions scenario). These changes could lead to an increase in illnesses and deaths related to extreme heat in Amador County.

Climate Change and Health Profile Report – Amador County

The CCHPR noted for Amador County that increased temperatures manifested as heat waves and sustained high heat days directly harm human health through heat-related illnesses (mild heat stress to fatal heat

stroke) and the exacerbation of pre-existing conditions in the medically fragile, chronically ill, and vulnerable. Increased heat also intensifies the photochemical reactions that produce smog and ground level ozone and fine particulates (PM2.5), which contribute to and exacerbate respiratory disease in children and adults. Increased heat and carbon dioxide enhance the growth of plants that produce pollen, which are associated with allergies. Increased temperatures add to the heat load of buildings in urban areas and exacerbate existing urban heat islands adding to the risk of high ambient temperatures.

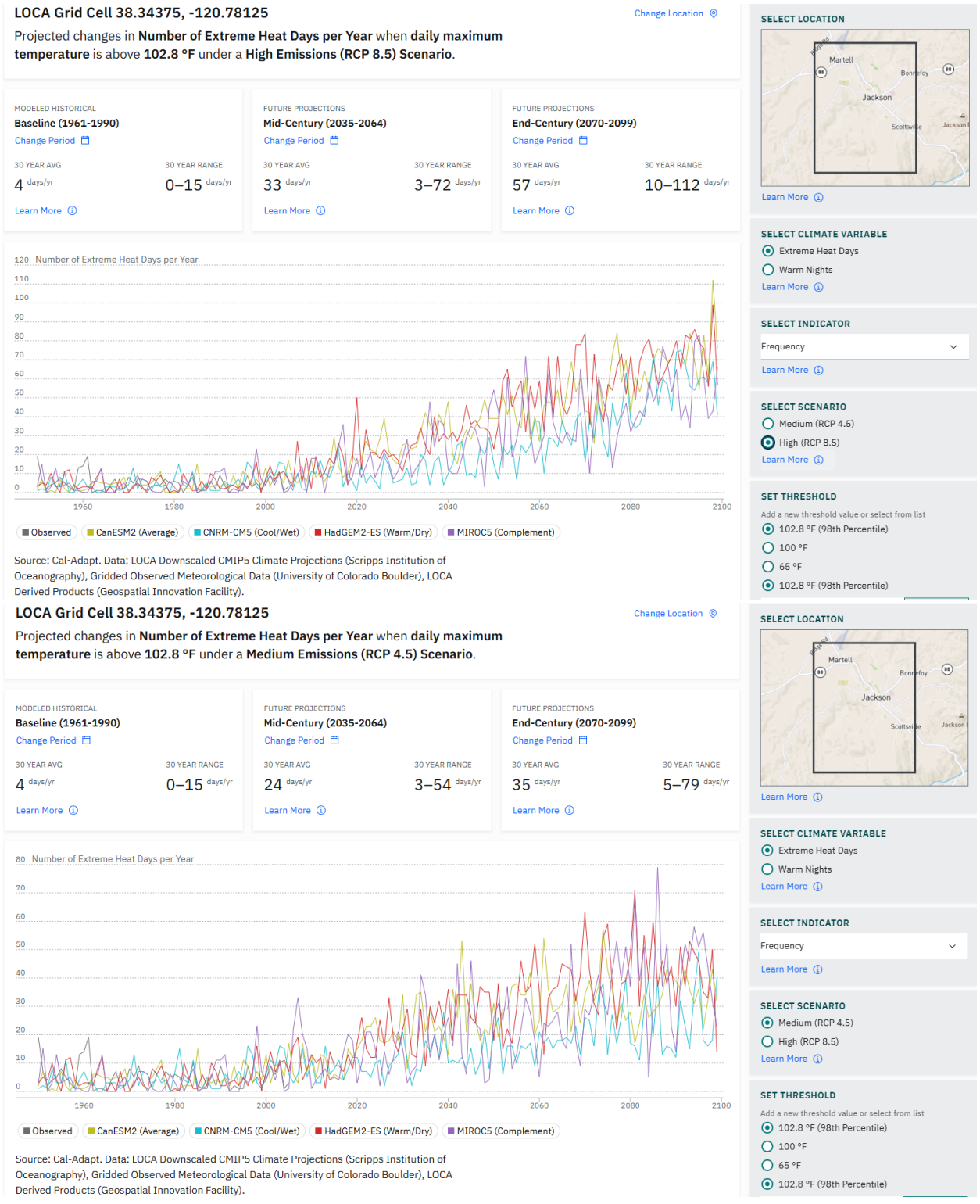
Cal-Adapt

Cal Adapt also noted that overall temperatures are expected to rise substantially throughout this century. During the next few decades, scenarios project average temperature to rise between 1 and 2.3°F; however, the projected temperature increases begin to diverge at mid-century so that, by the end of the century, the temperature increases projected in the higher emissions scenario (Representative Concentration Pathways (RCP) 8.5) are approximately twice as high as those projected in the lower emissions scenario (RCP 4.5).

These projections also differ depending on the time of year and the type of measurement (highs vs. lows), all of which have different potential effects to the state's ecosystem health, agricultural production, water use and availability, and energy demand. Future temperature estimates from Cal-Adapt for the Amador County Planning are shown in Figure 4-41. It shows the following:

- The upper chart shows the number of days in a year when daily maximum temperature is above the extreme heat threshold of 102.8°F. Data is shown for Amador County under the RCP 8.5 scenario in which emissions continue to rise through 2050 and maintain that trend into 2100.
- The lower chart shows the number of days in a year when daily maximum temperature is above the extreme heat threshold of 102.8 °F. Data is shown for Amador County under the RCP 4.5 scenario in which emissions show continued rise with more erratic patterns into 2100.

Figure 4-41 Amador County – Future Temperature Estimates in Low and High Emission Scenarios



Source: Cal-Adapt – Number of Extreme Heat Days by Year. Retrieved 2/6/2024.

Vulnerability Assessment

Vulnerability—Medium

Extreme heat happens in Amador County each year. Extreme heat may overload demands for electricity to run air conditioners and other utilities in homes and businesses during prolonged periods of exposure and presents health concerns to individuals outside in the temperatures. Extreme heat may also be a secondary effect of droughts or may cause drought-like conditions in a temporary setting. For example, several weeks of extreme heat increases evapotranspiration and reduces moisture content in vegetation, leading to higher wildfire vulnerability for that time period even if the rest of the season is relatively moist. Extreme heat, when combined with wind, can also lead to PSPS events in the County. Extreme heat also contributes to poor air quality during extended events.

Vulnerable populations are at the greatest risk to the effects of extreme heat. The Public Health Alliance has developed a composite index to identify cumulative health disadvantages in California. Factors such as those bulleted above were combined to show what areas are at greater risk to hazards like extreme heat. These sections below include assets at risk, impacts, and how future development may affect the vulnerability of the County to this hazard.

Local Concerns (unincorporated Amador County)

The unincorporated County has specific concerns regarding this hazard. These concerns form a portion of the basis for the mitigation strategy and mitigation actions that seek to reduce risk and vulnerabilities to this hazard.

The County noted that extreme heat can cause crop damages. These can be substantial if extreme heat occurs during periods of plant susceptibility to heat. Extreme heat contributes to PSPS and wildfire issues in the County. Heat domes have settled over the County in the past, which has caused the County to open cooling centers. The County is also worried about the effects on vulnerable populations. It was also noted that extreme heat contributes to unhealthy air quality.

Local concerns for each of the jurisdictions can be found under the Local Concerns heading in each respective jurisdictional annex to this LHMP Update.

Assets at Risk

Assets at risk from extreme heat include people and populations; structures; critical facilities and infrastructure; and natural, historic, and cultural resources. These are discussed in the following sections for both the Amador County Planning Area and unincorporated Amador County.

Additionally, for each hazard in the FEMA National Risk Index in Amador County, the relevant portions of the hazard analysis done by FEMA is presented below. This includes the Hazard Risk Index Rating, Expected Annual Loss Values, Exposure Values, and the Historic Loss Ratio Rating. These are presented for the Amador County Planning Area as a whole.

People and Populations

All populations within the Amador County Planning Area are vulnerable to extreme heat, but it generally affects people spending large amounts of time outside or without means of cooling indoor structures. During extended periods of high temperatures, extreme heat may overload the demands for electricity to run air conditioners and can present health concerns to individuals. When interruptions in power occur during extreme heat, the risk of heat related illnesses and deaths increase. Extreme heat is a significant concern to vulnerable populations. The unhoused; individuals who exercise or train outdoors; outdoor workers; individuals that lack the resources to afford heat; and the young, old, or medically fragile individuals that are more susceptible to heat related impacts. In addition to vulnerable populations, pets and livestock are at risk to extreme heat conditions.

Structures

Extreme heat normally does not generally impact structures, but individuals working in structures may be affected during periods of extended heat, especially in structures that might not be equipped with air conditioning or other means of cooling. In the Amador County Planning Area, extreme heat has caused interruptions to power in the past. Also depending on the structure, sensitive contents such as IT equipment can be impacted, especially if a power outage occurs.

Critical Facilities and Infrastructure

Depending on their type and function, critical facilities and infrastructure can also be affected by extreme heat. Interruptions in power caused by extreme heat can lead to system failures. Schools without air conditioning may have to close or operate on a reduced schedule.

Natural, Historic, and Cultural Resources

Park areas and natural resource assets in the Amador County Planning Area may be vulnerable during periods of extreme heat. These include turfed areas; landscapes, trees, wildlife and habitat areas, and wetlands and marsh lands. Recently, trees were lost in areas of Amador County that were weakened by drought and extreme heat. Extreme heat may also cause drought-like conditions, contributing to other issues. For example, several weeks of extreme heat increases evapotranspiration and reduces moisture content in vegetation, leading to higher wildfire vulnerability in the region for that time period, even if the rest of the season is relatively moist. Historic and cultural resources are not expected to be affected by extreme heat.

FEMA NRI Hazard Vulnerability Assessment

The FEMA NRI was queried for additional specific data on Amador County's vulnerability to Extreme Heat. The NRI contains data and analysis for 18 separate natural hazards. The NRI hazard related to Amador County's Extreme Heat is a heat wave. As shown in Table 4-36, heatwaves could cause a total of $1,761,917 in expected annual losses, with a historic loss rating of relatively low. Heat wave has a relatively moderate rating for both social vulnerability and community resilience, with a risk index score of 94.3 out of 100. According to the NRI, there have been 30 events on record between the years 2005-2021, with an average of 1.9 events per year.

Table 4-36 Amador County Planning Area – Heat Wave Vulnerability Ratings from FEMA NRI

NRI Hazard	Hazard Risk Index Rating*	Expected Annual Loss Values (total)**	Exposure Value (total)***	Historic Loss Ratio Rating
Heat Wave	94.3	$1,761,917	$477,114,646,325	Relatively Low

Source: FEMA NRI Report, retrieved 4/1/2025.

*Hazard Risk Index is calculated using data for only a single hazard type, and reflect a communities expected annual loss value, community risk factors, and the adjustment factor used to calculate the risk value.

**Expected annual loss represents the average economic loss in dollars resulting from natural hazards each year.

***Exposure is a natural hazard consequence factor that is the representative value of buildings, populations, or agriculture potentially exposed to a natural hazard occurrence.

Additional information on the FEMA NRI can be found in Section 4.2 and Appendix G.

Impacts from Severe Weather: Extreme Heat

The County experiences temperatures in excess of 100°F during the summer and fall months. The temperature moves to 105-110°F in rather extreme situations. Health issues are the primary concern with this hazard with vulnerable populations at greater risk, although economic impacts can also be an issue. Air quality can also be an issue during extreme heat.

During these times, drought conditions may worsen, and the Planning Area may see an increase in dry fuels contributing to wildfires. For example, several weeks of extreme heat increases evapotranspiration and reduces moisture content in vegetation, leading to higher wildfire vulnerability for that time period even if the rest of the season is relatively moist. Also, power outage and PSPS events may occur during these times as well. Drought is discussed further in Section 4.3.10 and wildfire in Section 4.3.15.

Impacts to identified assets at risk to this hazard and the overall vulnerability of the County may be affected in the future by climate change (which was discussed in the hazard profile section above), changes in population patterns, and changes in land use and development. The influencing effects of these factors on this hazard are discussed further in the Future Conditions/Future Development discussion below.

Future Conditions/Future Development

Future hazard conditions may be affected by climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. Findings on this for Amador County include the following:

- Climate change is likely to exacerbate future extreme heat conditions and associated impacts and vulnerability of the County.
- Future population growth should be considered, as having more or less people in a community affects the overall hazard vulnerability to the County. Population is expected to increase for Amador County and, as such, the vulnerability to this hazard may increase, specifically affecting growing vulnerable populations as the senior citizen population continues to reside in and age within the communities of the County. Along with this, low income and the unhoused population are at risk to extreme heat which can put strain on emergency services and shelters. Changes in population and population patterns may

or may not increase the impacts and vulnerability of the County to this hazard depending on the location and nature of growth and continued planning for future hazard conditions.

- Land use planning should be proactive to address future hazard conditions. County building codes are in effect to reduce this risk and should be updated as necessary to continue to address future extreme heat conditions. Due to adherence to protective building codes, changes in land use and development will likely not increase the impacts and associated vulnerabilities of the County to this hazard.

Future development in the County will take extreme heat into account. Backup generators are currently in use at many County facilities, and additional generators and backup power sources are being sought for other locations. The Office of Emergency maintains one, towable (portable) generator that can be used to support a facility that does not currently have a backup generator. One way to reduce the negative impacts of an extreme heat event is to develop a comprehensive heat response plan that combines individual strategies into an integrated approach. The County has one of these plans, and it is discussed in the Capability Assessment in Section 4.4.1. Components of such a plan might include forecasting and monitoring, education and awareness, and heat wave preparedness and response.

In addition to a comprehensive heat response plan, local officials can help areas adapt to extreme heat in the short-term by improving the resilience of infrastructure. Transportation planners can protect or modify roads, bridges, and other structures—for example, by using materials that are more resilient and heat tolerant—to help these systems withstand higher temperatures and reduce service disruptions. They can also implement energy efficiency and conservation efforts to reduce stress on electricity systems during heat waves and help avoid power outages.

Future development considerations should be ongoing and proactive. Ensuring that comprehensive land use planning is conducted, regulatory requirements such as building codes are followed, and varying needs for different demographic groups that reside within the County are considered can help make for a more disaster resilient community.

4.3.4. Severe Weather: Heavy Rains and Storm

Hazard Profile

This hazard profile contains multiple sections that detail how this hazard can affect the Amador County Planning Area. These sections include a hazard/problem description; description of location and extent; past occurrences of this hazard; likelihood of future occurrences; and how climate change can affect or influence this hazard.

Hazard/Problem Description

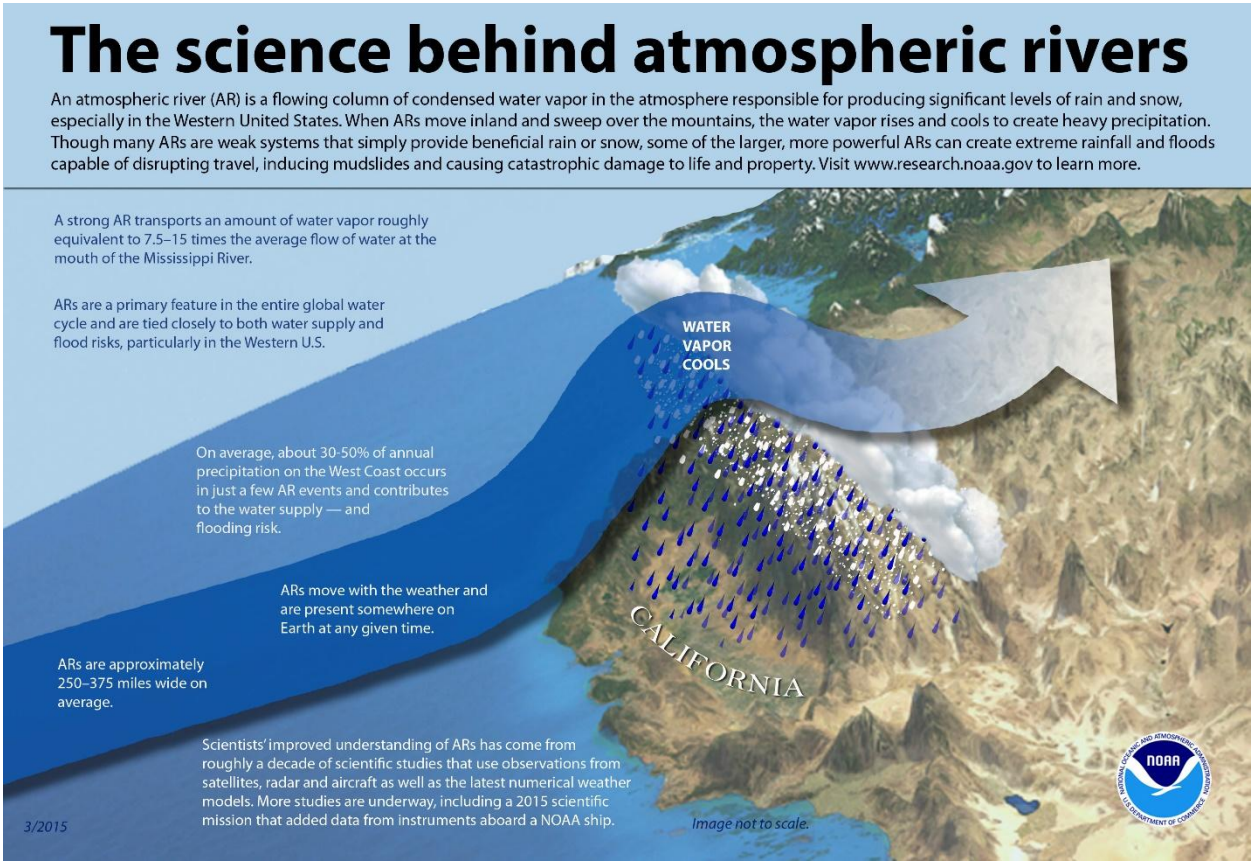
Storms in the Amador County Planning Area occur throughout the Planning Area and are generally characterized by heavy rain often accompanied by strong winds and sometimes lightning and hail. Approximately 10 percent of the thunderstorms that occur each year in the United States are classified as severe. A thunderstorm is classified as severe when it contains one or more of the following phenomena: hail that is three-quarters of an inch or greater, winds in excess of 50 knots (57.5 mph), or a tornado. Heavy precipitation in the Amador County area falls mainly in the fall, winter, and spring months.

Heavy Rain and Storms

The NWS reports that storms and thunderstorms result from the rapid upward movement of warm, moist air. They can occur inside warm, moist air masses and at fronts. As the warm, moist air moves upward, it cools, condenses, and forms cumulonimbus clouds that can reach heights of greater than 35,000 ft. As the rising air reaches its dew point, water droplets and ice form and begin falling the long distance through the clouds towards earth's surface. As the droplets fall, they collide with other droplets and become larger. The falling droplets create a downdraft of air that spreads out at Earth's surface and causes strong winds associated with thunderstorms.

The County and the rest of California can be affected by a phenomenon known as an atmospheric river. According to the NOAA, atmospheric rivers are relatively long, narrow regions in the atmosphere – like rivers in the sky – that transport most of the water vapor outside of the tropics. These columns of vapor move with the weather, carrying an amount of water vapor roughly equivalent to the average flow of water at the mouth of the Mississippi River. When the atmospheric rivers make landfall, they often release this water vapor in the form of rain or snow. This can be seen in Figure 4-42.

Figure 4-42 Atmospheric Rivers



Source: NOAA

Although atmospheric rivers come in many shapes and sizes, those that contain the largest amounts of water vapor and the strongest winds can create extreme rainfall and floods, often by stalling over watersheds

vulnerable to flooding. These events can disrupt travel, induce mudslides and cause catastrophic damage to life and property. A well-known example is the "Pineapple Express," a strong atmospheric river that is capable of bringing moisture from the tropics near Hawaii over to the U.S. West Coast.

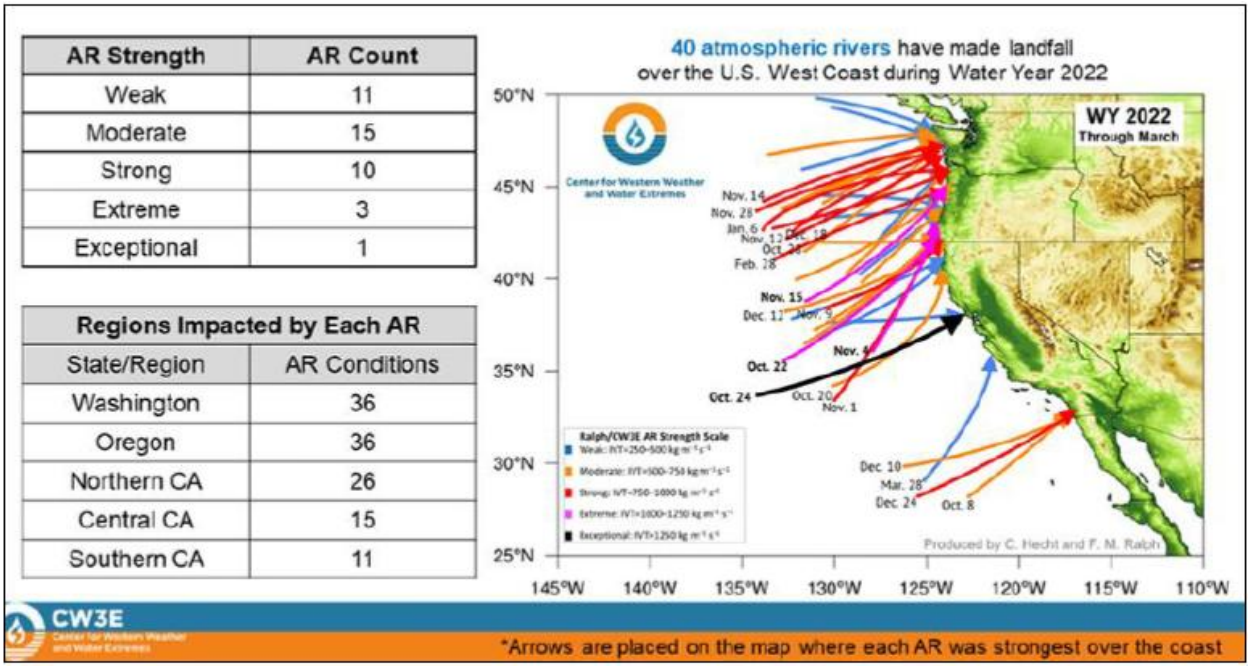
Not all atmospheric rivers cause damage; most are weak systems that often provide beneficial rain or snow that is crucial to the water supply. Atmospheric rivers are a key feature in the global water cycle and are closely tied to both water supply and flood risks — particularly in the western United States.

While atmospheric rivers are responsible for great quantities of rain that can produce flooding, they also contribute to beneficial increases in snowpack. A series of atmospheric rivers fueled the strong winter storms that battered the U.S. West Coast from western Washington to southern California from Dec. 10–22, 2010, producing 11 to 25 inches of rain in certain areas. These rivers also contributed to the snowpack in the Sierras, which received 75 percent of its annual snow by Dec. 22, the first full day of winter. Another example of this happened in 2022. Multiple atmospheric river storms occurred in the County and the rest of California. This can be seen in Figure 4-43. This also happened in the 2023 as well as in 2024, which can be seen in Figure 4-44 and Figure 4-45, respectively.

Figure 4-43 2022 Atmospheric River Events

AR Strength	AR Count
Weak	11
Moderate	15
Strong	10
Extreme	3
Exceptional	1

Regions Impacted by Each AR	
State/Region	AR Conditions
Washington	36
Oregon	36
Northern CA	26
Central CA	15
Southern CA	11

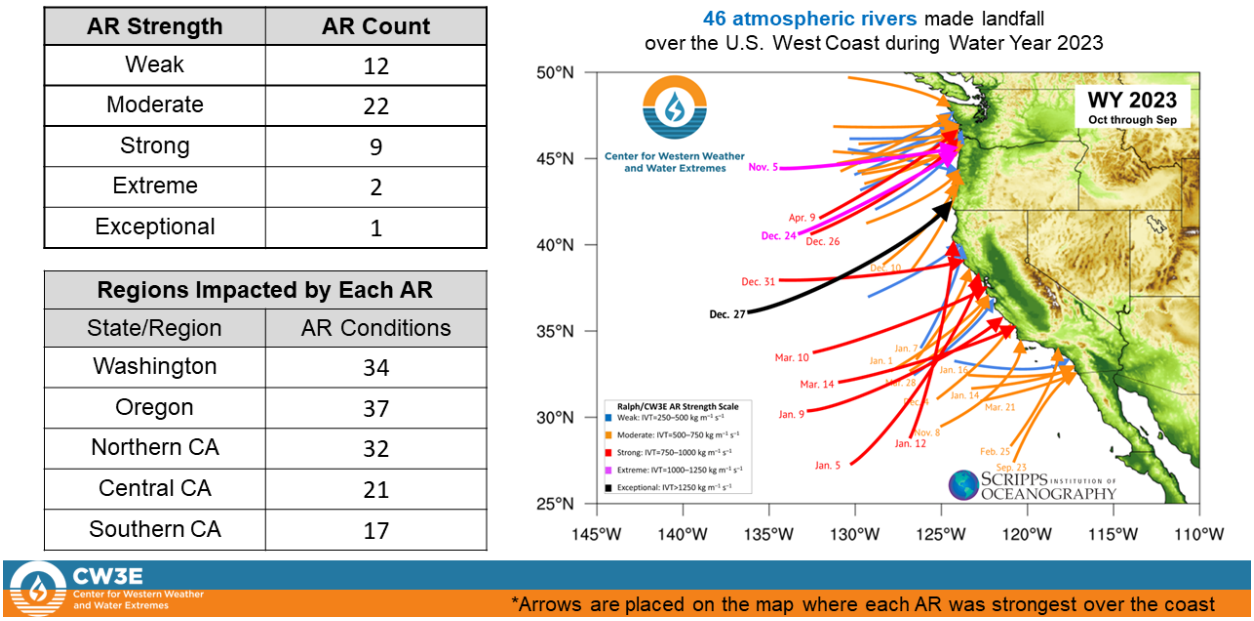


Source: Center for Western Weather and Water Extremes. Retrieved 12/18/2024.

Figure 4-44 2023 Atmospheric River Events

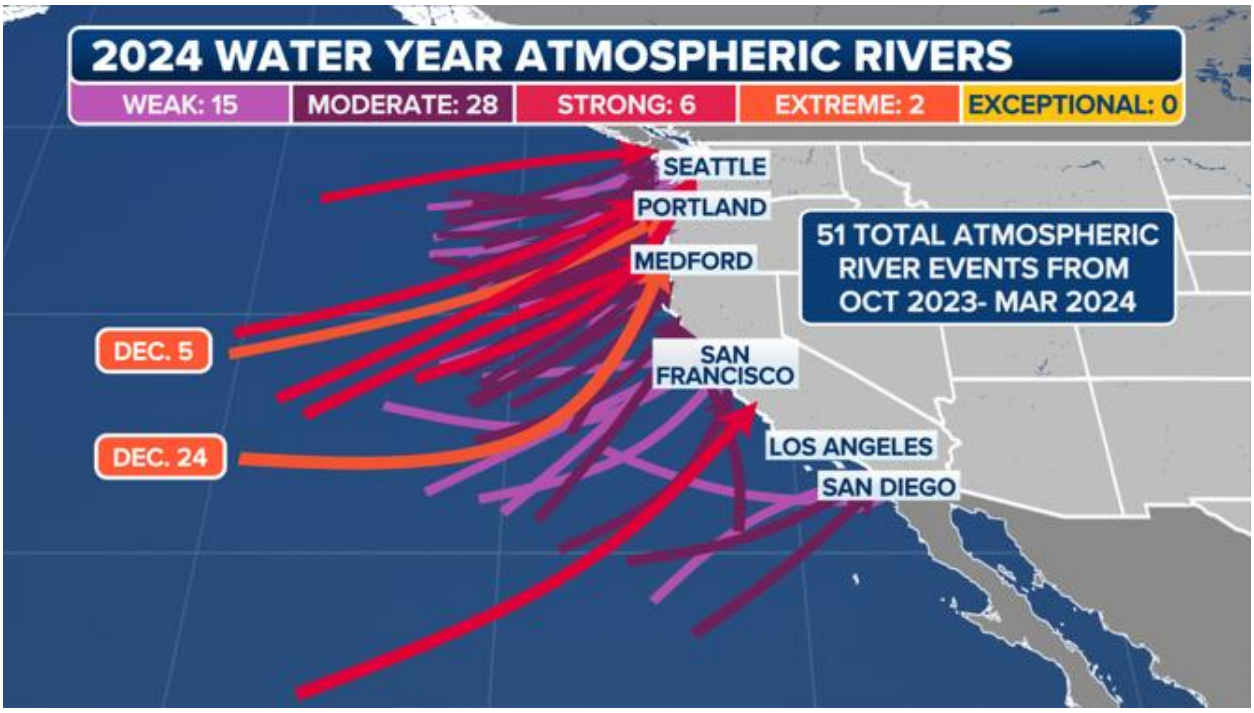
AR Strength	AR Count
Weak	12
Moderate	22
Strong	9
Extreme	2
Exceptional	1

Regions Impacted by Each AR	
State/Region	AR Conditions
Washington	34
Oregon	37
Northern CA	32
Central CA	21
Southern CA	17



Source: Center for Western Weather and Water Extremes. Retrieved 12/18/2024.

Figure 4-45 2024 Atmospheric Rivers



Source: Foxweather.com. Retrieved 12/18/2024.

Short-term, heavy storms can cause both widespread flooding as well as extensive localized drainage issues. In addition to the flooding that often occurs during these storms, strong winds, when combined with saturated ground conditions, can down very mature trees.

Location and Extent of Heavy Rains and Storms

Heavy rain events occur on a regional basis. Rains and storms can occur in any location of the County. All portions of the County are at risk to heavy rains and storms. Most of these rains occur during the winter months, as discussed below.

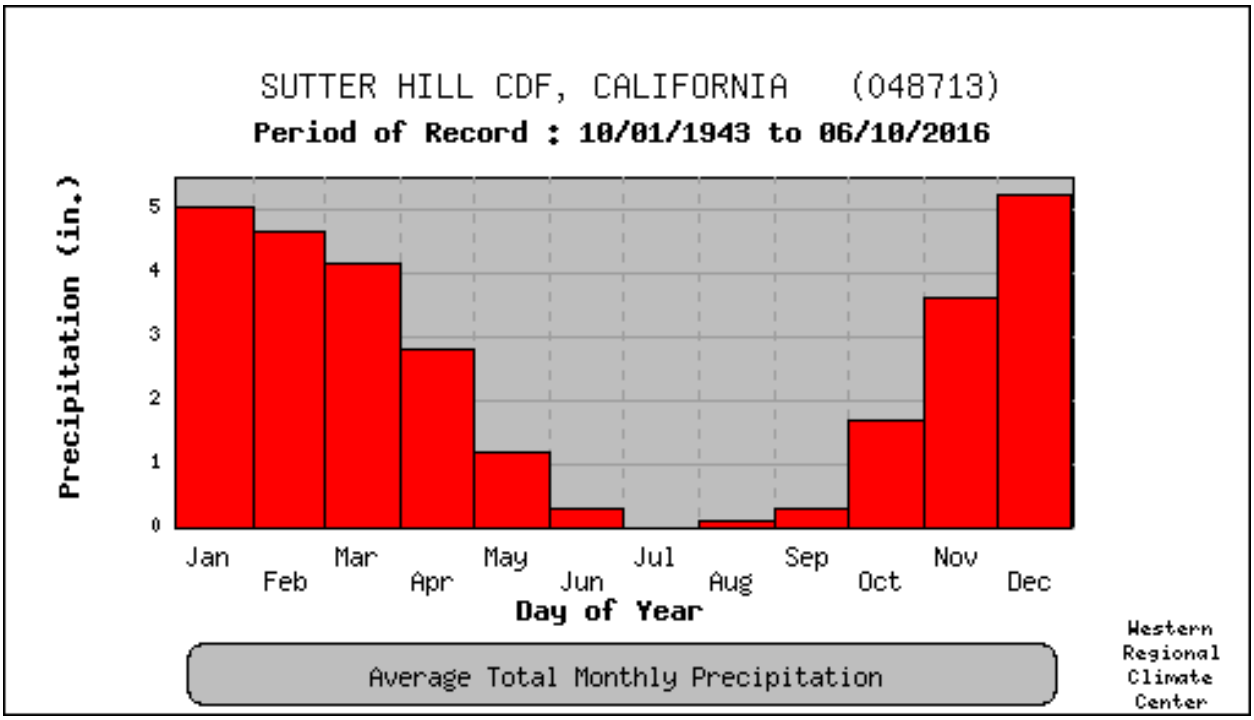
There is no scale by which heavy rains are measured – usually it is measured in terms of rainfall amounts. Magnitude of storms is measured often in rainfall and damages. The speed of onset of heavy rains can be short, but accurate weather prediction mechanisms often let the public know of upcoming events. Duration of thunderstorms in California is often short, ranging from minutes to hours. This can cause localized flooding, which is discussed in more detail in Section 4.3.13.

The WRCC and NWS maintain data on weather normal and extremes in the western United States. Each of these data sources maintain data in slightly different ways. Data from the WRCC stopped being collected in April of 2016. NWS covers the entire time period to present. Therefore, both data sets are shown below. WRCC and NWS data for both the western and eastern County is summarized below.

Western Amador County—Sutter Hill Ranger Station Weather Station (WRCC), Period of Record 1943 to 2016

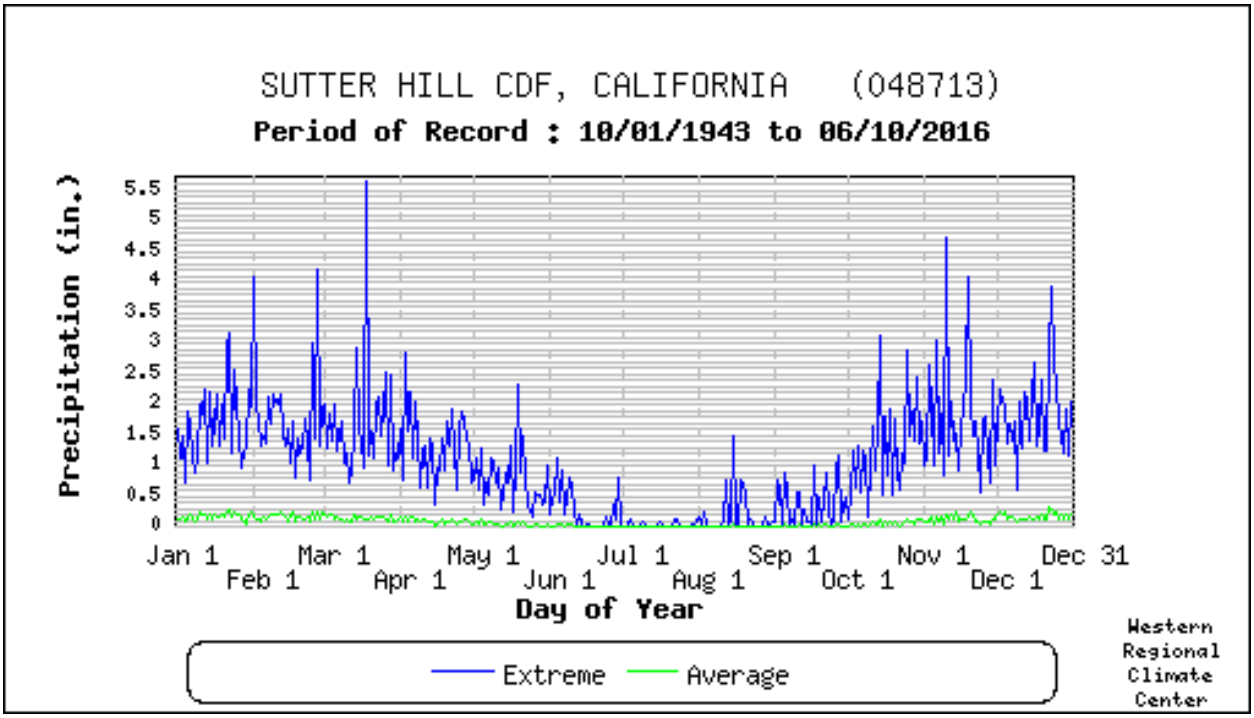
According to the WRCC, average annual precipitation in western Amador County is 26.55 inches per year. The highest recorded annual precipitation is 46.19 inches in 1950; the highest recorded precipitation for a 24-hour period is 5.62 inches on March 18, 2012. The lowest recorded annual precipitation was 10.17 inches in 1976. Average monthly precipitation for western Amador County is shown in Figure 4-46. Daily average and extreme precipitations are shown in Figure 4-47.

Figure 4-46 Western Amador County – Sutter Hill Ranger Station (WRCC) Monthly Average Total Precipitation 1943 to 2016



Source: Western Regional Climate Center, www.wrcc.dri.edu/. Retrieved 3/12/2025.

Figure 4-47 Western Amador County –Sutter Hill Ranger Station (WRCC) Daily Average and Extreme Precipitation 1943 to 2016

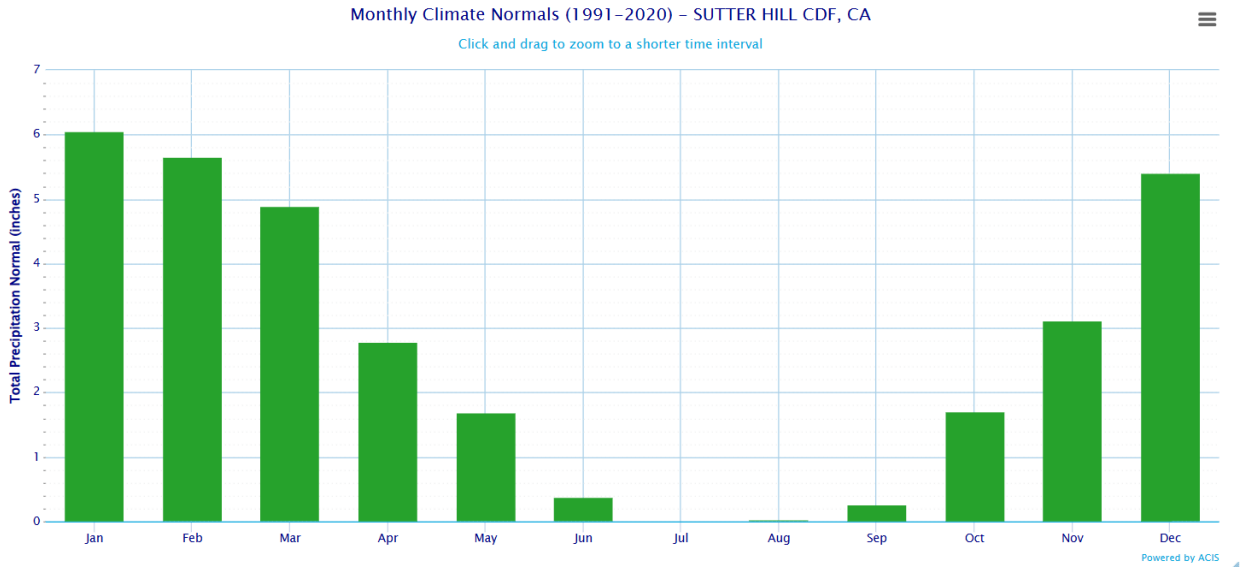


Source: Western Regional Climate Center, www.wrcc.dri.edu/. Retrieved 3/12/2025.

Western Amador County—Sutter Hill Ranger Station (NWS), Period of Record 1943 to 2024

According to the NWS, average annual precipitation in western Amador County is 31.6 inches per year. Average monthly precipitation for western Amador County is shown in Figure 4-48. The highest recorded precipitation for a 24-hour period is 5.62 inches on March 18, 2012. One day extreme precipitations are shown on Table 4-37.

Figure 4-48 Western Amador County— Sutter Hill Ranger Station (NWS) Monthly Average Total Precipitation 1991 to 2020



Source: National Weather Service XMAC site. Retrieved 3/12/2025.

Table 4-37 Western Amador County – Sutter Hill Ranger Station (NWS) 24 Hour Rainfall Extremes from 1943 to 2025

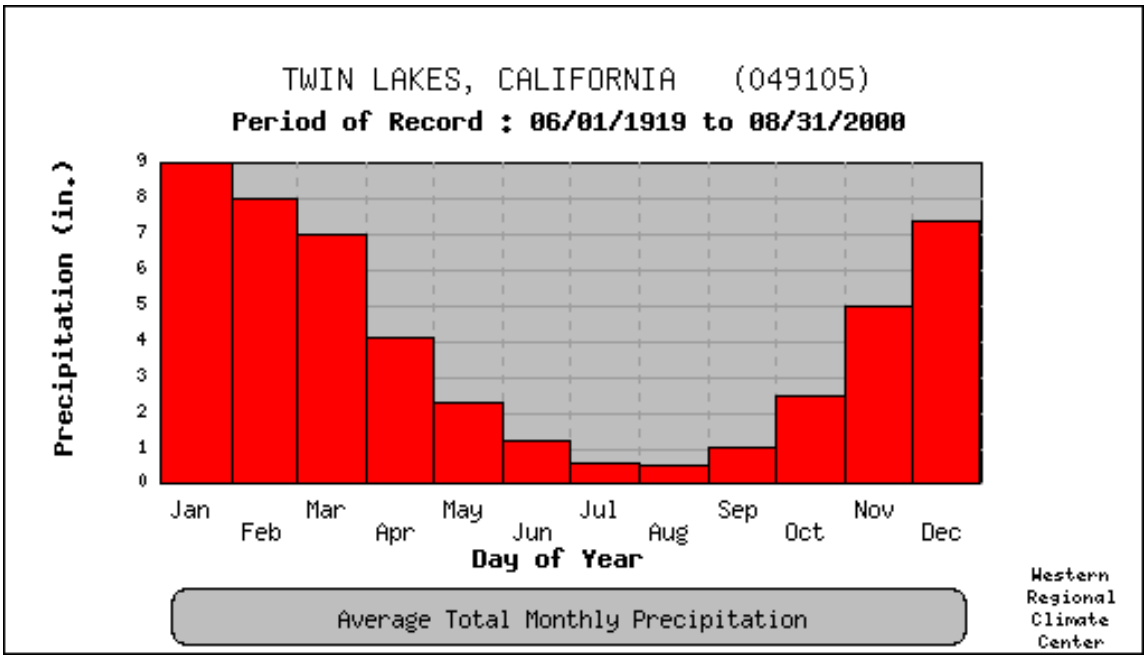
Rainfall in Inches	Date
5.62	3/18/2012
5.40	10/25/2021
4.69	11/10/1944
4.20	2/27/2011
4.08	11/19/1950
4.05	2/1/1963
3.90	12/23/1964
3.70	1/23/2017
3.13	1/22/1967
3.12	12/11/2022

Source: National Weather Service XMAC site. Retrieved 3/12/2025.

Eastern Amador County—Twin Lakes Weather Station (WRCC), Period of Record 1919 to 2000

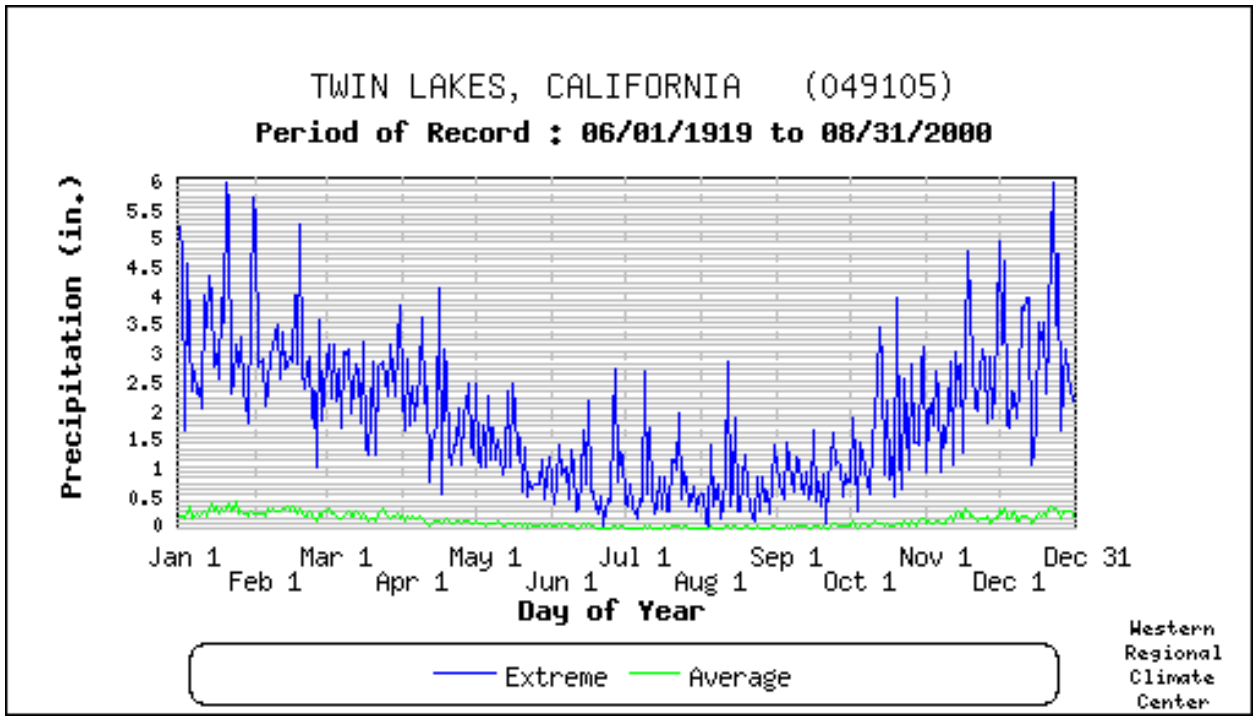
According to the WRCC, average annual precipitation in eastern Amador County is 47.05 inches per year. The highest recorded annual precipitation is 85.21 inches in 1983; the highest recorded precipitation for a 24-hour period is 9.35 inches on December 13, 1919. The lowest recorded annual precipitation was 10.17 inches in 1976. Average monthly precipitation for eastern Amador County is shown in Figure 4-49. Daily average and extreme precipitations are shown in Figure 4-50.

Figure 4-49 Eastern Amador County – Twin Lakes (WRCC) Monthly Average Total Precipitation 1919 to 2000



Source: Western Regional Climate Center, www.wrcc.dri.edu/. Retrieved 3/12/2025.

Figure 4-50 Eastern Amador County – Twin Lakes (WRCC) Daily Average and Extreme Precipitation 1919 to 2000



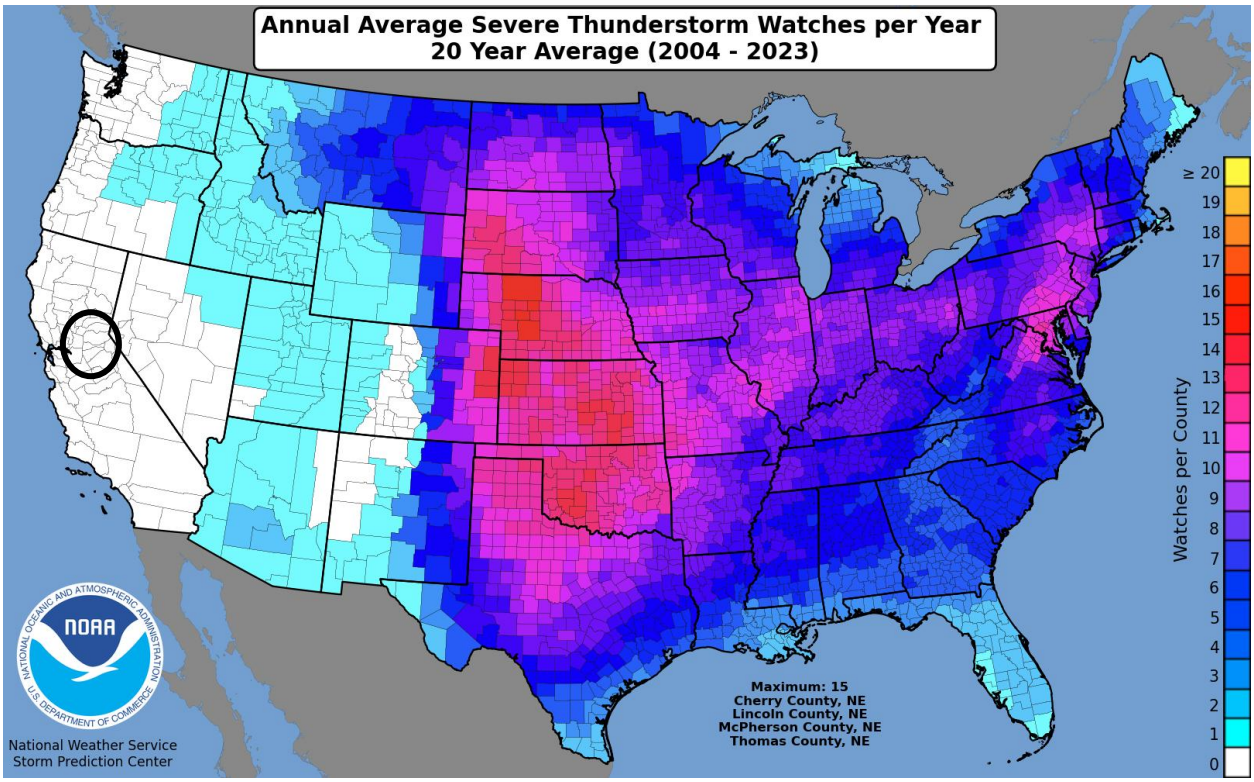
Source: Western Regional Climate Center, www.wrcc.dri.edu/. Retrieved 3/12/2025.

Eastern Amador County—Twin Lakes Weather Station (NWS), Period of Record 1919 to 2000

The NWS XMAC site did not have graphical or tabular data for heavy rains and storms; as such, no analysis is presented here.

The NOAA Storm Prediction Center tracks thunderstorm watches on a county basis. Figure 4-51 shows thunderstorm watches in Amador County and the United States for a 20-year period between 2004 and 2023.

Figure 4-51 Amador County – Average Thunderstorm Watches per Year (2004 to 2023)



Source: NOAA Storm Prediction Center. Retrieved 3/5/2025.

Hail

Hail can occur throughout the Planning Area during storm events, though it is rare in the County. Hail is formed when water droplets freeze and thaw as they are thrown high into the upper atmosphere by the violent internal forces of thunderstorms. Hail is sometimes associated with severe storms within the Amador County Planning Area. Hailstones are usually less than two inches in diameter and can fall at speeds of 120 miles per hour (mph). Severe hailstorms can be quite destructive, causing damage to roofs, buildings, automobiles, vegetation, and crops.

The National Weather Service classifies hail by diameter size, and corresponding everyday objects to help relay scope and severity to the population. Table 4-38 indicates the hailstone measurements utilized by the National Weather Service.

Table 4-38 Hailstone Measurements

Average Diameter	Corresponding Household Object
.25 inch	Pea
.5 inch	Marble/Mothball
.75 inch	Dime/Penny
.875 inch	Nickel
1.0 inch	Quarter

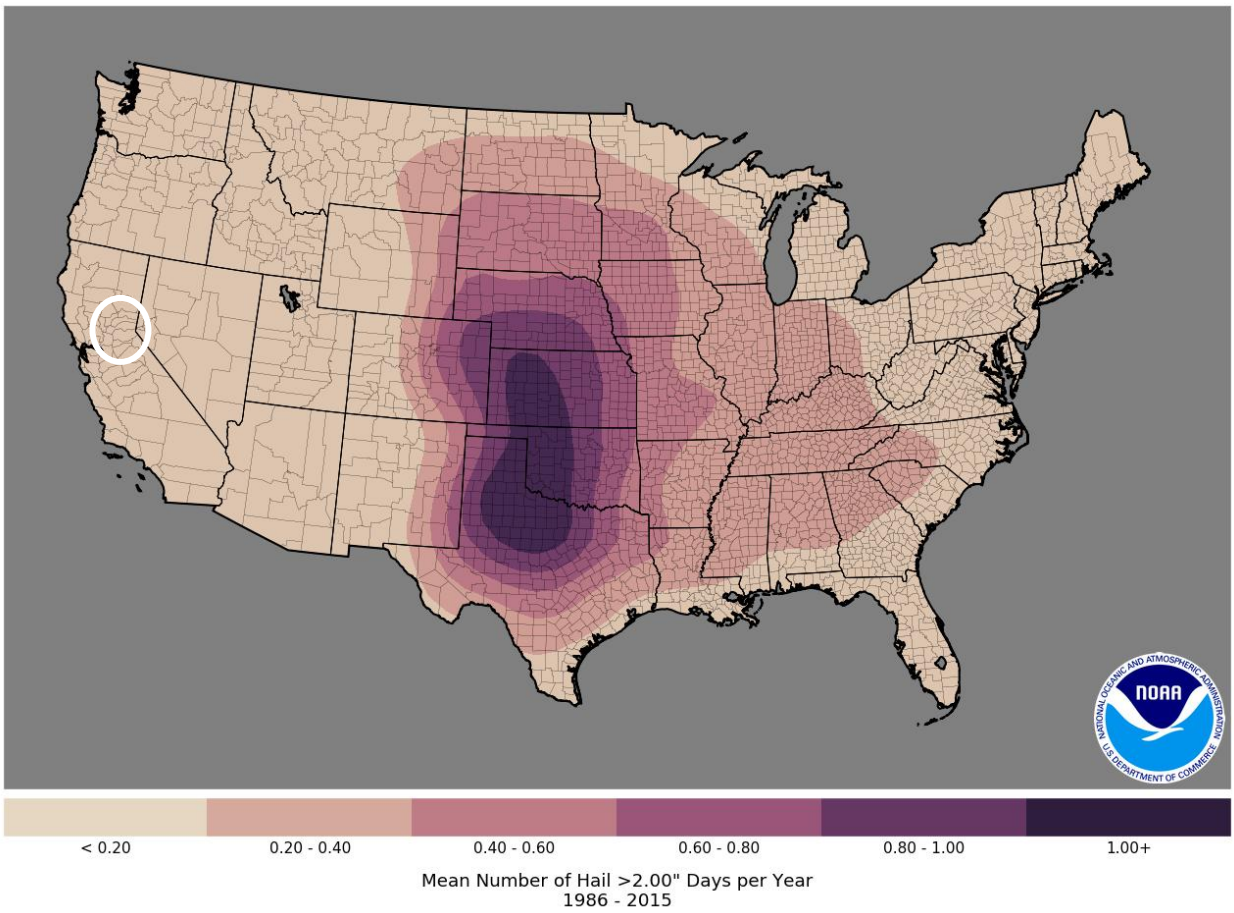
Average Diameter	Corresponding Household Object
1.5 inch	Ping-pong ball
1.75 inch	Golf-Ball
2.0 inch	Hen Egg
2.5 inch	Tennis Ball
2.75 inch	Baseball
3.00 inch	Teacup
4.00 inch	Grapefruit
4.5 inch	Softball

Source: National Weather Service

Location and Extent of Hail

Hail events can occur in any location of the County. All portions of the County are at risk to hail. Hail tends to be rare in California. There is no scale in which to measure hail, other than hail stone size as detailed above. The speed of onset of hail can be short, but accurate weather prediction mechanisms often let the public know of upcoming events. Duration of thunderstorms that can cause hail in California is often short, ranging from minutes to hours. Hail events last shorter than the duration of the total thunderstorm. The National Weather Service tracks hail events. Figure 4-52 shows the average days each year where hail of greater than 1" in diameter occurred during a 20-year period from 1986 to 2015 (the most recent data available).

Figure 4-52 Amador County – Average Hail Days per Year (1986 to 2015)



Source: National Weather Service. Retrieved 3/5/2024.

Lightning

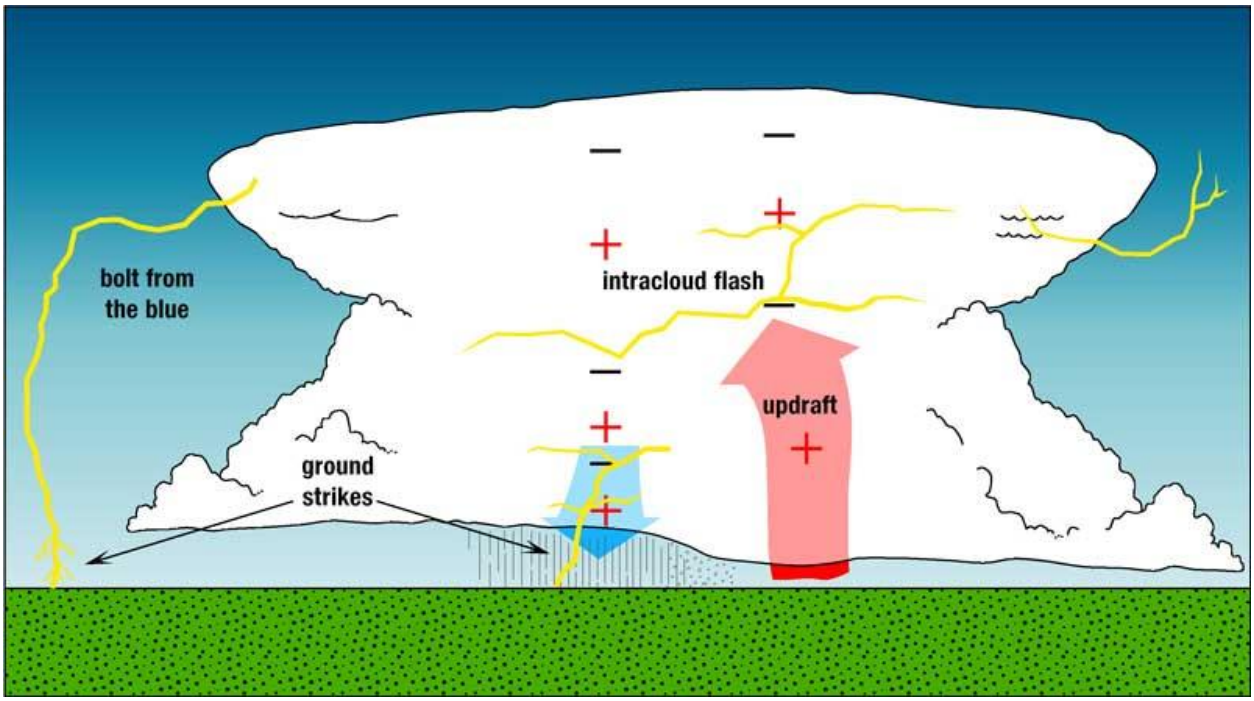
Lightning can occur throughout the County during storm events. Lightning is defined by the NWS as any and all of the various forms of visible electrical discharge caused by thunderstorms. Thunderstorms and lightning are usually (but not always) accompanied by rain. Cloud-to-ground lightning can kill or injure people by direct or indirect means. Objects can be struck directly, which may result in an explosion, burn, or total destruction. Or, damage may be indirect, when the current passes through or near an object, which generally results in less damage.

Intra-cloud lightning is the most common type of discharge. This occurs between oppositely charged centers within the same cloud. Usually it takes place inside the cloud and looks from the outside of the cloud like a diffuse brightening that flickers. However, the flash may exit the boundary of the cloud, and a bright channel, similar to a cloud-to-ground flash, can be visible for many miles.

Cloud-to-ground lightning is the most damaging and dangerous type of lightning, though it is also less common. Most flashes originate near the lower-negative charge center and deliver negative charge to earth. However, a large minority of flashes carry positive charge to earth. These positive flashes often occur during the dissipating stage of a thunderstorm's life. Positive flashes are also more common as a percentage

of total ground strikes during the winter months. This type of lightning is particularly dangerous for several reasons. It frequently strikes away from the rain core, either ahead or behind the thunderstorm. It can strike as far as 5 or 10 miles from the storm in areas that most people do not consider to be a threat (see Figure 4-53). Positive lightning also has a longer duration, so fires are more easily ignited. And, when positive lightning strikes, it usually carries a high peak electrical current, potentially resulting in greater damage.

Figure 4-53 Cloud to Ground Lightning



Source: National Weather Service

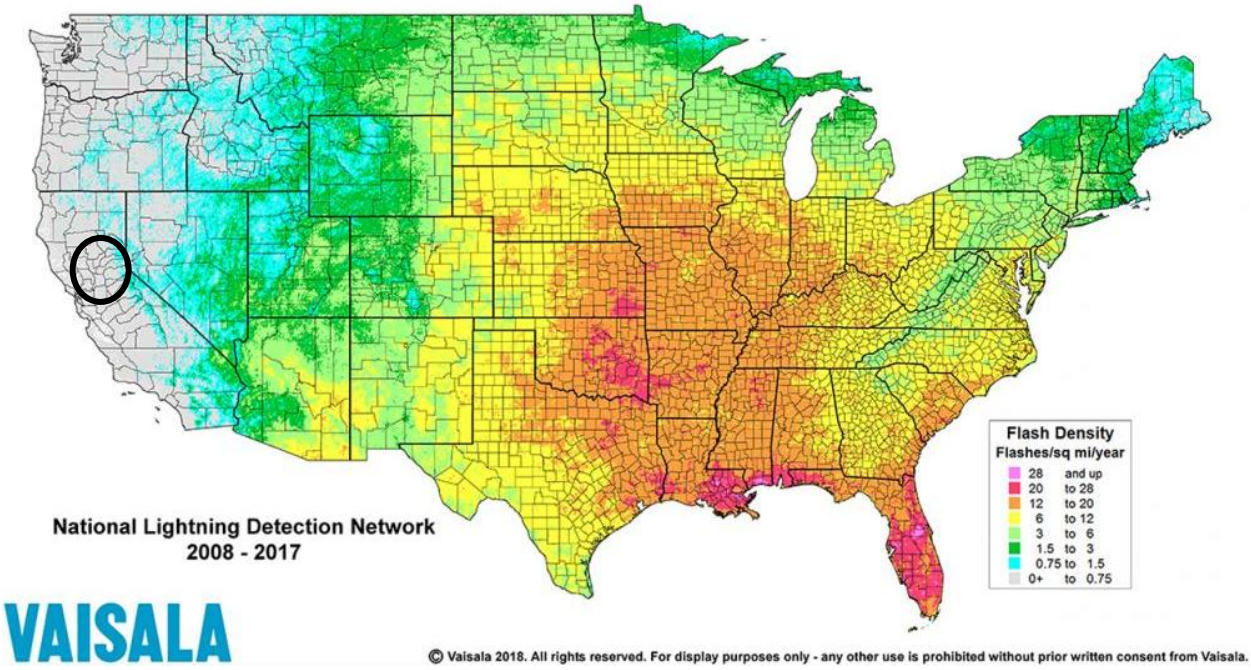
Lightning in the County is also a concern due to the number of fires that are started by lightning strikes. Wildfire is discussed in more detail in Section 4.3.15.

Location and Extent of Lightning

Lightning events can occur in any location of the County and are often associated with thunderstorms. All portions of the County are at risk to lightning. Lightning tends to be somewhat infrequent in the County, with more lightning events occurring in the higher elevations of the County, as discussed in the extent section below.

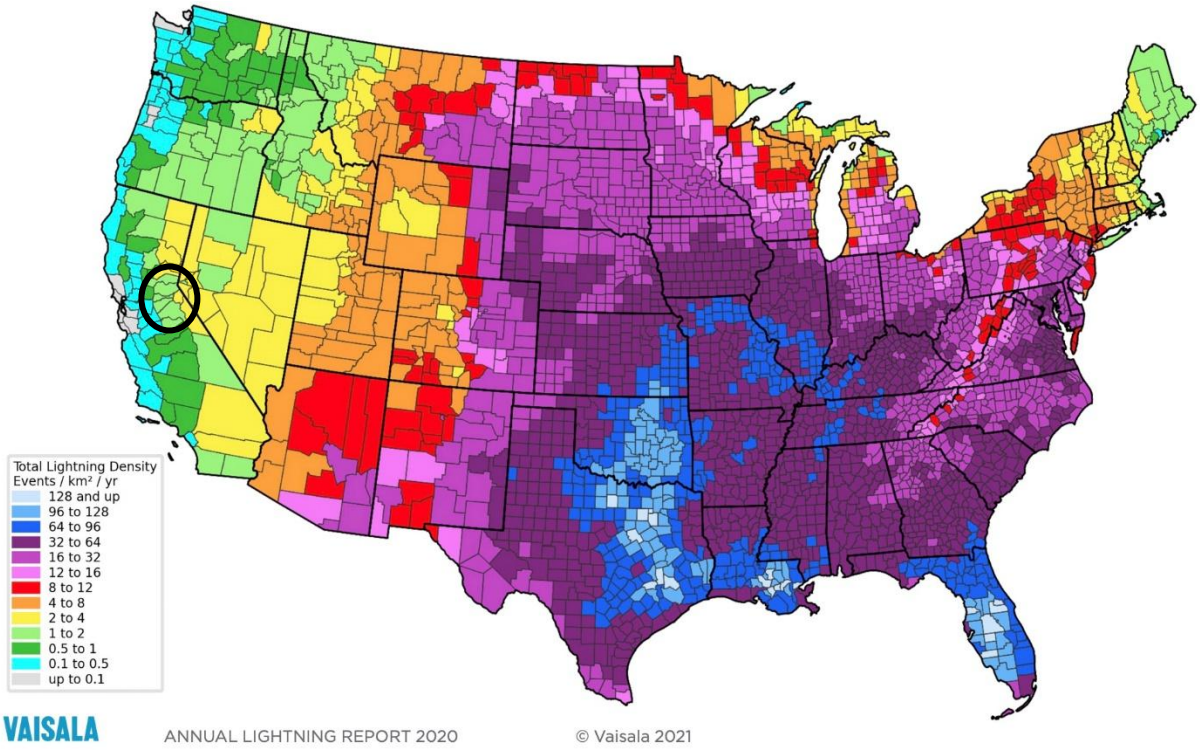
Lightning in the County can occur during thunderstorms. The speed of onset of thunderstorms that can cause lightning can be short, but accurate weather prediction mechanisms often let the public know of upcoming events. Duration of thunderstorms in California is often short, ranging from minutes to hours. Thunderstorms and lightning are rare in the County. Lightning can also occur in the County outside of a thunderstorm event. Vaisala maintains the National Lightning Detection Network. It tracks cloud to ground lightning incidences in the United States. Figure 4-54 shows lightning incidences in the County and the rest of the United States from 2008 to 2017 (the most recent long term tracking map available). Figure 4-55 shows a more recent lightning density by county map.

Figure 4-54 Amador County – Lightning Incidence Map 2008 to 2017



Source: Vaisala National Lightning Detection Network. Retrieved 3/20/2025.

Figure 4-55 Amador County – Average US Total Lightning Density per County 2015-2019



Source: Vaisala National Lightning Detection Network. Retrieved 3/20/2025.

Past Occurrences

Disaster Declaration History

A search of FEMA and Cal OES disaster declarations turned up multiple events. Heavy rains and storms have caused flooding in the County. Events where flooding and heavy rains and storms resulted in a state or federal disaster declaration are shown in Table 4-39.

More information on USDA disaster declarations from heavy rain and storms (once in 2016 and once in 2017) can be found in Table 4-48 in the Past Occurrences in Section 4.3.6.

Table 4-39 Amador County – Disaster Declarations from Heavy Rain and Storms 1950-2025

Disaster Type	State Declarations		Federal Declarations	
	Count	Years	Count	Years
Flood (including heavy rains and storms)	22	1950, 1955, 1958 (twice), 1959, 1963, 1964, 1969, 1980, 1982, 1986, 1995 (twice), 1997, 2006 (twice), 2017 (twice), 2019*, 2021, 2023 (twice)	20	1950, 1955, 1958, 1962, 1963, 1964, 1969, 1986, 1995 (twice), 1997, 1998, 2006 (twice), 2017 (twice), 2019, 2023 (three)

Source: FEMA, Cal OES

NCDC Events

The NCDC data recorded 8 hail and heavy rain weather incidents for Amador County since 1950. Winter weather events tend to be rain in the lower elevations of the County, while snow falls in the upper elevations. No incidents of lightning were found in the NCDC database for the County. A summary of these events is shown in Table 4-40.

*Table 4-40 NCDC Severe Weather Events in Amador County 1950-7/31/2024**

Event Type	Number of Events	Deaths	Deaths (indirect)	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Hail	2	0	0	0	0	$0	$0
Heavy Rain	6	0	0	0	0	$0	$0
Winter Weather	106	1	3	0	2	$100	$0
Total	**114**	**1**	**3**	**0**	**2**	**$ 100**	**$ 0**

Source: NCDC

*Note: Losses reflect totals for all impacted areas, some of which fell outside of Amador County

Hazard Mitigation Planning Committee Events

The HMPC noted some events of heavy rain and storm that caused agricultural impacts. Those are discussed in the Past Occurrences in Section 4.3.6. The HMPC also noted that Amador County experience localized heavy rains yearly. This creates potential flooding in localized area, such as upper Sutter Creek and unnamed drainages, within the County. Additionally, the County noted many of these past events are

discussed in the Section 4.3.12 Flood: 1%/0.2% Annual Chance and Section 4.3.13 Flood: Localized Stormwater Flooding.

Likelihood of Future Occurrence

Highly Likely – Based on NCDC data and HMPC input, 114 heavy rain and storm incidents over a 75-year period (1950-2024) equates to a severe storm event every year. Severe weather is a well-documented seasonal occurrence that will continue to occur often in the Amador County Planning Area.

It is likely that climate change will increase the chance of future occurrence as well as future impacts. More information on climate change and heavy rains and storms can be found in the next section. More information on future impacts can be found in the Future Conditions/Future Development section of the Vulnerability Assessment below.

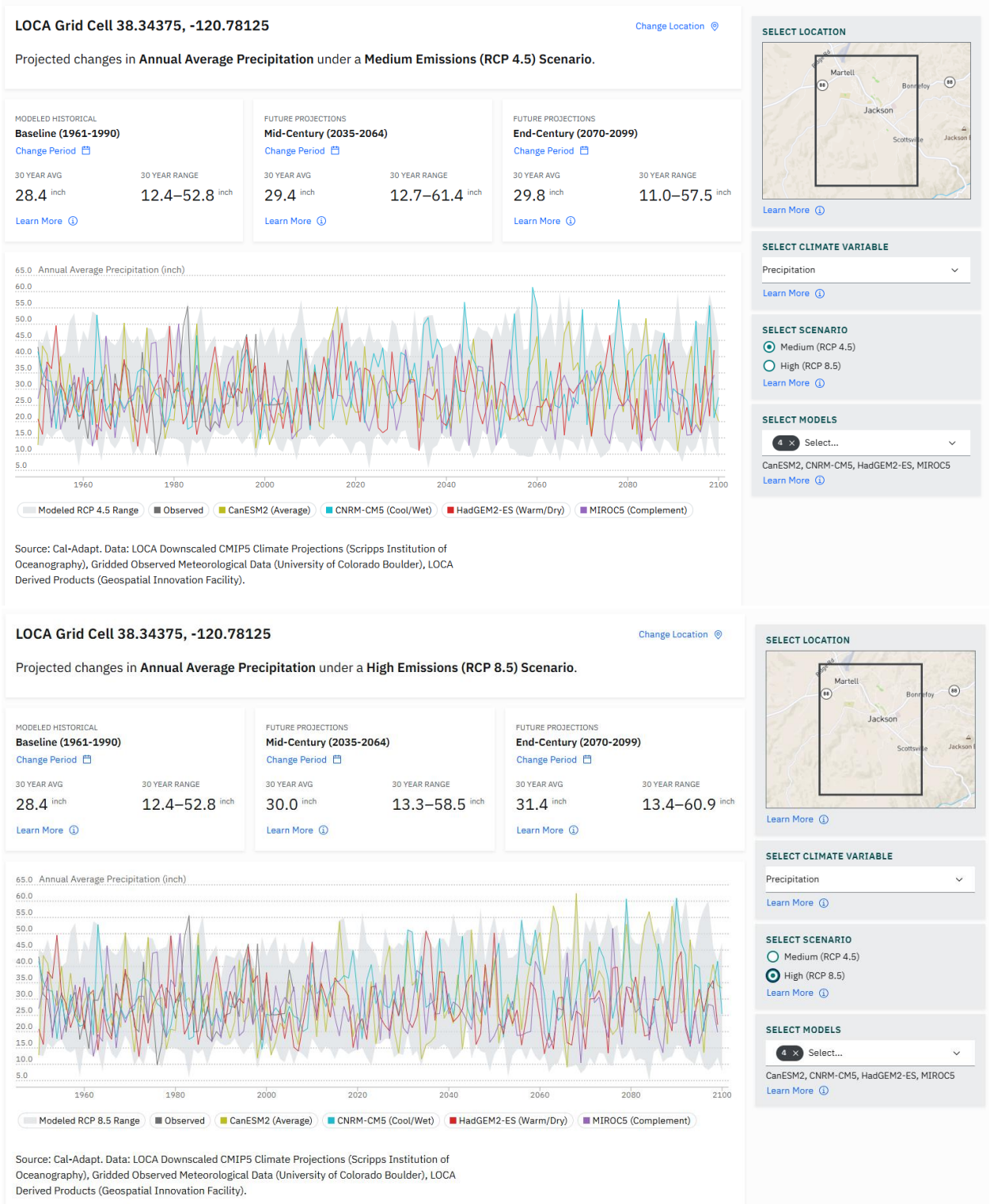
Climate Change and Heavy Rains and Storms

According to the 2021 CAS (as well as the 2024 Draft CAS), while average annual rainfall may increase or decrease slightly, the intensity of individual rainfall events is likely to increase during the 21st century. It is unlikely that hail will become more common in the County. The amount of lightning is not projected to change.

Cal-Adapt noted that, on average, the projections show little change in total annual precipitation in California. Furthermore, among several models, precipitation projections do not show a consistent trend during the next century. The Mediterranean seasonal precipitation pattern is expected to continue, with most precipitation falling during winter from North Pacific storms. One of the four climate models projects slightly wetter winters, and another projects slightly drier winters with a 10 to 20 percent decrease in total annual precipitation. However, even modest changes would have a significant impact because California ecosystems are conditioned to historical precipitation levels and water resources are nearly fully utilized. Future precipitation estimates for the County are shown in Figure 4-56.

- The upper chart shows annual averages of observed and projected Precipitation values for the selected area on map under the RCP 4.5 scenario. The gray line (1950 – 2005) is observed data. The colored lines (2006 – 2100) are projections from 10 LOCA downscaled climate models selected for California. The light gray band in the background shows the least and highest annual average values from all 32 LOCA downscaled climate models.
- The lower chart shows annual averages of observed and projected Precipitation values for the selected area on map under the RCP 8.5 scenario. The gray line (1950 – 2005) is observed data. The colored lines (2006 – 2100) are projections from 10 LOCA downscaled climate models selected for California. The light gray band in the background shows the least and highest annual average values from all 32 LOCA downscaled climate models.

Figure 4-56 Amador County– Future Precipitation Estimates: High and Low Emission Scenarios



Source: Cal-Adapt – Precipitation: Decadal Averages Map. Retrieved 2/6/2025.

Vulnerability Assessment

Vulnerability—Medium

According to historical hazard data, heavy rains and storms, including hail and lightning, are an annual occurrence in the Amador County Planning Area. Heavy rains can cause both localized flooding and flooding in the floodplains. Atmospheric river storms, which have been more frequent in recent years, are of great concern as they can dump large amounts of water in single storms, or in back-to-back storms.

An assessment of a community's vulnerability to this hazard begins with an understanding of local exposure to unincorporated Amador County. This is included in the Local Concerns section below. After that, vulnerability is discussed in multiple sections that detail how this hazard can affect both the entire Amador County Planning Area as well as the unincorporated portions of Amador County. How the hazard affects the other participating jurisdictions can be found in their respective annexes to this LHMP Update. These sections below include assets at risk, impacts, and how future development may affect the vulnerability of the County to this hazard.

Local Concerns (unincorporated Amador County)

The unincorporated County has specific concerns regarding this hazard. These concerns form a portion of the basis for the mitigation strategy and mitigation actions that seek to reduce the risk and vulnerabilities to this hazard.

One of the primary concerns of the County to heavy rains and storms is the resulting flooding that occurs during extreme storm events. These include large flood events as detailed in the Flood: 1%/0.2% annual chance flood hazard section and the localized flooding that occurs following these storms. Localized flood problem areas in the unincorporated County are shown in Table 4-113.

With the increased growth of the area, the lack of adequate drainage systems has become an increasingly important issue.

Local concerns for each of the other participating jurisdictions can be found under the Local Concerns heading in each respective jurisdictional annex to this LHMP Update.

Assets at Risk

Assets at risk from heavy rain and storms include people and populations; structures; critical facilities and infrastructure and community lifelines; natural, historic, and cultural resources; and economic assets and community activities of value. These are discussed in the following sections for the Amador County Planning Area and unincorporated Amador County.

Additionally, for each hazard in the FEMA National Risk Index in Amador County, the relevant portions of the hazard analysis done by FEMA is presented below. This includes the Hazard Risk Index Rating, Expected Annual Loss Values, Exposure Values, and the Historic Loss Ratio Rating. These are presented for the Amador County Planning Area as a whole.

People and Populations

All populations in the Amador County Planning Area have some measure of risk to heavy rains and storms. Those populations that work or recreate outside and unhoused individuals are more vulnerable to impacts from heavy storm events. Heavy rains and storms occur every year and do not generally cause significant adverse impacts to individuals; it is the secondary hazard, flooding, that poses the biggest impact to people. Populations at risk to flooding resulting from heavy rains and storm events include those who live in floodplains. (discussed in further detail in the Flood: 1%/0.2% Annual Chance in Section 4.3.12) and those who live in and near localized flooding areas floodplains (discussed in further detail in the Flood: Localized Stormwater Flooding in Section 4.3.13).

Structures

Structures in the Amador County Planning Area have some risk to heavy rains and storms. Structures built to modern building codes are built to withstand heavy rains and storms (including thunderstorm winds and lightning). During a heavy storm, localized flooding may cause water intrusion into buildings from the outside. Trees can be downed causing impacts to structures. Older homes and buildings may be at increased risk to heavy rains and storms. Power outages during severe storm events can occur, impacting the use of structures until the power is back online.

Critical Facilities and Infrastructure

Heavy rain and storms can affect critical facilities and infrastructure, and community lifelines during large events. Power outages may occur taking facilities offline. High winds can down power lines and trees impacting facilities. Water intrusion into facilities and infrastructure can impact operations. Local roads, streets, and bridges can be impacted resulting in closures restricting traffic flow in the Planning Area. In certain areas, large storms can cause erosion and localized landslides which can impact affected facilities. Many critical facilities are built to modern design standards that take heavy rains and storms into account when siting and building these structures, and others may need to be retrofitted to better withstand these events.

Natural, Historic, and Cultural Resources

Large storm events and associated flooding can affect natural, historic, and cultural resources. Silt and sediment can damage natural areas. Trees can be uprooted and downed by high winds. Extended periods of rainfall can erode natural banks along waterways and degrade soil stability for terrestrial species. While some natural systems can be adversely impacted during these large storms, heavy rain events can also provide benefits. Groundwater and wetland areas can be recharged and water supplies replenished. Historic and cultural resources may also be affected. Generally, the impacts are associated with damage to structures affected by large storm events, but other cultural resources such as those associated with Native Americans and old tribal areas can also be disturbed, damaged, and lost during extreme storm and flood events.

FEMA NRI Hazard Vulnerability Assessment

The FEMA NRI was queried for additional specific data on Amador County's vulnerability to Heavy Rains and Storms. The NRI contains data and analysis for 18 separate natural hazards. The NRI hazard related

to Amador County's Heavy Rains and Storms are: hail and lightning. As shown in Table 4-41, hail could cause a total of $2,739 in expected annual losses, with a historic loss rating of very low. Lightning could cause a total of $21,900 in expected annual losses with a historic loss ratio rating of very high. Hail and lighting have a relatively moderate rating for both social vulnerability and community resilience, with a risk index score of 4.4 out of 100 for hail and 24.6 out of 100 for lightning. According to the NRI, there have been 5 hail events between the years 1986-2021 with an average of 0.1 events per year and 43 lightning events on record between the years 1991-2012, with an average of 1.9 events per year.

Table 4-41 Amador County Planning Area – Hail and Lightning Vulnerability Ratings from FEMA NRI

NRI Hazard	Hazard Risk Index Rating*	Expected Annual Loss Values (total)**	Exposure Value (total)***	Historic Loss Ratio Rating
Hail	4.4	$2,739	$477,114,656,936	Very Low
Lightning	24.6	$21,900	$477,079,067,642	Very High

Source: FEMA NRI Report, retrieved 4/1/2025.

*Hazard Risk Index is calculated using data for only a single hazard type, and reflect a communities expected annual loss value, community risk factors, and the adjustment factor used to calculate the risk value.

**Expected annual loss represents the average economic loss in dollars resulting from natural hazards each year.

***Exposure is a natural hazard consequence factor that is the representative value of buildings, populations, or agriculture potentially exposed to a natural hazard occurrence.

Additional information on the FEMA NRI can be found in Section 4.2 and Appendix G.

Impacts from Heavy Rains and Storms

Impacts from heavy rains and storms include damage to property, critical facilities and infrastructure, and the natural landscape. This includes: erosion, downed trees, damaged utility structures and infrastructure; power outages; road damage and blockages; and lightning strikes to critical infrastructure and people. Lightning can also cause wildfires and urban fires to occur. Landslides occur when the soil on slopes becomes oversaturated and fails. Climate change may cause these impacts to worsen.

Actual damage associated with the primary effects of severe storms and heavy rains has been somewhat limited. It is the secondary hazards caused by these severe weather events, such as floods, landslides, and erosion that have had the greatest impact on the Planning Area. The risk and vulnerability associated with these secondary hazards are discussed in other sections of this Plan (Section 4.3.12 Flood: 100/500-year, Section 4.3.13 Flood: Localized Stormwater – specifically in the localized flood areas shown on Table 4-113, Section 4.3.9 Dam Failure, and Section 4.3.14 Landslide).

Impacts to identified assets at risk to this hazard and the overall vulnerability of the County may be affected in the future by climate change (which was discussed in the hazard profile section above), changes in population patterns, and changes in land use and development. The influencing effects of these factors on this hazard are discussed further in the Future Conditions/Future Development discussion below.

Future Conditions/Future Development

Future hazard conditions may be affected by climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. Findings on this for Amador County include the following:

- Climate change is likely to exacerbate future heavy rain and storm conditions and associated impacts and vulnerability of the County to flooding.
- Future population growth should be considered as having more or less people in a community affects the overall hazard vulnerability to the County. Population is expected to increase slowly for Amador County; however, the vulnerability may change depending on changes to the makeup of more vulnerable populations. Certain vulnerable populations, such as the unhoused, outdoor workers, and others could experience disproportional effects from this hazard. and should be addressed as the County continues to grow. Thus, changes in population and population patterns may or may not increase the impacts and vulnerability of the County to this hazard depending on the location and nature of growth and continued planning for future hazard conditions.
- Land use planning should be proactive to address future hazard conditions. Changes in land use may also amplify the impacts of heavy rains and storms, as additional impervious surfaces can cause additional runoff and localized flooding throughout the County. Building codes in the County ensure that new development is built to current building standards, which should reduce the risk to future development in the County from heavy rains and storms. New critical facilities such as communications towers and others should be built to withstand hail damage, lightning, and thunderstorm winds. With adherence to development standards, changes in land use and development will not likely increase the impacts and associated vulnerabilities of the County to this hazard.

Future development considerations should be ongoing and proactive. Ensuring that comprehensive land use planning is conducted, regulatory requirements, such as building codes, are followed, and varying needs for different demographic groups with intersecting identities that reside within the County are considered can help make for a more resilient community.

4.3.5. Severe Weather: High Winds and Tornadoes

Hazard Profile

This hazard profile contains multiple sections that detail how this hazard can affect the Amador County Planning Area. These sections include a hazard/problem description; description of location and extent; past occurrences of this hazard; likelihood of future occurrences; and how climate change can affect or influence this hazard.

Hazard/Problem Description

High Winds

High winds, often accompanying severe storms and thunderstorms, can cause significant property and crop damage, threaten public safety, and have adverse economic impacts from business closures and power loss. High winds, as defined by the NWS glossary, are sustained wind speeds of 40 mph or greater lasting for 1

hour or longer, or winds of 58 mph or greater for any duration. These winds may occur as part of a seasonal climate pattern or in relation to other severe weather events such as thunderstorms.

Straight-line winds may also exacerbate existing weather conditions by increasing the effect on temperature and decreasing visibility due to the movement of particulate matters through the air, as in dust and snow storms. The winds may also exacerbate fire conditions by drying out the ground cover, propelling fuel around the region, and increasing the ferocity of exiting fires. These winds may damage crops, push automobiles off roads, damage roofs and structures, and cause secondary damage due to flying debris.

Location and Extent

The entire Planning Area is subject to significant, non-tornadic (straight-line), winds. Each area of the County is at risk to high winds. Magnitude of winds is measured often in speed and damages. These events are often part of a heavy rain and storm event, but can occur outside of storms. The speed of onset of winds can be short, but accurate weather prediction mechanisms often let the public know of upcoming events. Duration of winds in California is often short, ranging from minutes to hours. The Beaufort scale is an empirical measure that relates wind speed to observed conditions at sea or on land. Its full name is the Beaufort wind force scale. Figure 4-57 shows the Beaufort wind scale.

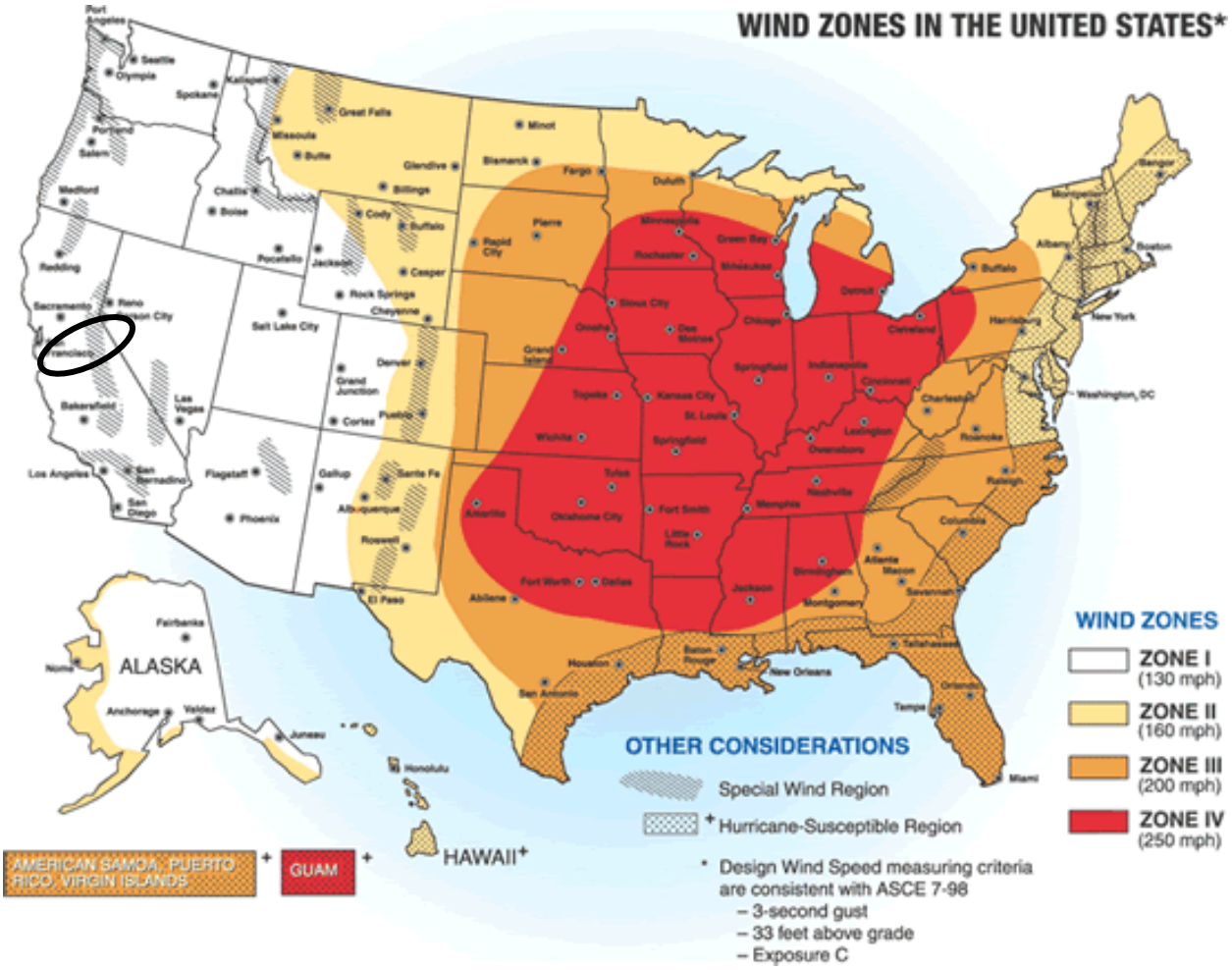
Figure 4-57 Beaufort Wind Scale

Beaufort Number	Wind Speed (miles/hour)	Wind Speed (km/hour)	Wind Speed (knots)	Description	Wind Effects on Land
0	< 1	< 1	< 1	Calm	Calm. Smoke rises vertically.
1	1-3	1-5	1-3	Light Air	Wind motion visible in smoke.
2	4-7	6-11	4-6	Light Breeze	Wind felt on exposed skin. Leaves rustle.
3	8-12	12-19	7-12	Gentle Breeze	Leaves and smaller twigs in constant motion.
4	13-18	20-28	11-16	Moderate Breeze	Dust and loose paper are raised. Small branches begin to move.
5	19-24	29-38	17-21	Fresh Breeze	Small trees begin to sway.
6	25-31	39-49	22-27	Strong Breeze	Large branches are in motion. Whistling is heard in overhead wires. Umbrella use is difficult.
7	32-38	50-61	28-33	Near Gale	Whole trees in motion. Some difficulty experienced walking into the wind.
8	39-46	62-74	34-40	Gale	Twigs and small branches break from trees. Cars veer on road.
9	47-54	75-88	41-47	Strong Gale	Larger branches break from trees. Light structural damage.
10	55-63	89-102	48-55	Storm	Trees broken and uprooted. Considerable structural damage.
11	64-72	103-117	56-63	Violent Storm	Widespread damage to structures and vegetation.
12	> 73	> 117	> 64	Hurricane	Considerable and widespread damage to structures and vegetation. Violence.

Source: National Weather Service

Figure 4-58 depicts wind zones for the United States. The map denotes that Amador County falls into Zone I, which is characterized by high winds of up to 130 mph. Portions of the County are also located in a special wind hazard region, which is a result of foehn winds. A foehn wind is a type of dry down-slope wind that occurs in the lee (downwind side) of a mountain range. Winds of this type are called "snow-eaters" for their ability to make snow melt or sublimate rapidly. This snow-removing ability is caused not only by warmer temperatures, but also the low relative humidity of the air mass coming over the mountain(s). They are also associated with the rapid spread of wildfires, making some regions which experience these winds particularly fire prone. Burn patterns of almost all historic large wildfires in the County indicate they occurred during foehn winds. This is discussed in greater detail in the wildfire profile in Section 4.3.15.

Figure 4-58 Wind Zones in the United States

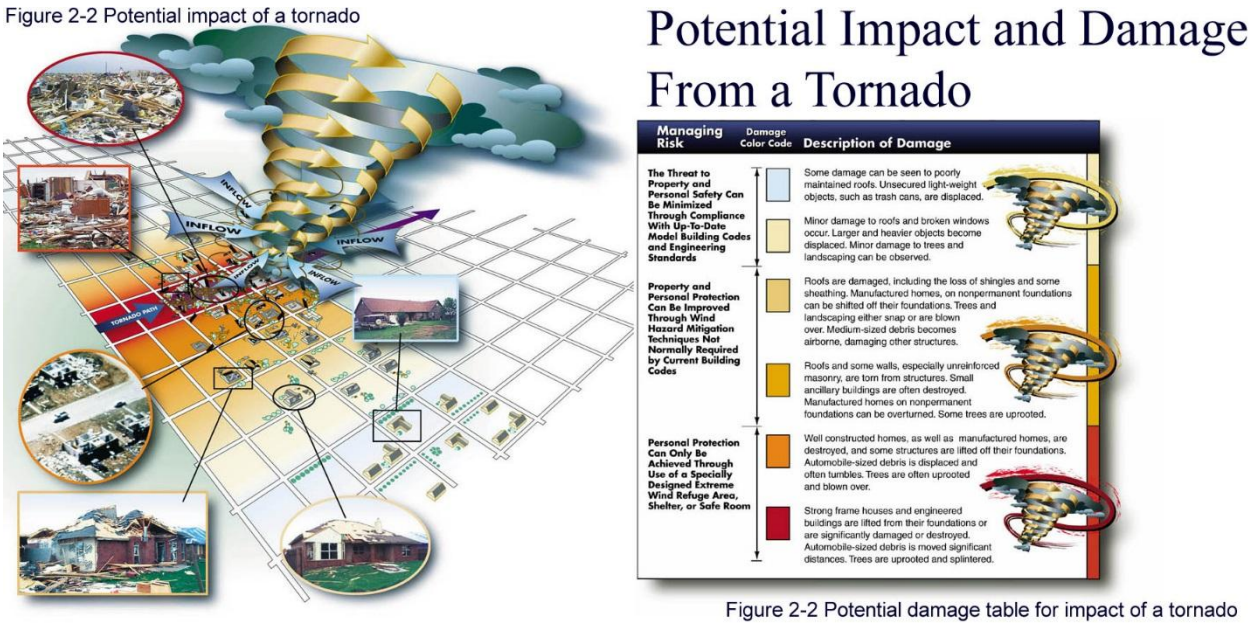


Source: FEMA

Tornadoes

Tornadoes and funnel clouds can also occur during these types of severe storms. Tornadoes are another severe weather hazard that, though rare, can affect anywhere within the Amador County Planning Area, but most often in the lower elevations, and primarily occur during the storm season in the late fall and early spring. Tornadoes form when cool, dry air sits on top of warm, moist air. Tornadoes are rotating columns of air marked by a funnel-shaped downward extension of a cumulonimbus cloud whirling at destructive speeds of up to 300 mph, usually accompanying a thunderstorm. Tornadoes are the most powerful storms that exist. They can have the same pressure differential across a path only 300 yards wide or less as 300-mile-wide hurricanes. Figure 4-59 illustrates the potential impact and damage from a tornado.

Figure 4-59 Potential Impact and Damage from a Tornado



Source: FEMA: Building Performance Assessment: Oklahoma and Kansas Tornadoes

Location and Extent

Tornadoes, while rare, can occur at any location in the County, but most often occur in the lower elevations. All areas of the County are at risk to tornadoes.

Prior to February 1, 2007, tornado intensity was measured by the Fujita (F) scale. This scale was revised and is now the Enhanced Fujita scale. Both scales are sets of wind estimates (not measurements) based on damage. The new scale provides more damage indicators (28) and associated degrees of damage, allowing for more detailed analysis and better correlation between damage and wind speed. It is also more precise because it considers the materials affected and the construction of structures damaged by a tornado. Table 4-42 shows the wind speeds associated with the original Fujita scale ratings and the damage that could result at different levels of intensity. Table 4-43 shows the wind speeds associated with the Enhanced Fujita Scale ratings.

Table 4-42 Original Fujita Scale

Fujita (F) Scale	Fujita Scale Wind Estimate (mph)	Typical Damage
F0	< 73	Light damage. Some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; sign boards damaged.
F1	73-112	Moderate damage. Peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads.
F2	113-157	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars overturned; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.

Fujita (F) Scale	Fujita Scale Wind Estimate (mph)	Typical Damage
F3	158-206	Severe damage. Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off the ground and thrown.
F4	207-260	Devastating damage. Well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown, and large missiles generated.
F5	261-318	Incredible damage. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 meters (109 yards); trees debarked; incredible phenomena will occur.

Source: National Oceanic and Atmospheric Administration Storm Prediction Center, www.spc.noaa.gov/faq/tornado/f-scale.html

Table 4-43 Enhanced Fujita Scale

Enhanced Fujita (EF) Scale	Enhanced Fujita Scale Wind Estimate (mph)
EF0	65-85
EF1	86-110
EF2	111-135
EF3	136-165
EF4	166-200
EF5	Over 200

Source: National Oceanic and Atmospheric Administration Storm Prediction Center, www.spc.noaa.gov/faq/tornado/ef-scale.html

It is difficult to predict a tornado or the conditions that preclude a tornado far in advance. Tornadoes can strike quickly with very little warning. In California it is rare for tornadoes to exceed EF3 magnitude. Most tornadoes that touch down are not long lived.

Past Occurrences

Disaster Declaration History

There have been no past federal or state disaster declarations due to high winds or tornadoes, according to Table 4-4. There was one USDA Secretarial Disaster Declaration for high winds from 2016, which can be found in Table 4-48 in Section 4.3.6 below.

NCDC Events

The NCDC data recorded 160 high wind, 3 funnel cloud, and no tornado incidents for Amador County since 1950. A summary of these events is shown in Table 4-44.

Table 4-44 NCDC High Wind and Tornado Events in Amador County 1950-7/31/2024

Event Type	Number of Events	Deaths	Deaths (indirect)t	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Funnel Cloud	3	0	0	0	0	$0	$0
High Wind	91	3	0	6	0	$17,276,000	$48,000

Event Type	Number of Events	Deaths	Deaths (indirect)t	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Strong Wind	66	6	1	4	3	$6,219,100	$0
Thunderstorm Wind	3	0	0	0	0	$3,000	$0
Total	**163**	**9**	**1**	**10**	**3**	**$23,498,100**	**$48,000**

Source: NCDC

Hazard Mitigation Planning Committee Events

The HMPC noted that winds have affected the agricultural industry in the past. Those events are discussed in the Past Occurrences in Section 4.3.6. HMPC members also noted that:

2004 – the Power Fire was a wind driven event that consumed 16,993 acres, affecting national forest, industrial timberlands, and electric transmission lines. Amador County experience localized high winds, due to topography within the County. This results in downed limbs or trees along roadway.

2019 – high winds downed trees throughout the Amador County resulting in debris removal and road repairs that was reimbursed by FEMA.

Amador County Public Works could recall no wind events since 2020 that caused damages, injuries, or deaths. They also noted that no damaging tornadoes could be recalled, including tornadoes since 2020. Two tornado warnings occurred (April 21, 2022 and January 10, 2023) for Amador and surrounding counties, but no tornadoes occurred.

Likelihood of Future Occurrence

Highly Likely/Occasional – Based on NCDC data and HMPC input, 163 wind and tornado incidents over a 74-year period (1950-2024) equates to a severe wind/tornado event every year. High winds are a well-documented seasonal occurrence that will continue to occur annually in the Amador County Planning Area. Tornadoes tend to be rare in the County and warrant a likelihood of future occurrence rating of occasional.

Climate change may increase the chance of future occurrence as well as future impacts. More information on climate change and high winds and tornadoes can be found in the next section. More information on future impacts can be found in the Future Conditions/Future Development section of the Vulnerability Assessment below.

Climate Change and High Winds

According to the 2021 CAS (as well as the 2024 Draft CAS), while average annual rainfall may increase or decrease slightly, the intensity of individual thunderstorm events is likely to increase during the 21st century. This may bring stronger thunderstorm winds. The CAS does not discuss non-thunderstorm winds.

Vulnerability Assessment

Vulnerability—Medium

The Amador County Planning Area is subject to potentially destructive high winds and tornadoes. High winds are common throughout the area and can happen during most times of the entire year and outside of a severe storm event. Tornadoes are rare. High winds and tornadoes can be a significant public safety and economic concern.

The whole of the Planning Area has some measure of vulnerability to high winds and tornadoes. An assessment of a community's vulnerability to this hazard begins with an understanding of local exposure to unincorporated Amador County. This is included in the Local Concerns section below. After that, vulnerability is discussed in multiple sections that detail how this hazard can affect both the entire Amador County Planning Area as well as the unincorporated portions of Amador County. How the hazard affects the other participating jurisdictions can be found in their respective annexes to this LHMP Update. These sections below include assets at risk, impacts, and how future development may affect the vulnerability of the County to this hazard.

Local Concerns (unincorporated Amador County)

The unincorporated County has specific concerns regarding this hazard. These concerns form a portion of the basis for the mitigation strategy and mitigation actions that seek to reduce risk and vulnerability to this hazard.

The County noted that while there has been some scattered record keeping describing the impacts of windstorms, there is little information to indicate that straight-line winds are little more than a nuisance. For example, while winds can blow weeds that can create an additional expense for farmers, they often cause little long-term damage and there is little justification for allocating resources to combat them. Trees may be downed in the County. As detailed in the wildfire discussion, one of the most significant concerns in the County is the effect of high winds in fueling wildfires. Even before a wildfire starts, high winds can cause PG&E to put PSPS events into effect.

Local concerns for each of the jurisdictions can be found under the Local Concerns heading in each respective jurisdictional annex to this LHMP Update.

Assets at Risk

Assets at risk from winds and tornadoes include people and populations; structures; critical facilities and infrastructure; and natural, historic, and cultural resources. These are discussed in the following sections for the Amador County Planning Area and unincorporated Amador County.

Additionally, for each hazard in the FEMA National Risk Index in Amador County, the relevant portions of the hazard analysis done by FEMA is presented below. This includes the Hazard Risk Index Rating, Expected Annual Loss Values, Exposure Values, and the Historic Loss Ratio Rating. These are presented for the Amador County Planning Area as a whole.

People and Populations

All populations are at some vulnerability to high winds and tornadoes. Certain vulnerable populations are at the greatest risk to the effects of high winds and tornadoes. These include the unsheltered, residents who live in mobile homes, residents who live in older buildings not built to withstand high winds and that may not have areas to shelter, such as below ground floors, and those working or caught outdoors during a wind or tornado event.

Structures

All structures in the Amador County Planning Area have some measure of risk from high wind and tornadoes. Though most structures are built to withstand winds, high wind speeds can still cause damages in the Planning Area. Though rare, a tornado could cause damage to virtually all facilities in the tornado touchdown path. This would affect homes, businesses, commercial property, as well as government and critical facilities. During a wind or tornado event, power lines in the Planning Area can be damaged causing power outages and falling trees can cause damage to nearby structures. High winds are also a cause for PSPS events to be declared, causing power outages to occur. High winds and tornadoes could cause sparks from electric wires and other sources, which could lead to wildfire ignition. Once ignited, high winds can also cause wildfires to rapidly spread and become out of control. High wind conditions can cause wildfires to move into more urban areas destroying structures and whole subdivisions, as seen in recent wildfire events in the California.

Critical Facilities and Infrastructure

Though most critical facilities are built to withstand winds, high wind speeds can still cause damage to critical facilities and infrastructure in the Amador County Planning Area. Though rare, a tornado could cause damage to virtually all facilities in the tornado touchdown path. Winds can cause PSPS events and lead to out of control wildfires, which can damage critical facilities and impact their abilities to perform their critical roles in the community.

Natural, Historic, and Cultural Resources

Natural resources, such as trees, are vulnerable to winds. Increased levee and streambank erosion can occur during periods of high water and high winds. High wave action during significant wind events can cause levee and streambank erosion and impact marsh lands and habitat areas. Soil erosion can also occur during high winds. Most all natural, historic, or cultural resources are at risk to tornadoes. Tornadoes can tear apart habitats, causing fragmentation across ecosystems and can damage and destroy historic structures and cultural resources.

FEMA NRI Hazard Vulnerability Assessment

The FEMA NRI was queried for additional specific data on Amador County's vulnerability to High Winds and Tornadoes. The NRI contains data and analysis for 18 separate natural hazards. The NRI hazard related to Amador County's High Winds and Tornadoes are: strong winds and tornadoes. As shown in Table 4-45, strong winds could cause a total of $5,715 in expected annual losses, with a historic loss rating of relatively low. Tornadoes could cause a total of $23,039 in expected annual losses with a historic loss ratio rating of

very low. Strong winds and tornadoes have a relatively moderate rating for both social vulnerability and community resilience, with a risk index score of 2.5 out of 100 for strong winds and 6.2 out of 100 for tornadoes. According to the NRI, there have been 2 strong wind events between the years 1986-2021 with an average of 0 events per year and 0 tornado events on record between the years 1950-2021, with an average of 0 events per year.

Table 4-45 Amador County Planning Area – Strong Wind and Tornado Vulnerability Ratings from FEMA NRI

NRI Hazard	Hazard Risk Index Rating*	Expected Annual Loss Values (total)**	Exposure Value (total)***	Historic Loss Ratio Rating
Strong Wind	2.5	$5,715	$477,114,656,936	Relatively Low
Tornado	6.2	$23,039	$477,114,656,936	Very Low

Source: FEMA NRI Report, retrieved 4/1/2025.

*Hazard Risk Index is calculated using data for only a single hazard type, and reflect a communities expected annual loss value, community risk factors, and the adjustment factor used to calculate the risk value.

**Expected annual loss represents the average economic loss in dollars resulting from natural hazards each year.

***Exposure is a natural hazard consequence factor that is the representative value of buildings, populations, or agriculture potentially exposed to a natural hazard occurrence.

Additional information on the FEMA NRI can be found in Section 4.2 and Appendix G.

Impacts from Severe Weather: High Wind and Tornado

Wind and tornadoes can cause damage to property and loss of life. While most tornado damage is caused by violent winds, the majority of injuries and deaths generally result from flying debris. Property damage can include damage to buildings, fallen trees, and power lines. Local industries may also be damaged or destroyed. Access roads and streets may be blocked by debris, delaying necessary emergency response. Winds can push automobiles off roads, damage roofs and structures, cause power outages, and cause secondary damage due to flying debris and hazardous trees. High winds can also contribute to the spread and intensity of wildfires.

Tornadoes can cause damage to property and loss of life. While most tornado damage is caused by violent winds, the majority of injuries and deaths generally result from flying debris. Property damage can include damage to buildings, fallen trees and power lines, broken gas lines, broken sewer and water mains, and the outbreak of fires. Agricultural crops and industries may also be damaged or destroyed. Access roads and streets may be blocked by debris, delaying necessary emergency response.

Impacts to identified assets at risk to this hazard and the overall vulnerability of the County may be affected in the future by climate change (which was discussed in the hazard profile section above), changes in population patterns, and changes in land use and development. The influencing effects of these factors on this hazard are discussed further in the Future Conditions/Future Development discussion below.

Future Conditions/Future Development

Future hazard conditions may be affected by climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. Findings on this for Amador County include the following:

- Climate change is likely to exacerbate future wind conditions and associated impacts and vulnerability of the County. Climate change is not likely to affect future tornado conditions.
- Future population growth should be considered as having more or less people in a community affects the overall hazard vulnerability to the County. Population growth in Amador County is expected to continue slowly. Vulnerable populations could experience disproportional effects from this hazard and should be planned for as development of the County continues. Changes in population and population patterns may or may not increase the impacts and vulnerability of the County to this hazard depending on the location and nature of growth and continued planning for future hazard conditions.
- Land use planning should be proactive to address future hazard conditions. Building codes in the County ensure that new development is built to current building standards to withstand high winds, which should reduce the risk to future development in the County from high winds and tornadoes. With adherence to development standards, future losses to new development should be minimal. Changes in land use and increased development may amplify the impacts of high winds and tornadoes, as additional structures in the County increase the number of buildings at risk to high winds and tornadoes.

Future development considerations should be ongoing and proactive. Ensuring that comprehensive land use planning is conducted, regulatory requirements, such as building codes, are followed, and varying needs for different demographic groups with intersecting identities that reside within the County are considered can help make for a more resilient community. Utilities at risk to high winds should be undergrounded as new facilities are improved or added. Whether high winds and tornadoes will occur, where, when, and of what intensity are all factors that evolve over the days and hours before they form and after they do. Improved weather forecasts coupled with new information technologies, including social media, has resulted in an increasingly large volume of risk information that is available to people when tornadoes and high winds threaten. Development trends in the County are not expected to increase vulnerability to this hazard.

4.3.6. Agricultural Hazards: Severe Weather/Pests/Invasive Species

Hazard Profile

This hazard profile contains multiple sections that detail how this hazard can affect the Amador County Planning Area. These sections include a hazard/problem description; description of location and extent; past occurrences of this hazard; likelihood of future occurrences; and how climate change can affect or influence this hazard.

Hazard/Problem Description

Farming and related agricultural industries are not only the backbone of Amador County's economy, they also play a central role in the way of life of County residents and help define the character of the County. Agriculture has always been an integral part of Amador County and has continually grown and changed

along with the County. Today, the soils and climate of Amador County make it an ideal area to sustain many agricultural endeavors. Agriculture in Amador County is a mosaic of farm, grazing, and timber lands intermingled with other uses in the rural setting which typifies much of the County. In recent years, grape growing and the wine industry has become a key component of the agricultural industry in Amador. This agricultural hazard focuses on severe weather, as well as certain native and invasive species (insects, pests and weeds), all which can significantly affect the agricultural industry in the County.

Agricultural losses occur on an annual basis and can be affected by a variety of natural hazards, but are most often affected by severe weather events, including heavy rains, floods, freeze, heat, and drought. The 2023 State of California Multi-Hazard Mitigation Plan attributes most of the agricultural disasters statewide to drought, freeze, and insect infestations. Other agricultural hazards include fires, crop and livestock disease, insects, and noxious weeds.

In addition to severe weather, certain native and invasive species can affect the agricultural industry in the County. Invasive species are organisms that are introduced into an area beyond their natural range and become a pest in the new environment. This hazard addresses the issues related to both native and invasive insects, pests, and weeds that are considered a nuisance and pose a significant threat to the agricultural industry in the Amador County Planning Area. This hazard does not address pests and plants that cause impacts to human health, as those issues are addressed in other planning mechanisms in the County.

Amador County is geographically and ecologically diverse, extending from the western edge of California's Central Valley east into the Sierra Nevada Mountains. Foothill growers produce a wide diversity of crops in a range of microclimates. Agricultural production in Amador County remains a significant contributor to the local economy. According to the California Department of Conservation's Farmland Mapping and Monitoring Program (FMPP), as of 2022 the County has 2,635 acres of prime farmland, 1,390 acres of farmland of statewide importance, 3,107 acres of unique farmland, 2,535 acres of farmland of local importance, and 187,804 acres of grazing land. These numbers have been reduced since 2006 due in part to increased development in the County. (see Table 4-46).

Table 4-46 Amador County Farmland Inventory – 2006, 2016, and 2022

Soil Category	2006 Acres	2016 Acres	2022 Acres
Prime Farmland	3,610	2,822	2,635
Farmland of Statewide Importance	1,717	1,419	1,390
Unique Farmland	3,596	3,397	3,107
Farmland of Local Importance	1,272	2,299	2,535
Grazing Land	188,569	188,115	187,804
Urban and Built-Up Land	8,094	8,791	9,192
Other Land	88,191	88,275	88,673
Water area	5,322	5,253	5,036
Total Area Inventoried	**300,371**	**300,371**	**300,371**

Source: State of California Department of Conservation Farmland Mapping and Monitoring Program, www.conservation.ca.gov/

According to the 2023 Amador County Crop Report, many commodities are grown in Amador County. This includes timber products; fruit and nut crops; livestock and poultry; and field crops. The top three commodities for the County in 2022 were fruit and nut crops (grapes), livestock (cattle), and field crops.

According to the 2023 Crop Report, the gross value of Amador County's agricultural production in 2023 was $35,701,766. This is a decrease of 7.1% in comparison to the estimated value in 2022. A summation of crop production values, sourced from the Amador County Agricultural Commissioner's Annual Crop Reports, from 2020-2023 for Amador County is shown in Table 4-47.

Table 4-47 Amador County – Value of Agricultural Production 2020-2023

Crop	2020	2021	2022	2023
Fruit & Nut	$17,347,460	$25,409,569	$13,632,517	$14,977,377
Field Crops	$5,425,201	$6,144,723	$6,914,849	$5,449,186
Livestock Productions	$11,967,192	$12,284,218	$17,262,390	14,965,155
Livestock & Poultry Products	$105,250	$61,059	$52,053	$41,828
Miscellaneous	$415,661	$444,587	$277.221	$301,633
Timber	$3,102,503	$1,010,696	$39,606	$0
Total	**$38,363,267**	**$45,354,851**	**$38,203,048**	**$35,701,766**

Source: Amador County Agricultural Commissioner Reports. Retrieved 3/12/2025.

Location and Extent

Agricultural hazards occur throughout the County where lands are used for farming, grazing, and other agricultural uses. The County has large swaths of agricultural lands in the lower elevations of the County. These are shown in the Land Use Map for the County on Figure 4-20 above. Areas not as greatly affected by severe weather, insects, pests, and weeds are the cities, with limited agricultural uses, as well as the upper elevations of the County which all contain fewer agricultural acres. However, while the cities may not be directly affected, they are indirectly affected economically when agricultural losses occur.

There is no scale that measures agricultural hazards. Agriculture in the County is at risk to many hazards: insects, weeds, severe weather, as well as downturns in commodity prices. Each of these has a different duration and speed of onset. Some, such as freeze, can have a short onset and a short duration. Drought can have a long onset and long duration. Insects, pests, and weeds can have short or long onset, and short or long durations. All agricultural losses can have a significant impact on affected communities.

Past Occurrences

Disaster Declaration History

The agricultural lands of Amador County have historically been affected by weather related events such as extreme heat, freeze, heavy rain, and drought. The severe weather events can have devastating effects leading to losses in yield and affecting quality. The US Farm Services Agency provided information on disaster declarations from 2014 through 2024. These are shown in Table 4-48.

Table 4-48 Amador County – USDA Disaster Declarations 2012 to 2024

Year Declared/Disaster Type	Designation Number	Primary or Contiguous	Begin Date
2012			
Drought-FAST TRACK	S3268	Contiguous	7/12/2012
Drought-FAST TRACK	S3351	Contiguous	8/22/2012
Drought	S3379	Contiguous	9/5/2012
Drought	S3452	Primary	12/19/2012
2013			
Drought – FAST TRACK	S3558	Contiguous	7/31/2013
Drought – FAST TRACK	S3569	Primary	8/21/2013
2014			
Drought – FAST TRACK	S3626	Primary	1/15/2014
Drought – FAST TRACK	S3743	Primary	1/1/2014
2015			
Drought – FAST TRACK	S3784	Primary	1/1/2015
2016			
Drought – FAST TRACK	S3952	Primary	1/1/2016
Excessive rain, high winds, cold temperatures, and hail	S4170	Contiguous	3/1/2016
2017			
Drought – FAST TRACK	S4144	Contiguous	1/1/2017
Drought – FAST TRACK	S4163	Primary	10/1/2016
Excessive rain	S4237	Contiguous	10/1/2016
2018			
–	–	–	–
2019			
–	–	–	–
2020			
Drought – FAST TRACK	S4697	Contiguous	4/21/2020
2021			
Drought – FAST TRACK	S4916	Primary	10/1/2020
2022			
Drought – FAST TRACK	S5146	Primary	4/8/2022
Freeze	S5229	Contiguous	7/1/2022
Freeze	S5230	Primary	7/1/2022
2023			
Drought – FAST TRACK	S5371	Primary	10/1/2022

Year Declared/Disaster Type	Designation Number	Primary or Contiguous	Begin Date
2024			
–	–	–	–

Source: Amador County Agricultural Commissioner, US Farm Service Agency

NCDC Events

The NCDC does not track agriculture events.

Hazard Mitigation Planning Committee Events

The HMPC noted that there have been other documented instances in which adverse weather events have occurred, not all of which warranted USDA Secretarial Disaster Declarations:

- **In 1982**, rains causing agricultural losses were reported in the County. Crop damage statistics were unavailable.
- **In 1988**, severe winter storms and flooding were reported in the County. Crop damage statistics were unavailable.
- **In 2003,** excessive rains and wheat stripe rust were reported in the County. Crop damage statistics were unavailable.
- **In 2003,** extreme heat and unseasonable rainfall occurred in the County. Crop damage statistics from the USDA were unavailable.
- **In 2003,** unseasonable rainfalls were reported in the County. Crop damage statistics were unavailable.
- **In 2005**, severe high temperatures, low humidity, and strong winds occurred in the County. Crop damage statistics from the USDA were unavailable.
- **In 2005**, rains causing agricultural losses were reported in the County. Crop damage statistics were unavailable.
- **In 2005**, the HMPC noted that there was damage to the agricultural industry from strong winds in the County that warranted a USDA Secretarial Disaster Declaration.
- **In 2005**, cold wet weather occurred in the County. Crop damage estimates were unavailable.
- **In 2006**, a record setting heat wave occurred in the County. Crop damage statistics from the USDA were unavailable.
- **In 2007,** extremely low temperatures and drought conditions occurred in the County. Crop damage estimates were unavailable.
- **In 2008,** freezing temperatures occurred in the County. Crop damage estimates were unavailable.
- **2020-2022 –** The Public Policy Institute noted that the prolonged drought from 2020 to 2022 severely affected Amador County's agriculture, particularly its wine grape industry, which constitutes a substantial portion of the county's agricultural output. Reduced precipitation and surface water availability led to increased groundwater pumping, raising production costs. The Public Policy Institute of California reported that statewide, farmers faced $1.7 billion in revenue losses and 14,600 job losses in 2021, with Amador County part of the impacted Sacramento Valley region.
- **2021 -** The Western North America heat wave (June 25–July 1, 2021) brought temperatures 20–35°F above average, likely exceeding 105–110°F in Amador's lower elevations (e.g., Jackson, Ione). This heat stressed crops, particularly grapes, which are sensitive to extreme temperatures during fruit development, reducing yields and quality. High temperatures can cause fruit to drop or spoil, as seen

with walnuts in the Central Valley, where 40% of the 2021 crop was lost due to heat following rain. Similar impacts likely affected Amador's vineyards, though specific losses are not documented.

- **In 2022,** freezing temperatures occurred in the County in mid-April. This caused crop damage to the grape crop in the County. This caused a loss of yield of about 30-40% of the grape crop for the 2022 farming season.
- **2023** – Relentless storms and atmospheric rivers in early 2023 caused widespread flooding across California, with Amador County affected by heavy rainfall. While specific flood damage in Amador is not detailed, the storms led to hundreds of millions in agricultural losses statewide, particularly for crops like strawberries and leafy green. Flooded fields in Amador likely delayed planting and damaged vineyards, especially in low-lying areas. Saturated soils can cause root rot in grapevines, reducing yields. Dairy and livestock operations faced challenges with flooded pastures, increasing feed costs. The USDA offered recovery assistance for crop, land, and livestock losses in California, indicating Amador's eligibility.
- **July 2024** saw prolonged heat with temperatures likely hitting 105–110°F in lower Amador County, followed by another heat wave in September 2024 (100–105°F). These events increased wildfire risks and stressed crops, particularly late-season grapes. Heat waves reduce grape quality (e.g., sugar content) and can cause sunburn on fruit, lowering market value. The 2023 statewide heat wave cost $1.6 billion in fruit and nut losses, suggesting similar, though smaller-scale, impacts in Amador. The Electra Fire in Amador and Calaveras counties burned 4,478 acres, threatening vineyards and grazing lands. While direct crop losses were not quantified, smoke taint from wildfires can render grapes unusable for winemaking, a significant concern for Amador's wine industry.
- **2025** – Golden mussels threats in the County caused Camanche Reservoir to be closed. No mussels were found, but the threat was of great enough concern that the Reservoir was closed.

Likelihood of Future Occurrence

Highly Likely—As long as severe weather events, insects, pests, and weeds continue to be an ongoing concern to the Amador County Planning Area, the potential for agricultural losses remains.

It is likely that climate change will increase the chance of future occurrence as well as future impacts. More information on climate change and agricultural hazards can be found in the next section. More information on future impacts can be found in the Future Conditions/Future Development section of the Vulnerability Assessment below.

Climate Change and Agricultural Hazards

According to the 2021 CAS (as well as the 2024 Draft CAS), addressing climate change in agriculture will encompass reducing vulnerability through adapting to the ongoing and predicted impacts of climate. Agriculture in California is vulnerable to predicted impacts of climate change, including less reliable water supplies, increased temperatures, and increased pests.

The 2023 California State Hazard Mitigation Plan noted that California farmers contend with a wide range of crop-damaging invasive pests and pathogens. Continued climate change is likely to alter the abundance and types of many pests, lengthen pests' breeding season, and increase pathogen growth rates. It also noted that change in climate can directly impact crop growth through new temperature patterns and northward

shifts of pests and disease. Additionally, longer growing seasons may enable pest species to complete more reproductive cycles, which can increase severity of infestations.

Finally, the 2023 State Plan noted that temperature is not the only climatic influence on pests. For example, some insects are unable to cope in extreme drought, while others cannot survive in extremely wet conditions. Furthermore, while warming speeds up the life cycles of many insects, suggesting that pest problems could increase, some insects may grow more slowly as elevated carbon dioxide levels decrease the protein content of the leaves on which they feed.

Vulnerability Assessment

Vulnerability—High

According to historical hazard data, severe weather affecting agriculture and agricultural pests and weeds are an annual occurrence in the Amador County Planning Area. If left unchecked, insects, pests, and weeds, including invasive species, can threaten native species, biodiversity, ecosystem services, recreation, water resources, agricultural and forest production, cultural resources, economies and property values, public safety, and infrastructure.

An assessment of a community's vulnerability to this hazard begins with an understanding of local exposure to unincorporated Amador County. This is included in the Local Concerns section below. After that, vulnerability is discussed in multiple sections that detail how this hazard can affect both the entire Amador County Planning Area as well as the unincorporated portions of Amador County. How the hazard affects the other participating jurisdictions can be found in their respective annexes to this LHMP Update. These sections below include assets at risk, impacts, and how future development may affect the vulnerability of the County to this hazard.

Local Concerns (unincorporated Amador County)

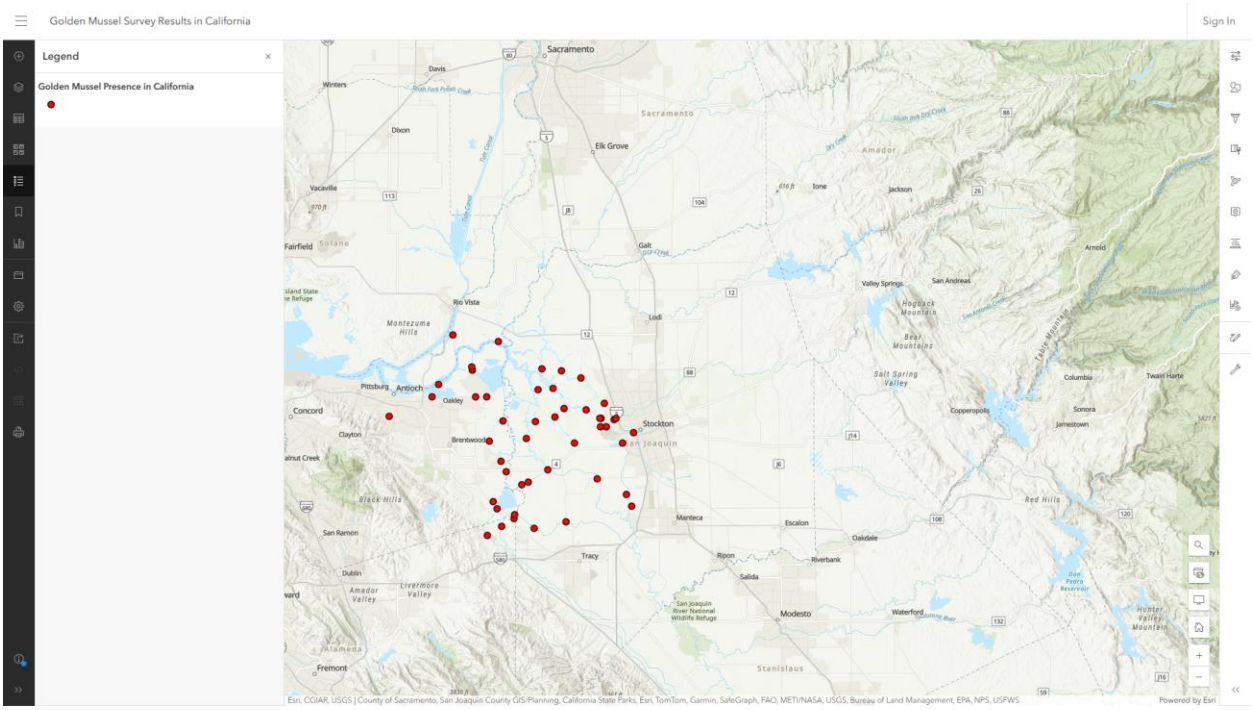
The unincorporated County has certain specific concerns regarding this hazard. These concerns form a portion of the basis for the mitigation strategy and mitigation actions that seek to reduce vulnerabilities to this hazard.

Invasive and Native Species (Insects/Pests)

Amador County is threatened by a number of insects that, under the right circumstances, can cause severe economic and environmental harm to the agricultural industry. Insects of concern to plants and crops include Glassy-winged sharp shooter, Gypsy moth, Japanese beetle, Mediterranean fruit fly, Melon fruit fly, Oriental fruit fly, and Bark beetle. Pest detection is a proactive program that seeks to identify exotic, invasive insects. These pests have a wide host ranges and are difficult and costly to manage once established. Early detection is essential for quick and efficient eradication. Public participation is critical to the success of this program, since staff relies on the goodwill of property owners who allow traps to be placed on their properties. The Amador County Department of Agriculture traps and monitors all of these agricultural pests.

Aquatic invasive species include: Zebra and Quagga Mussels, invasive fish species, and aquatic weeds such as hydrilla, water hyacinth, arundo, loosestrife, sesbania, South American Spongeplant, and cyanobacteria. An additional (and relatively new) invasive is the golden mussel. Golden mussel (*Limnoperna fortunei*), an invasive, non-native freshwater bivalve, was recently discovered in the Port of Stockton by California Department of Water Resources staff while conducting routine operations. Suspected golden mussels have also been identified at O'Neill Forebay in Merced County and are currently undergoing genetic testing for confirmation. This discovery is the first known occurrence of golden mussels in North America. The species poses a significant immediate threat to the ecological health of the Delta and all waters of the state, water conveyance systems, infrastructure and water quality. While not yet in Amador County, they are in areas to the west of the County, as seen on Figure 4-60.

Figure 4-60 Golden Mussels Survey Results near Amador County



Source: CA Dept. of Fish and Wildlife, retrieved 8/1/2025.

Due to the spread of the golden mussel recently discovered in Northern California, the East Bay Municipal Utility District (EBMUD) kept boat launches closed to private vessels for the 2025 season. This closure was to allow EBMUD time to study how to prevent and respond to golden mussel infestation. Although boat quarantines and decontamination stations can help reduce the likelihood of introduction, risk remains. EBMUD is working closely with state and federal agencies, research institutions, and other water managers to track the spread and prepare long-term plans in the event the mussel is introduced into the reservoirs. The closure applies to private boats and other watercraft, including kayaks and paddleboards, excluding boats with a permanent slip for Camanche that were in the water or in onsite dry storage when boat launches closed in November 2024. This had an effect on the County, as its largest reservoir was restricted from being used for recreational purposes.

Weeds (both invasive and native)

Noxious weeds, defined as any plant that is or is liable to be troublesome, aggressive, intrusive, detrimental, or destructive to agriculture, silviculture, or important native species, and difficult to control or eradicate, are also of concern. Noxious weeds within the Planning Area include those listed on Table 4-49.

Table 4-49 Amador County Weeds of Concern

Species of Concern				
Rush Skeletonweed	Giant Reed	Oblong Spurge	Tamarisk	Yellow Starthistle
Scotch Broom	Perrenial Pepperweed	Scotch Thistle	Spanish Broom	Barb Goatgrass
French Bloom	Medusahead	Diffuse Knapweed	Spotted Knapweed	

Source: California Invasive Plant Council

The Amador County Department of Agriculture uses mechanical and chemical control measures to contain these agricultural weeds.

Natural Disasters and Severe Weather

According to the USDA, every year natural disasters, such as droughts, earthquakes, extreme heat and cold, floods, fires, earthquakes, hail, landslides, and tornadoes, challenge agricultural production. Because agriculture relies on the weather, climate, and water availability to thrive, it is easily impacted by natural events and disasters. Agricultural impacts from natural events and disasters most commonly include contamination of water bodies, loss of harvest or livestock, increased susceptibility to disease, and destruction of irrigation systems and other agricultural infrastructure. These impacts can have long lasting effects on agricultural production including crops, forest growth, and arable lands, which require time to mature. Specific impacts by hazard are listed below:

- Drought's most severe effects on agriculture include water quality and quantity issues. Other impacts include decreased crop yields, impact to feed and forage, altered plant populations and tree mortality.
- Earthquakes, though rare in Amador County, can strike without warning and cause dramatic changes to the landscape of an area that can have devastating impacts on agricultural production and the environment. These impacts could include loss of harvest or livestock and destruction of irrigation systems and other agricultural infrastructure.
- Extreme cold may result in loss of livestock, increased deicing, downed power lines, and increased use of generators. Deicing can impact agriculture by damaging local ecosystems and contaminating water bodies. Downed power lines cause people to run generators more often, which can release harmful air pollutants.
- Hot weather and extreme heat can worsen ozone levels and air quality as well as leading to drought conditions. Excessive heat and prolonged dry or drought conditions can impact agriculture by creating worker safety issues for farm field workers, severely damaging crops, and reducing availability of water and food supply for livestock.
- Wildfires can spread quickly and devastate thousands of acres of land, which may include agricultural lands. This devastation could lead to large losses in crops, forestry, livestock, and agricultural infrastructure.

- Flooding causes many impacts to agricultural production, including water contamination, damage to crops, loss of livestock, increased susceptibility of livestock to disease, flooded farm machinery, and environmental damage to and from agricultural chemicals.
- Landslides and debris flow occur in all 50 states and commonly occur in connection with other major natural disasters such as earthquakes, volcanoes, wildfires, and floods. Some of the threats from landslides and debris flow include rapidly moving water and debris that can cause trauma; broken electrical, water, gas, and sewage lines; and disrupted roadways and railways. This can lead to agricultural impacts including contamination of water, change in vegetation, and harvest and livestock losses.

The Amador County Agricultural Commissioner noted that of the above, the County is most concerned with drought, freeze, and insect infestations.

Local concerns for each of the participating jurisdictions can be found under the Local Concerns heading in each respective jurisdictional annex to this LHMP Update.

Assets at Risk

Assets at risk from agricultural hazards include people and populations; structures; critical facilities and infrastructure; and natural, historic, and cultural resources. These are discussed in the following sections for the Amador County Planning Area and unincorporated Amador County.

Additionally, for each hazard in the FEMA National Risk Index in Amador County, the relevant portions of the hazard analysis done by FEMA is presented below. This includes the Hazard Risk Index Rating, Expected Annual Loss Values, Exposure Values, and the Historic Loss Ratio Rating. These are presented for the Amador County Planning Area as a whole.

People and Populations

Agricultural hazards (severe weather, and both native and invasive species) have a minimal effect on people and populations in Amador County, including vulnerable populations. However, damage to crops from invasive and nuisance species can cause significant increases in food prices and food insecurity among low-income communities.

Structures

Structures in Amador County may be indirectly affected by agricultural hazards. The effects of severe weather on structures are included in the discussions on severe weather above. This section focuses then on native and invasive species and pests and weeds. Some species can impact vegetation and can result in stream bank instability, erosion, and increased sedimentation, impacting ground stabilization and possibly causing foundation issues for nearby structures. If species cause trees and other vegetation to die, there is an increased risk of damage to roadways, powerlines, and buildings, and increased risk to wildfire. Some invasive plants have been shown to destabilize soil due to high densities and shallow root systems, negatively impacting nearby buildings and septic systems. Other nuisance plant species have been known to clog culverts and streams, increasing flooding risk.

Critical Facilities and Infrastructure

Critical facilities and infrastructure in Amador County may be affected by agricultural hazards, though these effects are expected to be limited. The effects of severe weather on critical facilities are included in the discussions on severe weather above. This section focuses then on native and invasive species and insects, pests, and weeds. The 2023 State of California Hazard Mitigation Plan noted that water treatment plants could be impacted by invasive and nuisance species. Water that becomes polluted due to increased sedimentation and erosion will require additional treatment. If the system becomes clogged with these pollutants or with nuisance aquatic species, the ability of water treatment plants to operate may become impaired. Additionally, soil that becomes unstable due to decaying vegetation can impact critical facilities that are built on or around these soils.

Natural, Historic, and Cultural Resources

Natural resources can be affected by agricultural hazards. The effects of severe weather on these resources are included in the discussions on severe weather above. This section focuses then on native and invasive species, and insects, pests, and weeds. Negative impacts of these to natural resources include the following:

- Loss of wildlife habitat and reduced wildlife numbers;
- Loss of native plant species;
- Reduced livestock grazing capacity;
- Increased soil erosion and topsoil loss;
- Diminished water quality and fish habitat.

Historic and cultural resources have a more limited risk from agricultural hazards.

FEMA NRI Hazard Vulnerability Assessment

Agricultural hazards are not an NRI hazard, therefore no data is presented.

Impacts from Agricultural Hazards

According to the California Invasive Plants Council. California annually suffers over $3 billion in agricultural losses due to these invasive species. The magnitude of this problem cannot be understated, as both the United States and California Departments of Agriculture are mandated to protect against the invasion of exotic pests and diseases.

The consequences of agricultural disasters to the Planning Area include ruined plant crops, dead livestock, ruined feed and agricultural equipment, monetary loss, job loss, and possible multi-year effects (i.e., trees might not produce if damaged, loss of markets, food shortages, increased prices, possible spread of disease to people, and loss or contamination of animal products). When these hazards cause a mass die-off of livestock, other issues occur that include the disposal of animals, depopulation of affected herds, decontamination, and resource problems. Those disasters related to severe weather may also require the evacuation and sheltering of animal populations. Overall, any type of severe agricultural disaster can have significant economic impacts on both the agricultural community and the entire Amador County Planning Area.

Impacts to identified assets at risk to this hazard and the overall vulnerability of the County may be affected in the future by climate change (which was discussed in the hazard profile section above), changes in population patterns, and changes in land use and development. The influencing effects of these factors on this hazard are discussed further in the Future Conditions/Future Development discussion below.

Future Conditions/Future Development

Future hazard conditions may be affected by climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. Findings on this for Amador County include the following:

- Climate change is likely to exacerbate future conditions that may impact the agricultural industry in Amador County.
- Future population growth should be considered as having more or less people in a community affects the overall hazard vulnerability to the County. Population growth in Amador County is expected to increase. Population changes are unlikely to affect the vulnerability of the County to this hazard unless the population growth significantly increases, displacing agricultural uses. Changes in population and population patterns may or may not increase the impacts and vulnerability of the County to this hazard depending on the location and nature of growth and continued planning for future hazard conditions.
- Land use planning should be proactive to address future hazard conditions. Limited growth is occurring in the County, which should result in limited changes to land uses that would affect the agricultural industry. As the County continues to add new development, land uses may change resulting in a reduction in agricultural uses. However, for the next five years covered by this LHMP Update, changes in land use and development will likely not increase the impacts and associated vulnerabilities of the County to this hazard.

Future development in the County is not likely to have an impact on agricultural hazards in Amador County, except to the extent that agricultural lands are taken out of production as new development occurs reducing available land for agricultural uses, including those related to farming, timber production and grazing. In addition, with additional development in the County, there may be additional competition for water resources thus possibly impacting the agricultural industry.

4.3.7. Avalanche

Hazard Profile

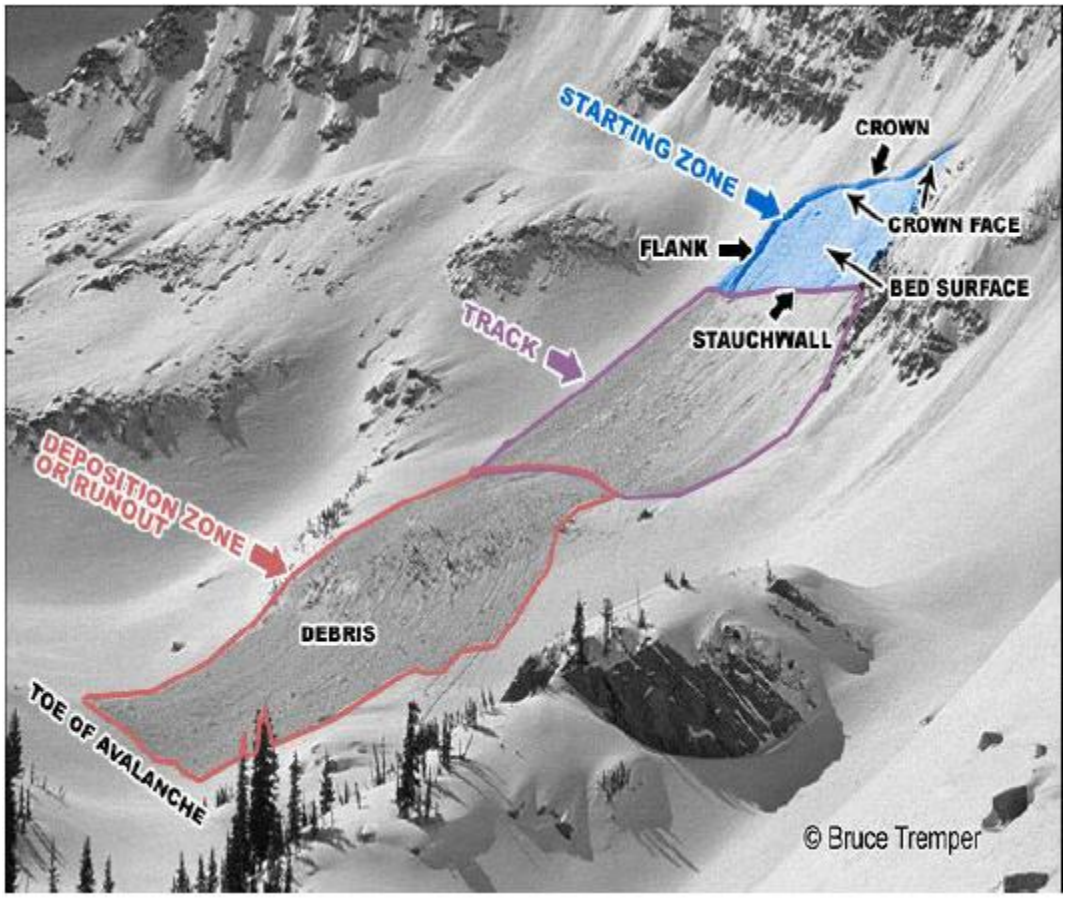
This hazard profile contains multiple sections that detail how this hazard can affect the Amador County Planning Area. These sections include a hazard/problem description; description of location and extent; past occurrences of this hazard; likelihood of future occurrences; and how climate change can affect or influence this hazard.

Hazard/Problem Description

According to the 2016 Amador County General Plan Safety Element, avalanches occur when loading of new snow increases stress at a rate faster than strength develops, and the slope fails. Avalanches are a rapid down-slope movement of snow, ice and debris triggered by ground shaking, sound, or human or animal

movement. Avalanches consist of a starting zone where the ice or snow breaks loose, a track which is the grade or channel the debris slides down and a run-out zone where the snow is deposited. This can be seen in Figure 4-61.

Figure 4-61 Avalanche Zones



Source: Sierra Avalanche Center

Critical stresses develop more quickly on steeper slopes and where deposition of wind-transported snow is common. The vast majority of avalanches occur during and shortly after storms. This hazard generally affects a small number of people, such as snowboarders, skiers, and hikers who venture into backcountry areas during or after winter storms. Roads and highway closures, damaged structures, and destruction of forests are also a direct result of avalanches.

Location and Extent

The combination of steep slopes, abundant snow, weather, snowpack, and an impetus to cause movement to create an avalanching episode. Avalanche hazards exist in eastern Amador County, where combinations of the above criteria occur. The two primary factors impacting avalanche activity are weather and terrain. Large, frequent storms deposit snow on steep slopes to create avalanche hazards. Additional factors that contribute to slope stability are the amount of snow, rate of accumulation, moisture content, wind speed and direction and type of snow crystals. Topography also plays a vital role in avalanche dynamics. Slope

angles between 30 to 45 degrees are optimal for avalanches. The risk of avalanches decreases on slope angles below 30 degrees. At 50 or more degrees they tend to produce sluff or loose snow avalanches that account for only a small percentage of avalanche deaths and property damage annually.

Avalanche-prone areas are found upcountry along SR 88 in the Devil's Gate and Kirkwood areas (in the eastern portions County) where these combinations readily occur. Speed of onset of avalanche is short, as is the duration of each event. Most avalanches occur during and shortly after storms between January and March. A scale of avalanche danger has been created for North America. This can be found in Table 4-50.

Table 4-50 North American Public Avalanche Danger Scale

Danger Level	Travel Advice	Likelihood of Avalanche	Avalanche Size or Distribution.
5 – Extreme	Avoid all avalanche terrain	Natural and human-triggered avalanches certain	Large to very large avalanches in many areas
4 – High	Very dangerous avalanche conditions. Travel in avalanche terrain not recommended	Natural avalanches likely; human-triggered avalanches very likely	Large avalanches in many areas; or very large avalanches in specific areas
3 – Considerable	Dangerous avalanche conditions. Careful snowpack evaluation, cautious route-finding and conservative decision making essential	Natural avalanches possible; human-triggered avalanches likely	Small avalanches in many areas; or large avalanches in specific areas; or very large avalanches in isolated areas
2 – Moderate	Heightened avalanche conditions on specific terrain features. Evaluate snow and terrain carefully; identify features of concern	Natural avalanches unlikely; human-triggered avalanches possible	Small avalanches in specific areas; or large avalanches in isolated areas
1 – Low	Generally safe avalanche conditions. Watch for unstable snow on isolated terrain features	Natural and human-triggered avalanches unlikely	Small avalanches in isolated areas or extreme terrain

Source: National Avalanche Center

Past Occurrences

Disaster Declaration History

There have been no federal or state disaster declarations related to avalanche in Amador County, as shown in Table 4-4.

NCDC Events

The NCDC shows five avalanche events in the County since 1993, as shown on Table 4-51.

Table 4-51 NCDC Avalanche Events in Amador County 1993-7/31/2024

Event Type	Number of Events	Deaths	Deaths (indirect)	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Avalanche	5	2	0	3	0	$0	$0

Source: NCDC.

Hazard Mitigation Planning Committee Events

Historically, avalanches occur within the eastern portion of the County between the months of January and March, following snowstorms. Past events include those listed below.

In **1982/1983**, an avalanche destroyed some USFS lease summer cabins located west of Highway 88. The cabins are only allowed to be occupied during the summer months, and no one was injured.

In **1982/1983**, the mountain manager for Kirkwood ordered an evacuation of homes in this area during a multiple day Sierra snowstorm. A representative from Kirkwood provided one unconfirmed report of a local skier getting caught in an avalanche and digging out and skiing away. It is likely that other avalanche incidents such as this one go unreported.

In **1993**, a man was buried in an avalanche in Kirkwood's Button Bowl. He was buried for nearly 15 minutes under five feet of snow before he was discovered by one of the resort's avalanche rescue dogs. He survived but suffered a broken back and ribs.

2018 – an avalanche occurred that resulted in two deaths. A mother and her son died skiing back to their cabin in Kirkwood.

2019 – This SR 88 spur was closed an estimated 28 days in 2019 for avalanche conditions and mitigation.

Cal-Trans noted that the winter of **2022-23** (with the heavy snow) led to numerous occasions where the Kirkwood community faced isolation with the highway being closed in both directions for longer durations than usual.

In March of 2024, an avalanche closed Highway 88 in Amador County. Transportation officials said the highway was closed from 3.5 miles east of Silver Lake to Kirkwood/Carson Spur. As far as singular "avalanche events" are concerned, 2024 had one of the most dramatic when three USFS leased cabins were destroyed in the Devil's Gate Tract.

Likelihood of Future Occurrence

Likely – Given the topography and amount of snow falling on an annual basis in Eastern Amador County, avalanches will continue to occur. The loss of life due to an avalanche is usually due to people recreating in remote areas at the wrong time. Avalanche warnings are posted after winter storms; therefore, information is available to reduce the risk to those in avalanche prone areas.

Climate Change and Avalanche

According to the CAS, climate change may exacerbate the avalanche hazard in the County. Avalanches stemming from a weather pattern of heavy snowfalls followed by thawing may increase – a dangerous combination that can be expected with climate change.

Vulnerability Assessment

Vulnerability—Medium

Avalanche events happen in the Amador County Planning Area each year. These often occur in the backcountry where no roads or structures exist. However, avalanche can impact key assets in the Planning Area. The upper elevations of the Planning Area has some measure of vulnerability to extreme cold, freeze, and snow.

An assessment of a community's vulnerability to this hazard begins with an understanding of local exposure to unincorporated Amador County. This is included in the Local Concerns section below. After that, vulnerability is discussed in multiple sections that detail how this hazard can affect both the entire Amador County Planning Area as well as the unincorporated portions of Amador County. How the hazard affects the other participating jurisdictions can be found in their respective annexes to this LHMP Update. These sections below include assets at risk, impacts, and how future development may affect the vulnerability of the County to this hazard.

Local Concerns (unincorporated Amador County)

The unincorporated County has specific concerns regarding this hazard. These concerns form a portion of the basis for the mitigation strategy and mitigation actions that seek to reduce risk and vulnerability to this hazard.

Avalanche impacts vary, but include risk to property, injury, or death. Avalanches generally affect a few snowboarders, skiers, and hikers who venture into backcountry areas during or after winter storms. Avalanches cause road closures, and can damage structures and forests.

In Amador County, avalanche-prone areas are found upcountry along SR 88 in the Devil's Gate and Kirkwood areas, where these combinations readily occur (discussed in more detail below). Most avalanches occur during and shortly after storms between January and March. On the way to Kirkwood, there is a Spur of the Highway that is very vulnerable to traffic backups from Kirkwood. Because traffic flow is an issue in this area – the backed up cars could easily be affected by an avalanche. Cal Trans representatives on the HMPC noted that in addition to the highway issues, as far as Amador County is concerned, the marked increase in winter recreation would be of concern, as well as the overall awareness of avalanche areas that would be encountered by emergency service workers.

Highway 88 and Devils Gate area

With respect to Highway 88, Caltrans is responsible for avalanche mitigation. There have been no known fatalities or injuries within this area. The HMPC noted that the area of significant concern to the County (besides Kirkwood) is the spur leading up to Kirkwood on HWY 88. Avalanches and mitigation on Hwy 88 are managed by Cal Trans. They conduct a weekly conference call regarding conditions. Challenges to effective mitigation include older equipment, access, and qualified operators that can get to the area.

Kirkwood Resort Ski area

The Kirkwood Ski Area has conducted a series of Design-Magnitude Avalanche Mapping and Mitigation Analyses to guide future development of the area. Design-magnitude avalanches are of a size and destructive potential that should be considered in land-use planning and engineering. The design-magnitude avalanche path boundaries are subdivided into "red", "blue" and "white" zones which indicate

the potential hazard severity based on the resulting impact pressure and return period (or frequency). Land use recommendations and restrictions are then applied to the identified hazard zones. This methodology for the identification of avalanche zones and the associated land use recommendations is relatively unique to the United States, and is based on similar methodologies used in other countries with development in and near avalanche areas (e.g., Switzerland and Austria). A summary of land use recommendations for identified zones is provided below.

- **Red Zone (High Hazard)** – Residential development within the red zone is not recommended. Avalanche pressure potentials are beyond the practical design limits of most residential structures; avalanche frequency is high; and detached structural protection is difficult or impossible to build. Additionally, any development that concentrates human activity in Red zones (e.g., ski-lift terminals, ticket areas, parking lots, trail heads, skating ponds, and public buildings) should be avoided. Even though structural protection of some facilities might be feasible, people standing or working outside of these facilities could be exposed to avalanches. Road construction through some red zones might be acceptable unless the frequency of avalanches is high. Utilities should be buried whenever possible.
- **Blue Zone (Moderate Hazard)** – By definition, blue zones are subject to much lower levels of avalanche frequency and energy than red zones. Thus construction of private buildings may be acceptable, but only if reinforced or protected for design avalanche loads. Even with structural protection, property owners must be made aware of the fact that living in an area designated as a blue zone means assuming the possibility of property damage or personal injury from avalanches because people outside may be exposed. Because of the potential for a greater concentration of people at public facilities, construction of public buildings in blue zones should be avoided. Other public facilities such as parking lots and ski-lift terminals should, if possible, be located near the outer limits of the blue zone and the area should be posted as potentially hazardous. Utilities should be buried. Road construction is acceptable.
- **White Zone (Hazard Free)** – There are no identified land use recommendations or development restrictions associated with Hazard Free White Zones.

There are approximately 50 major avalanche starting zones in Amador County that were mapped by an avalanche consultant prior to the formation of the ski resort. The avalanche zones are within Kirkwood's Special Use Permit (SUP) boundary on Forest Service land. Another 50 plus major avalanche starting zones are in Alpine County in the SUP boundary. According to representatives from the resort, the number of avalanches over the years in these areas would total in the thousands. There are a few starting zones that, while within the SUP, are outside of the current ski area boundary. Some avalanche control work has been done in this area over the years. Some of these starting zones are actually above existing housing in Amador County and nearest to Highway 88. The potential for a serious avalanche accident is greatest in this area of Amador County at Kirkwood.

The County is proactive in avalanche mitigation. In problem areas, roads are closed after significant storms for avalanche control. There is constant monitoring of the snow loads in problem areas. Much of this is done by Cal Trans. Likewise, Cal Trans is also responsible for monitoring and mitigating landslide areas along State routes. The County did note that slide paths are changing with new fire activity, wind changes, etc. The Caldor fire affected areas that were prone to avalanche sliding.

Local concerns for each of the other participating jurisdictions can be found under the Local Concerns heading in each respective jurisdictional annex to this LHMP Update.

Assets at Risk

Assets at risk from extreme cold and freeze include people and populations; structures; critical facilities and infrastructure; and natural, historic, and cultural resources. These are discussed in the following sections for the Amador County Planning Area and unincorporated Amador County.

Additionally, for each hazard in the FEMA National Risk Index in Amador County, the relevant portions of the hazard analysis done by FEMA is presented below. This includes the Hazard Risk Index Rating, Expected Annual Loss Values, Exposure Values, and the Historic Loss Ratio Rating. These are presented for the Amador County Planning Area as a whole.

People and Populations

Most of the populations within the Amador County Planning Area have limited vulnerable to avalanche. Those at risk include those traveling in the upper elevations of the County, as well as those who ski in these areas. Vulnerable populations to avalanche are not well known. The 2023 California State Hazard Mitigation Plan noted that in determining whether equity priority populations are exposed to the threat of avalanches, the best method available at the time of this Plan update is to consider how the counties in which avalanches take place score on existing social vulnerability indexes. Using that, Amador is relatively moderate in its social vulnerability index.

Structures

Structures in the Amador County Planning Area have some measure of risk from avalanche. Buildings in the upper elevations of the County can be affected directly by avalanche events. Most of these events occur away from structures in the Amador County Planning Area.

Critical Facilities and Infrastructure

Avalanche 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 County. Depending on the facility type and function, critical facilities and infrastructure may be affected directly by avalanche events. Infrastructure such as roads, highways, and bridges can be blocked during these events.

Natural, Historic, and Cultural Resources

Depending on the location of an avalanche event, natural resources in the Amador County Planning Area may be affected. During periods of avalanche, trees in the Planning Area may be damaged, which may in turn cause increased fire risk due to an increase in wildfire fuels. Other natural resources like wildlife may be at risk during a period of avalanche. Historic structures in the County are located outside of the avalanche prone areas.

FEMA NRI Hazard Vulnerability Assessment

The FEMA NRI was queried for additional specific data on Amador County's vulnerability to avalanche. The NRI contains data and analysis for 18 separate natural hazards, including avalanches. As shown in Table 4-52, avalanches could cause a total of $61,612 in expected annual losses, with a historic loss rating of relatively moderate. Avalanche has a relatively moderate rating for both social vulnerability and community resilience, with a risk index score of 26.4 out of 100. According to the NRI, there has been 1 event on record between the years of 1960-2019, with an average of 0 events per year.

Table 4-52 Amador County Planning Area – Avalanche Vulnerability Ratings from FEMA NRI

NRI Hazard	Hazard Risk Index Rating*	Expected Annual Loss Values (total)**	Exposure Value (total)***	Historic Loss Ratio Rating
Avalanche	26.4	$61,612	$59,000,000	Relatively Moderate

Source: FEMA NRI Report, retrieved 4/1/2025.

*Hazard Risk Index is calculated using data for only a single hazard type, and reflect a communities expected annual loss value, community risk factors, and the adjustment factor used to calculate the risk value.

**Expected annual loss represents the average economic loss in dollars resulting from natural hazards each year.

***Exposure is a natural hazard consequence factor that is the representative value of buildings, populations, or agriculture potentially exposed to a natural hazard occurrence.

Additional information on the FEMA NRI can be found in Section 4.2 and Appendix G.

Impacts from Avalanche

Avalanches occur when the weight of new snow increases stress faster than strength of the snowpack develops, causing the slope to fail. Avalanche conditions develop more quickly on steeper slopes and where wind-blown snow is common. The combination of steep slopes, abundant snow, weather, snowpack, and a trigger to cause movement create avalanches.

The most significant impacts from snow avalanches are the closure of transportation corridors, which can isolate populations and interrupt commodity flows. Avalanches tend to occur independently of other types of hazards, although it is possible for avalanches to be triggered by severe weather and earthquakes. There may be occasions where avalanches contribute to the presence of other hazards, such as flash floods resulting from mountainside erosion. Avalanches might cause erosion on sloped terrain, thereby increasing the likelihood of future landslides. In addition, debris deposited in a river or stream because of avalanches might alter its flow and contribute to flooding later.

Impacts to identified assets at risk to this hazard and the overall vulnerability of the County may be affected in the future by climate change (which was discussed in the hazard profile section above), changes in population patterns, and changes in land use and development. The influencing effects of these factors on this hazard are discussed further in the Future Conditions/Future Development discussion below.

Future Conditions/Future Development

Future hazard conditions may be affected by climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. Findings on these factors for Amador County include the following:

- Climate change may exacerbate avalanches and their associated impacts to the County.
- The population of Amador County is expected to slowly increase as time progresses. Future population growth should be considered, as having more or less people in a community affects the overall hazard vulnerability to the County. Changes in populations patterns should also be considered. During hazard events, existing inequities can get worse, and vulnerable groups are the most likely to be affected and may require extra assistance. Planning for population changes will help to decrease the County's overall vulnerability. It was noted that there is very limited housing stock in the avalanche areas. Changes in population and population patterns may or may not increase the impacts and vulnerability of the County to this hazard depending on the location and nature of population growth and continued planning for future hazard conditions.
- Land use planning should be proactive to address future hazard conditions. County building codes, including those specific to building in avalanche zones, are in effect to reduce this risk and should be updated as necessary to continue to avalanche conditions. Due to adherence to protective building codes, changes in land use and development will likely not increase the impacts and associated vulnerabilities of the County to this hazard.

Future development considerations should be ongoing and proactive. Outside of any future development at the Kirkwood ski area where avalanche is comprehensively addressed in the siting of future structures, future development is unlikely to occur in avalanche prone areas.

4.3.8. Climate Change

Hazard Profile

This hazard profile contains multiple sections that detail how this hazard can affect the Amador County Planning Area. These sections include a hazard/problem description; description of location and extent; past occurrences of this hazard; likelihood of future occurrence; and how climate change can affect or influence this hazard.

Hazard/Problem Description

Climate change is the distinct change in measures of weather patterns over a long period of time, ranging from decades to millions of years. More specifically, it may be a change in average weather conditions such as temperature, rainfall, snow, ocean and atmospheric circulation, or in the distribution of weather around the average. While the Earth's climate has cycled over its 4.5-billion-year age, these natural cycles have taken place gradually over millennia, and the Holocene, the most recent epoch in which human civilization developed, has been characterized by a highly stable climate – until recently.

This LHMP Update is concerned with human-induced climate change that has been rapidly warming the Earth at rates unprecedented in the last 1,000 years. Since industrialization began in the 19th century, the

burning of fossil fuels (coal, oil, and natural gas) at escalating quantities has released vast amounts of carbon dioxide and other greenhouse gases responsible for trapping heat in the atmosphere, increasing the average temperature of the Earth.

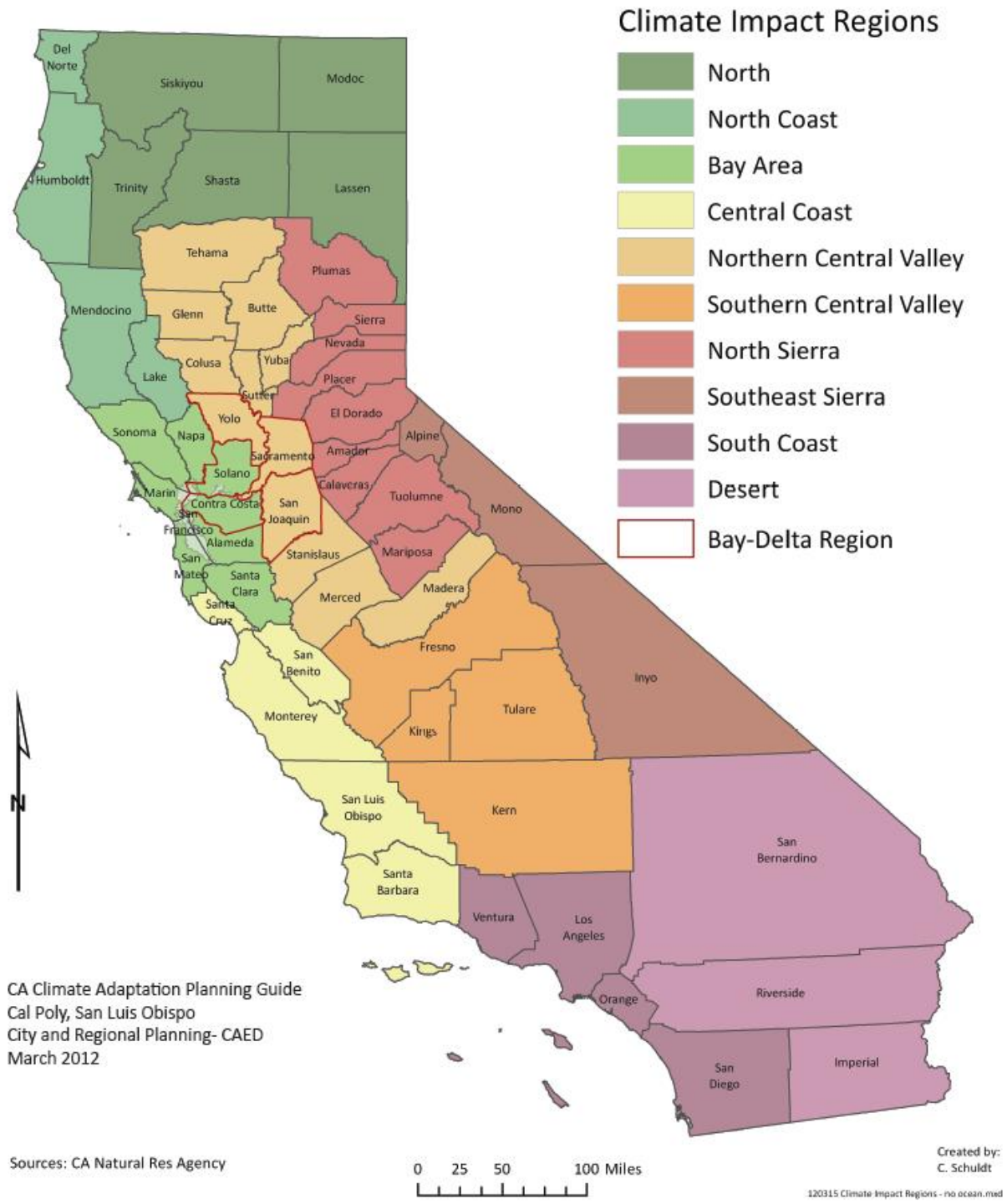
In Amador County, the HMPC noted that each year it seems to get a bit warmer. California's Adaptation Planning Guide: Understanding Regional Characteristics has divided California into 11 different regions based on political boundaries, projected climate impacts, existing environmental setting, socioeconomic factors and regional designations (as shown in Figure 4-62). Amador County falls within the North Sierra Region characterized as a sparsely settled mountainous region where the region's economy is primarily tourism-based. The region is rich in natural resources, biodiversity, and is the source for the majority of water used by the state. Table 4-53 provides a summary of Cal-Adapt Climate Projections for the North Sierra Region.

Table 4-53 North Sierra Region and Amador County – Cal Adapt Climate Projections

Effect	Ranges
Temperature Change, 1990-2100	January increase in average temperatures: 2.5 °F to 4°F by 2050 and 6°F to 7°F by 2100. The largest changes are observed in the southern part of the region. July increase in average temperatures: 4 °F to 5°F by 2050 and I 0°F by the end of the century, with the greatest change in the northern part of the region. (Modeled average temperatures; high emissions scenario)
Precipitation	Precipitation decline is projected throughout the region. The amount of decrease varies from 3 to 5 inches by 2050 and 6 inches to more than 10 inches by 2100, with the larger rainfall reductions projected for the southern portions of the region. (CCSM3 climate model; high carbon emissions scenario)
Heat wave	Heat waves are defined as five consecutive days over 83 °F to 97°F depending on location. By 2050, the number of heat waves per year is expected to increase by two. A dramatic increase in annual heat waves is expected by 2100, eight to I 0 more per year.
Snowpack	Snowpack levels are projected to decline dramatically in many portions of the region. In southern portions of the region, a decline of nearly 15 inches in snowpack levels - a more than 60 percent drop - is projected by 2090. (CCSM3 climate model; high carbon emissions scenario)
Wildfire	Wildfire risk is projected to increase in a range of 1.1 to 10.5 times throughout the region, with the highest risks expected in the northern and southern parts of the region. (GFDL climate model; high carbon emissions scenario)

Source: Cal-Adapt 2017/2023.

Figure 4-62 Amador County – Climate Impact Regions



Source: Cal-Adapt 2017/2023

Location and Extent

Climate change is a global phenomenon. It is expected to affect the whole of the County. There is no scale to measure the extent of climate change. Climate change exacerbates other hazard, such as drought, extreme

heat, flooding, wildfire, and others. The speed of onset of climate change is very slow. The duration of climate change is not yet known but is feared to be tens to hundreds of years.

Past Occurrences

Disaster Declaration History

Climate change has never been directly linked to any declared disasters, as shown in Table 4-4.

NCDC Events

The NCDC does not track climate change events.

Hazard Mitigation Planning Committee Events

While the HMPC noted that climate change is of concern, no specific climate change incidents could be recalled. HMPC members noted that the strength of storms does seem to be increasing and the temperatures seem to be getting hotter. The HMPC also noted that snow levels seem to be higher (or larger) each year and the recent atmospheric river winter rains were more intense. In addition, the Amador County Air Quality District noted that within the last five years, Amador County has experienced extreme droughts that have affected the health of the forest. The lack of rain lead to the Bark Beetle infestation, causing thousands upon thousands of trees to die. This has led to large areas of Amador County to be declared high fire hazardous zones as well. The combined effects of the drought, decline in the health of the forest, temperature changes, and wildfires in and around neighboring counties, much contributed to climate change, have also steered our way to poor air quality.

Likelihood of Future Occurrence

Highly Likely – Climate change is virtually certain to continue without immediate and effective global action. According to NASA, 2023 was one of the hottest years on record as was 2024. Without significant global action to reduce greenhouse gas emissions, the United Nations Intergovernmental Panel on Climate Change (IPCC) concludes in its Sixth Assessment Synthesis Report (2022) that average global temperatures are likely to exceed 1.5°C by the end of the 21st century, with consequences for people, assets, economies and ecosystems, including risks from heat stress, storms and extreme precipitation, inland and coastal flooding, landslides, air pollution, drought, water scarcity, sea level rise and storm surges.

Climate Scenarios

The United Nations IPCC developed several greenhouse gas (GHG) emissions scenarios based on differing sets of assumptions about future economic growth, population growth, fossil fuel use, and other factors. The emissions scenarios range from "business-as-usual" (i.e., minimal change in the current emissions trends) to more progressive (i.e., international leaders implement aggressive emissions reductions policies). Each of these scenarios leads to a corresponding GHG concentration, which is then used in climate models to examine how the climate may react to varying levels of GHGs. Climate researchers use many global climate models to assess the potential changes in climate due to increased GHGs.

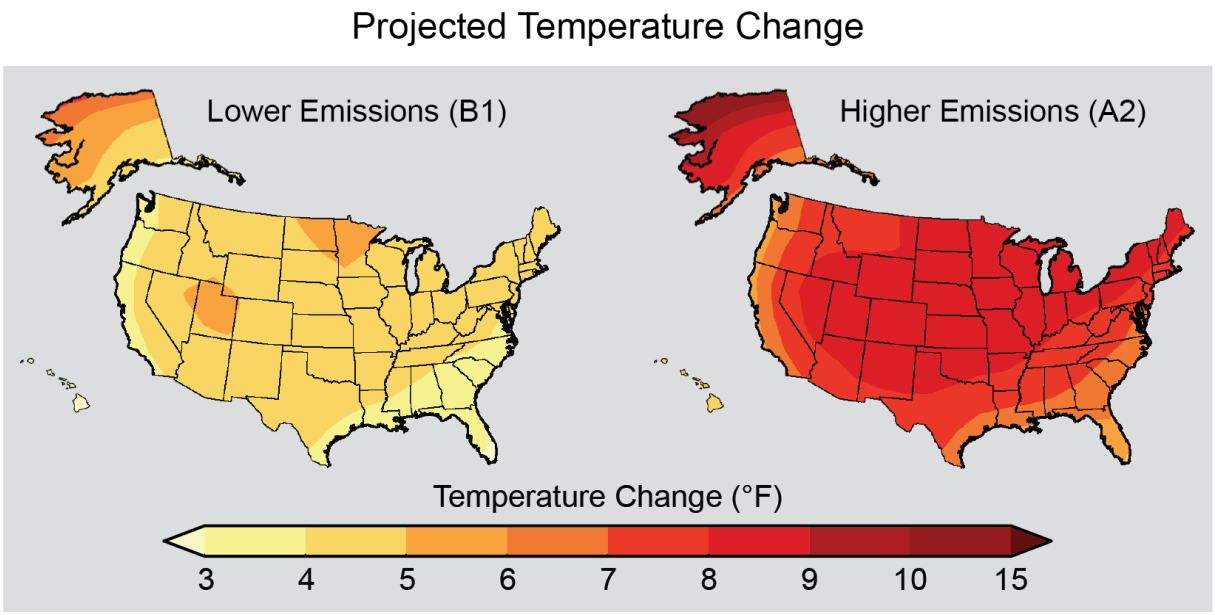
Key Uncertainties Associated with Climate Projections

- Climate projections and impacts, like other types of research about future conditions, are characterized by uncertainty. Climate projection uncertainties include but are not limited to:
  - ✓ Levels of future greenhouse gas concentrations and other radiatively important gases and aerosols,
  - ✓ Sensitivity of the climate system to greenhouse gas concentrations and other radiatively important gases and aerosols,
  - ✓ Inherent climate variability, and
  - ✓ Changes in local physical processes (such as afternoon sea breezes) that are not captured by global climate models.

Even though precise quantitative climate projections at the local scale are characterized by uncertainties, the information provided can help identify the potential risks associated with climate variability/climate change and support long term mitigation and adaptation planning.

Maps show projected change in average surface air temperature in the later part of this century (2071-2099) relative to the later part of the last century (1970-1999) under a scenario that assumes substantial reductions in heat trapping gases and a higher emissions scenario that assumes continued increases in global emissions. These are shown in Figure 4-63.

Figure 4-63 Projected Temperature Change – Lower and Higher Emissions Scenario



Source: National Climate Assessment

According to the California Natural Resource Agency (CNRA), climate change is already affecting California and is projected to continue to do so well into the foreseeable future. Current and projected changes include increased temperatures, sea level rise, a reduced winter snowpack altered precipitation patterns, and more frequent storm events. Over the long term, reducing greenhouse gases can help make these changes less severe, but the changes cannot be avoided entirely. Unavoidable climate impacts can

result in a variety of secondary consequences including detrimental impacts on human health and safety, economic continuity, ecosystem integrity and provision of basic services.

The CNRA's 2021 CAS (as well as the 2024 Draft CAS) delineated how climate change may impact and exacerbate natural hazards in the future, including wildfires, extreme heat, floods, and drought:

- Climate change is expected to lead to increases in the frequency, intensity, and duration of extreme heat events and heat waves in Amador County and the rest of California, which are likely to increase the risk of mortality and morbidity due to heat-related illness and exacerbation of existing chronic health conditions. Those most at risk and vulnerable to climate-related illness are the elderly, individuals with chronic conditions such as heart and lung disease, diabetes, and mental illnesses, infants, the socially or economically disadvantaged, and those who work outdoors.
- Higher temperatures will melt the Sierra snowpack earlier and drive the snowline higher, resulting in less snowpack to supply water to California users.
- Droughts are likely to become more frequent and persistent in the 21st century.
- Intense rainfall events, periodically ones with larger than historical runoff, will continue to affect California with more frequent and/or more extensive flooding.
- Storms and snowmelt may coincide and produce higher winter runoff from the landward side, while accelerating sea-level rise will produce higher storm surges during coastal storms. Together, these changes may increase the probability of floods and levee and dam failures, along with creating issues related to saltwater intrusion.
- Warmer weather, reduced snowpack, and earlier snowmelt can be expected to increase wildfire through fuel hazards and ignition risks. These changes can also increase plant moisture stress and insect populations, both of which affect forest health and reduce forest resilience to wildfires. An increase in wildfire intensity and extent will increase public safety risks, property damage, fire suppression and emergency response costs to government, watershed and water quality impacts, vegetation conversions and habitat fragmentation.

Vulnerability to Climate Change

Vulnerability—Medium

Climate change adaptation is a key priority of the State of California. The 2023 State of California Multi-Hazard Mitigation Plan stated that climate change is already affecting California. Sea levels have risen by as much as seven inches along the California coast over the last century, increasing erosion and pressure on the state's infrastructure, water supplies, and natural resources. The State has also seen increased average temperatures, more extreme hot days, fewer cold nights, a lengthening of the growing season, shifts in the water cycle with less winter precipitation falling as snow, and earlier runoff of both snowmelt and rainwater in the year. In addition to changes in average temperatures, sea level, and precipitation patterns, the intensity of extreme weather events is also changing.

The whole of the County is at some measure of vulnerability to climate change. An assessment of a community's vulnerability to this hazard begins with an understanding of local exposure to unincorporated Amador County. This is included in the Local Concerns section below. After that, vulnerability is discussed in multiple sections that detail how this hazard can affect both the entire Amador County Planning Area as well as the unincorporated portions of Amador County. How the hazard affects the other

participating jurisdictions can be found in their respective annexes to this LHMP Update. These sections below include assets at risk, impacts, and how future development may affect the vulnerability of the County to this hazard.

Local Concerns (unincorporated Amador County)

The unincorporated County has specific concerns regarding this hazard. These concerns form a portion of the basis for the mitigation strategy and mitigation actions that seek to reduce risk and vulnerability to this hazard.

Amador County OES Concerns

Anthropogenic and other greenhouse gasses will continue to cause more extreme climate change conditions unless steps taken to minimize greenhouse gases and carbon footprints. The County's roadways, infrastructure in flood zones, disadvantaged communities, agriculture sector and sensitives species habitat are among the most vulnerable to climate change impacts.

Climate change threatens the food security and economic viability of agriculture in Amador County. Drought, flood, and severe weather are all poised to intensify as climate change continues to impact California. Agricultural practices need updating to become resilient and can be part of the solution to climate change in our region.

Amador County Air District Concerns

The Amador County Air District noted the following local concerns: Climate change brings on changes in our temperatures. Heat waves lead to poor air quality which impact public health. The changes in temperatures recently experienced (low temperatures at night/morning and mid to warm temperatures in the day) create inversion layers that trap air low to the ground exposing the public to bad air quality for longer periods of time. If Amador was to be hit with a wildfire during an inversion, the effects could be catastrophic. There is too much fuel present in the County. Drought affects crops in the County and health of the forest.

Amador County Public Health Concerns

Amador County Public Health noted the following local concerns: The chief public health concerns related to climate change are numerous and significant. Here are some of the most pressing issues:

- Respiratory and Cardiovascular Diseases: Increased air pollution and allergens can exacerbate conditions like asthma and heart disease.
- Extreme Weather Events: This can lead to injuries, illnesses, and deaths.
- Infectious Diseases: Changes in temperature and precipitation patterns can alter the distribution of disease vectors.
- Food and Waterborne Illnesses: Changes in precipitation and temperature can affect food and water safety.
- Mental Health: The stress and trauma from experiencing extreme weather events and displacement can lead to mental health issues like anxiety and depression.

- Vulnerable Populations: Certain groups, such as the elderly, unhoused, children, and those with pre-existing health conditions, are more susceptible to the health impacts of climate change.

CAL FIRE Concerns

CAL FIRE noted that wildfires pose several significant public health concerns. Here are some of the chief local concerns:

- Respiratory Issues: Wildfire smoke contains fine particulate matter (PM2.5) that can penetrate deep into the lungs and even enter the bloodstream, exacerbating conditions like asthma, bronchitis, and chronic obstructive pulmonary disease (COPD).
- Cardiovascular Problems: Exposure to wildfire smoke can increase the risk of heart attacks, arrhythmias, and other cardiovascular issues.
- Vulnerable Populations: Certain groups, such as children, the unhoused, the elderly, pregnant women, and those with pre-existing health conditions, are more susceptible to the health impacts of wildfire smoke.
- Mental Health: The stress and trauma from experiencing wildfires and displacement can lead to mental health issues like anxiety, depression, and post-traumatic stress disorder (PTSD).
- Long-term Health Effects: Prolonged exposure to wildfire smoke can have lasting health impacts, including increased rates of respiratory infections and other chronic conditions.
- Emergency Room Visits and Hospitalizations: Increased air pollution from wildfires can lead to a rise in emergency room visits and hospitalizations for respiratory and cardiovascular issues which could overcome our small rural hospital's ability to care for patients.

Assets at Risk

Assets at risk from climate change include people and populations; structures; critical infrastructure and vulnerable uses (with community lifelines); natural, historic, and cultural resources; and economic assets and community activities of value. These are discussed in the following sections for the Amador County Planning Area and unincorporated Amador County.

Additionally, for each hazard in the FEMA National Risk Index in Amador County, the relevant portions of the hazard analysis done by FEMA is presented below. This includes the Hazard Risk Index Rating, Expected Annual Loss Values, Exposure Values, and the Historic Loss Ratio Rating. These are presented for the Amador County Planning Area as a whole.

People and Populations

Climate change affects people and populations within a community, especially those climate change issues related to increases in temperature over time. While all populations can be affected by temperature extremes, populations particularly vulnerable include the very old and very young, medically fragile people, people without means of shelter (and air conditioning) or transportation, people who are socially isolated and other socially vulnerable or underserved populations (as shown in Special Populations discussion in Section 4.2.1). Acclimatization to heat may help reduce risks from heat waves in the healthy general population but may not be sufficient to protect those with underlying issues and lack of resources.

Structures

Climate change, on its own, does not generally impact structures. However, structures in areas of increased wildfire, drought, extreme heat, or flood areas exacerbated by the effects of climate change would be at increased risk, as described throughout this LHMP. Due to the slow onset of climate change, many structures in the County are expected to undergo improvements and adapt over time to a new climate normal.

Critical Infrastructure and Vulnerable Uses

As with structures, critical and vulnerable facilities in areas of increased wildfire, flood areas, or in other hazard areas exacerbated by climate change, would be at increased risk. Climate change is expected to increase the general vulnerability of critical and vulnerable facilities to natural hazards. Due to the slow onset of climate change, critical and vulnerable facilities and community lifelines in the County are expected to undergo improvements and adapt over time to a new climate normal.

Natural, Historic, and Cultural Resources

The rivers, streams, and open space areas of the County supports rich biodiversity, including many special-status species. These are all at risk from the effects of climate change. In addition, if heat changes wildfire patterns, all areas (on land) of the County are at increased risk from fire – including natural, historic, and cultural resources. Furthermore, if climate change exacerbates the drought hazard, areas of wetlands in the County may dry up temporarily, which could damage habitat areas for waterfowl and other species that depend on these areas.

FEMA NRI Hazard Vulnerability Assessment

Climate change is not an NRI hazard, therefore no data is presented.

Impacts from Climate Change

The 2017 California Adaptation Planning Guide (APG) North Central Valley Region identifies area specific impacts and vulnerabilities to the Amador County Planning Area. These impacts include:

- Increased temperatures
- Reduced precipitation
- Public health – heat and air pollution
- Reduced agricultural productivity
- Inland flooding
- Reduced tourism

Secondary impacts include changes in precipitation patterns, the global water cycle, melting glaciers and ice caps, and rising sea levels. According to the IPCC, climate change will "increase the likelihood of severe, pervasive and irreversible impacts for people and ecosystems" if unchecked.

Through changes to oceanic and atmospheric circulation cycles and increasing heat, climate change affects weather systems around the world. Climate change increases the likelihood and exacerbates the severity

of extreme weather – more frequent or intense storms, floods, droughts, and heat waves. The 2023 State of California Hazard Mitigation Plan noted that there are direct and secondary impacts:

- Direct Impacts
  - ✓ Increase in average temperature
  - ✓ Changes in annual precipitation
- Secondary Impacts
  - ✓ Increased frequency, intensity, and duration of extreme heat days and heat waves/events
  - ✓ Increased flooding
  - ✓ Increased wildfire
  - ✓ Loss of snowpack and decreased water supplies

Consequences for human society include loss of life and injury, damaged infrastructure, long-term health effects, loss of agricultural crops, disrupted transport and freight, and more. Climate change is not a discrete event but a long-term hazard, the effects of which communities are already experiencing.

In addition to these sources, the 2023 State of California Hazard Mitigation Plan noted that according to California's Fourth Climate Change Assessment, the state will experience the following climate impacts:

- Annual average daily high temperatures are expected to rise by 2.7 °F by 2040, 5.8°F by 2070, and 8.8°F by 2100 compared to observed and modeled historical conditions. These changes are statewide averages.
- Heat waves are projected to become longer, more intense, and more frequent.
- Warming temperatures are expected to increase soil moisture loss and lead to drier conditions. Summer dryness may become prolonged, with soil drying beginning earlier in the spring and lasting longer into the fall and winter.
- Droughts are likely to become more frequent and persistent through 2100.
- The strength of the most intense precipitation and storm events affecting California is expected to increase.
- Snowpack levels are projected to decline significantly by 2100 due to reduced snowfall and faster snowmelt.
- Marine layer clouds are projected to decrease.
- Extreme wildfires (i.e., fires larger than 24,710 acres) would occur 50 percent more frequently. The maximum area burned statewide may increase 178 percent by the end of the century.
- Sea level rise is expected to continue to increase beach, cliff, and bluff erosion.

Impacts to identified assets at risk to this hazard and the overall vulnerability of the County may be affected in the future by climate change (which was discussed in the hazard profile section above), changes in population patterns, and changes in land use and development. The influencing effects of these factors on this hazard are discussed further in the Future Conditions/Future Development discussion below.

Future Conditions/Future Development

Future hazard conditions may be affected by climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. Findings on this for Amador County include the following:

- As climate change continues to accelerate over time, climate related impacts to the County will continue to increase.
- Climate change can influence population growth in the County over time. While the County is expected to see slow and steady growth, the County could see population fluctuations as a result of climate impacts relative to those experienced in other regions, and these fluctuations are expected to impact demand for housing and other development. While there are currently no formal studies of specific migration patterns expected to impact the County region, climate-induced migration was recognized within the UNFCCC Conference of Parties Paris Agreement of 2015 and is expected to be the focus of future studies. So while changes in population and population patterns are not expected to increase the impacts associated with this hazard, climate change may instead influence future population growth in the County.
- Land use planning should be proactive to address future hazard conditions. The increasing severity and frequency of storms and other weather events due to the changing climate should be taken into account while considering land use planning for the County. Ensuring that regulatory requirements, such as building codes, are updated and followed will help reduce future impacts to this hazard. Due to adherence to protective building codes, changes in land use and development will likely not increase the impacts and associated vulnerabilities of the County to this hazard.

Future development considerations should be ongoing and proactive. Ensuring that comprehensive land use planning is conducted, regulatory requirements, such as building codes, are followed, and varying needs for different demographic groups with intersecting identities that reside within the County are considered can help to make for a more disaster resilient community.

4.3.9. Dam Failure

Hazard Profile

This hazard profile contains multiple sections that detail how this hazard can affect the Amador County Planning Area. These sections include a hazard/problem description; description of location and extent; past occurrences of this hazard; and how climate change can affect or influence this hazard.

Hazard/Problem Description

Dams are manmade structures built for a variety of uses including flood protection, power generation, agriculture, water supply, and recreation. When dams are constructed for flood protection, they are usually engineered to withstand a flood with a computed risk of occurrence. For example, a dam may be designed to contain a flood at a location on a stream that has a certain probability of occurring in any one year. If prolonged periods of rainfall and flooding occur that exceed the design requirements, that structure may be overtopped or fail. Overtopping is the primary cause of earthen dam failure in the United States.

Dam failures can also result from any one or a combination of the following causes:

- Earthquake
- Inadequate spillway capacity resulting in excess overtopping flows
- Internal erosion caused by embankment or foundation leakage, or piping or rodent activity
- Improper design
- Improper maintenance
- Negligent operation
- Failure of upstream dams on the same waterway

In general, there are three types of dams: concrete arch or hydraulic fill, earth and rockfill, and concrete gravity. Each type of dam has different failure characteristics. A concrete arch or hydraulic fill dam can fail almost instantaneously; the flood wave builds up rapidly to a peak then gradually declines. An earth-rockfill dam fails gradually due to erosion of the breach; a flood wave will build gradually to a peak and then decline until the reservoir is empty. A concrete gravity dam can fail instantaneously or gradually with a corresponding buildup and decline of the flood wave.

The CA DWR Division of Safety of Dams (DSOD) has jurisdiction over impoundments that meet certain capacity and height criteria. Embankments that are less than six feet high and impoundments that can store less than 15 acre-feet are non-jurisdictional. Additionally, dams that are less than 25 feet high can impound up to 50 acre-feet without being jurisdictional. FEMA and CA DWR Division of Safety of Dams (DSOD) assign hazard potential classifications to dams within the State that provides information on the potential impact should a dam fail. The following two factors are considered when assigning hazard ratings: existing land use and land use controls (zoning) downstream of the dam. FEMA categorizes the downstream hazard potential into three categories in increasing severity: Low, Significant, and High. DSOD adds a fourth category of Extremely High. Dams are classified in these four categories that identify the potential hazard to life and property:

- **Extremely High Hazard** – Expected to cause considerable loss of human life or would result in an inundation area with a population of 1,000 or more.
- **High Hazard** – Expected to cause loss of at least one human life.
- **Significant Hazard** – No probable loss of human life but can cause economic loss, environmental damage, impacts to critical facilities, or other significant impacts.
- **Low Hazard** – No probable loss of human life and low economic and environmental losses. Losses are expected to be principally limited to the owner's property.

Location and Extent

According to data provided by Cal DWR, DSOD data, there are 20 dams in Amador County constructed for flood control, storage, electrical generation, and recreational purposes. Of these, 4 are rated as extremely high, 9 rated as High Hazard, 1 as Significant Hazard, and 6 as Low Hazard. In addition to these dams located within Amador County, there are 16 other dams (2 Extremely High, 8 High Hazard, 4 Significant Hazard, and 2 Low Hazard) outside the County (located in San Joaquin, El Dorado, Calaveras, Alpine Counties) with the potential to affect people and property in Amador County. All 6 Extremely High and 16 of the 17 High Hazard dams (all but Patterson in El Dorado County) have inundations in Amador County. There is no inundation data available for any of the Significant or Low Hazard dams. Figure 4-64 identifies

the dams that have inundation areas located in the Amador County Planning Area. Table 4-54 gives information on each of the dams in the County, and the dams outside the County that could affect areas in Amador County.

Figure 4-64 Amador County Dam Inventory (Including Dams from Outside the County)

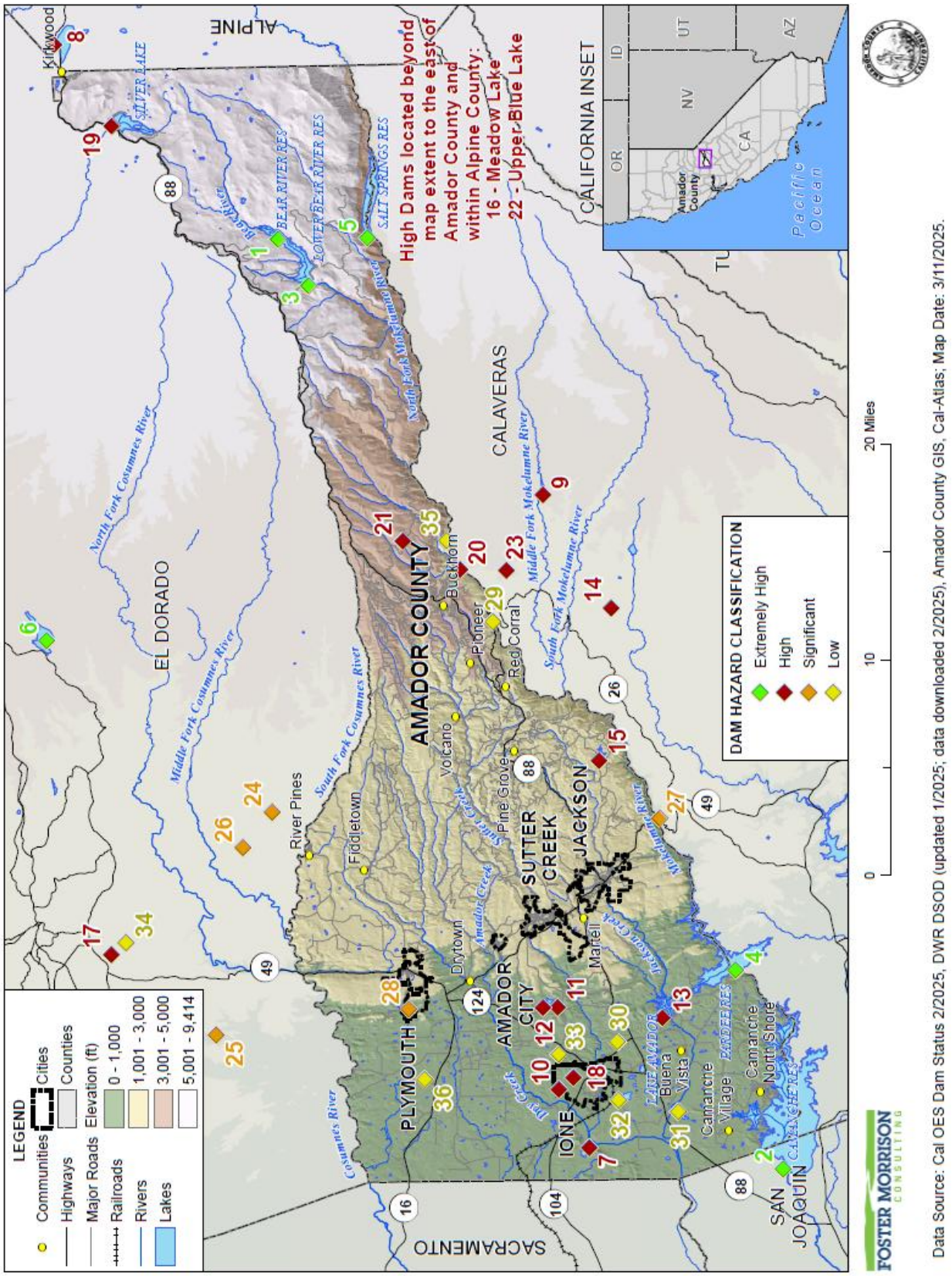


Figure 4-65 Dam Hazard Map Legend

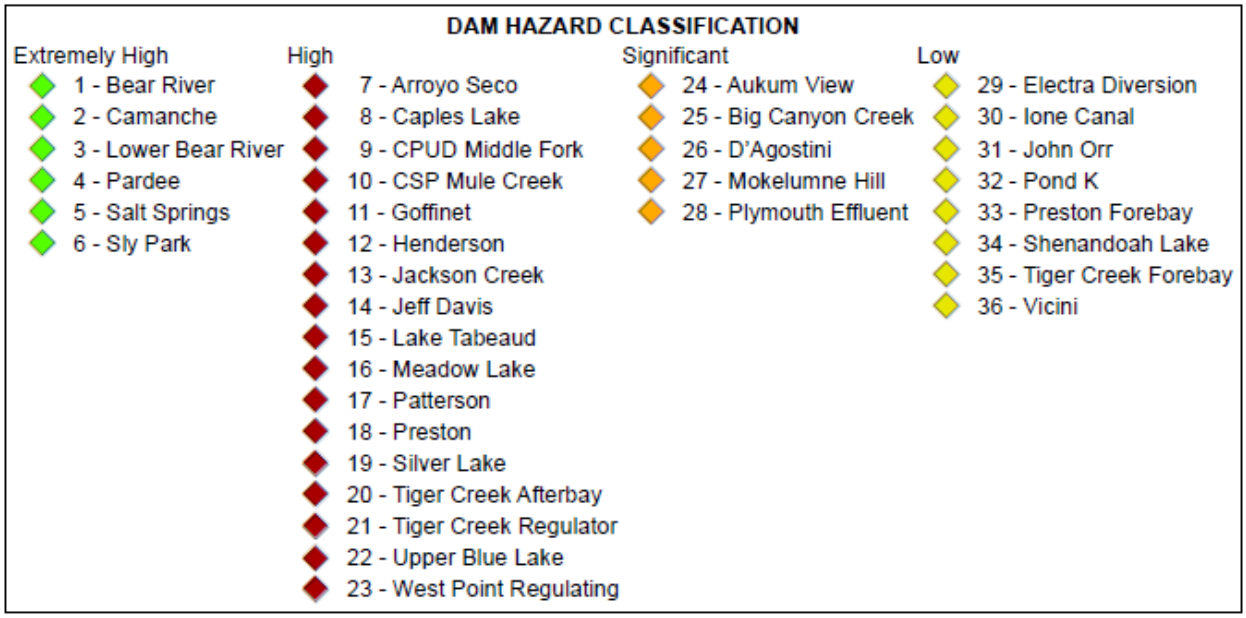


Table 4-54 Amador County – Dam Inventory (both Inside and Outside the County)

Name	Owner	Hazard Classification	Dam Type	River/Stream	Structural Height (ft)	Maximum Storage (acre-ft)	Map Location/ Mapped Inundation
Bear River	PG&E	Extremely High	Rockfill	Bear River	83	6,818	Y/Y
Camanche**	East Bay Municipal Utility District	Extremely High	Earth	Mokelumne River	171	417,120	Y/Y
Lower Bear River	PG&E	Extremely High	Rockfill	Bear River	253	48,750	Y/Y
Pardee	East Bay Municipal Utility District	Extremely High	Concrete Gravity	Mokelumne River	345	197,950	Y/Y
Salt Springs	PG&E	Extremely High	Rockfill	North Fork Mokelumne River	332	141,900	Y/Y
Sly Park**	El Dorado Irrigation District	Extremely High	Earth	Sly Park Creek	182	41,000	Y/Y
Arroyo Seco	Greenrock Ranch Lands LLC	High	Earth	Tributary of Dry Creek	67	2,433	Y/Y

Name	Owner	Hazard Classification	Dam Type	River/Stream	Structural Height (ft)	Maximum Storage (acre-ft)	Map Location/ Mapped Inundation
Caples Lake**	El Dorado Irrigation District	High	Earthen Rockfill	Caples Creek	71	21,580	Y/Y
CPUD Middle Fork**	Calaveras Public Utility District	High	Earth	Middle Fork of American River	98	1,700	Y/Y
CSP Mule Creek	California Department of Corrections and Rehabilitation	High	Earth	Offstream	51	535	Y/Y
Goffinet	Private Owner	High	Earth	Jackass Creek	38	197	Y/Y
Henderson	Amador Regional Sanitation Authority	High	Earth	Jackass Creek	56	500	Y/Y
Jackson Creek	Jackson Valley Irrigation District	High	Earth Concrete	Jackson Creek	193	22,000	Y/Y
Jeff Davis**	Calaveras Public Utility District	High	Earth	Mokelumne River	114	2,059	Y/Y
Lake Tabeaud	PG&E	High	Earth	South Fork of Jackson Creek	123	1,170	Y/Y
Meadow Lake**	PG&E	High	Earth Rockfill	Tributary of Fordyce Creek	37	4,930	Y/Y
Patterson**	Private	High	Earth	Offstream	37	350	Y/Y
Preston	Amador Regional Sanitation Authority	High	Earth	Tributary Mule Creek	40	268	Y/Y
Silver Lake	El Dorado Irrigation District	High	CRIB	Silver Fork	26	3,840	Y/Y
Tiger Creek Afterbay**	PG&E	High	VARA	North Fork Mokelumne River	115	3,960	Y/Y
Tiger Creek Regulator	PG&E	High	SLBT	Tiger Creek	112	523	Y/Y
Upper Blue Lake**	PG&E	High	Earth Rockfill	Blue Creek	31	7,576	Y/Y

Name	Owner	Hazard Classification	Dam Type	River/Stream	Structural Height (ft)	Maximum Storage (acre-ft)	Map Location/ Mapped Inundation
West Point Regulating**	Calaveras County Water District	High	Earth	Ruse Creek	36	60	Y/Y
Aukum View**	Showcase Ranches Community Services District	Significant	Earth	Tributary of Flat Creek	32	136	Y/N
Big Canyon Creek**	Private	Significant	Earth	Big Canyon Creek	63	395	Y/N
D'Agostini**	Private	Significant	Earth	Spanish	32	355	Y/N
Mokelumne Hill**	Mokelumne Hill Sanitary District	Significant	Earth	Mokelumne River	52	52	Y/N
Plymouth Effluent	City of Plymouth	Significant	Earth	Tributary of Lower Indian Creek	59	187	Y/N
Electra Diversion**	PG&E	Low	Gravel	North Fork Mokelumne River	44	65	Y/N
Ione Canal	Amador Water Agency	Low	Earth	Ione Canal	48	24	Y/N
John Orr	Private Owner	Low	Earth	Tributary of Jackson Creek	20	152	Y/N
Pond K	US Mine Corporation	Low	Earth	none	22	1,056	Y/N
Preston Forebay	Amador Regional Sanitation Authority	Low	Earth	Offstream	40	30	Y/N
Shenandoah Lake**	Renwood Ranch	Low	Earth	Pigeon Creek	33	168	Y/N
Tiger Creek Forebay	PG&E	Low	Earth	Tributary of Tiger Creek	33	36	Y/N
Vicini	Private Owner	Low	Earth	Tributary of Willow Creek	19	150	Y/N

Source: DSOD/Cal OES/NID Dam Status 1/25, National Performance of Dams Program

*One Acre Foot=326,000 gallons

**Located outside of Amador County, but inundating areas inside Amador County

Once a list of dams was established, dam inundation layers were obtained from DSOD and Cal OES in GIS. Only extremely high and high hazard dams were analyzed for this LHMP due to the potential for these dams to cause loss of life in the Amador County Planning Area should a dam failure occur. All 6 of the

extremely high dams and all of the 17 high hazard dams had available inundation mapping. Of these, all 6 extremely high and 16 of the 17 high hazard dams (all but Patterson in El Dorado County) have inundations that extend into Amador County. Dams with an inundation area in the Amador County Planning Area are shown on Figure 4-66 for extremely high hazard dams, and Figure 4-67 for high hazard dams. As shown, only the unincorporated County has areas located in the extremely high hazard dam inundation areas. The high hazard dam inundation zones are located in the unincorporated County, as well as in Ione and Jackson. Geographic flood extents as shown on the dam inundation maps are detailed by dam in Table 4-55 for both extremely high and high hazard dams for the unincorporated County. Information on the high hazard dam extents by jurisdiction can be found in their respective annexes to this Plan.

Figure 4-66 Amador County Planning Area – Extremely High Hazard Dam Inundation Areas

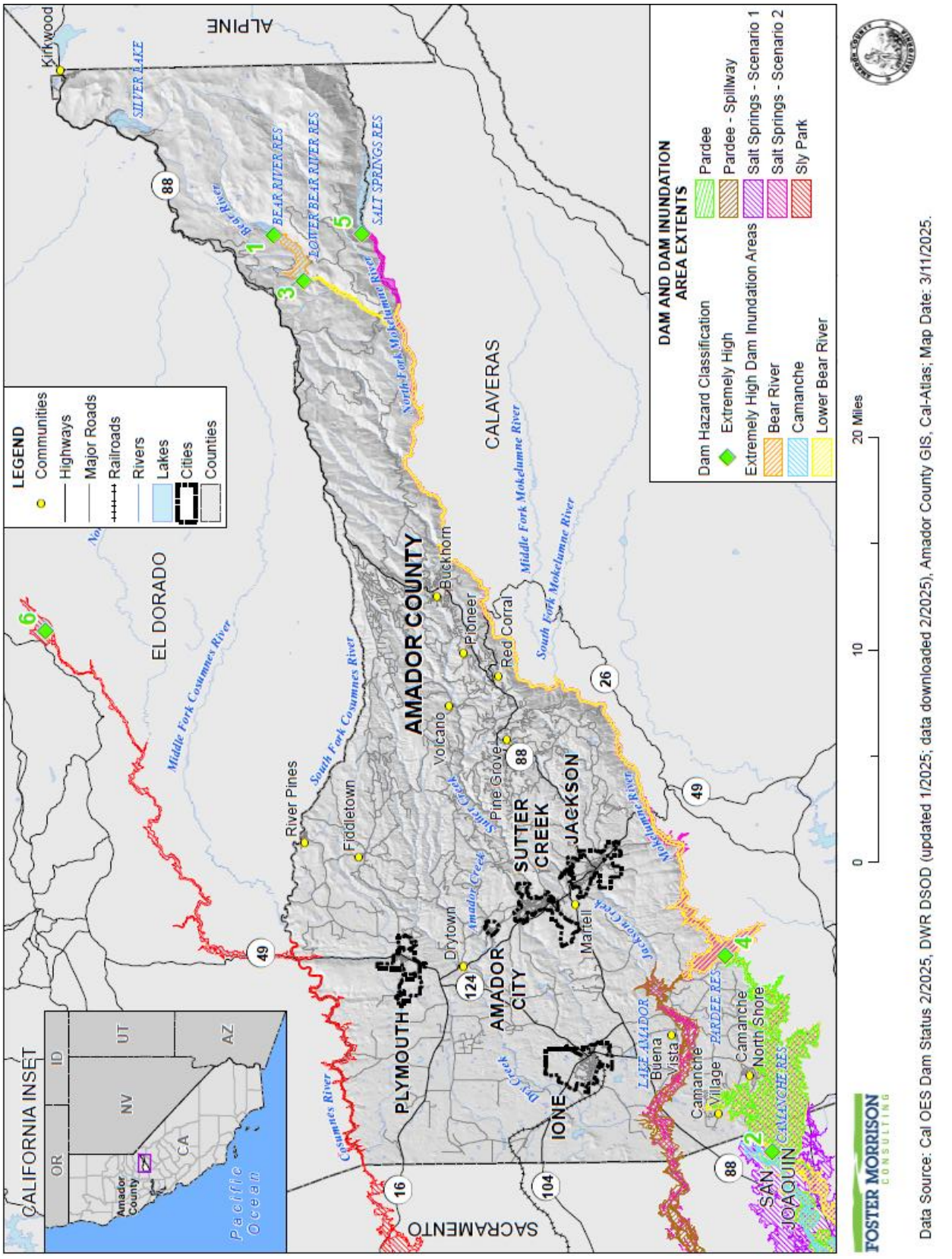


Figure 4-67 Amador Planning Area – High Hazard Dam Inundation Areas

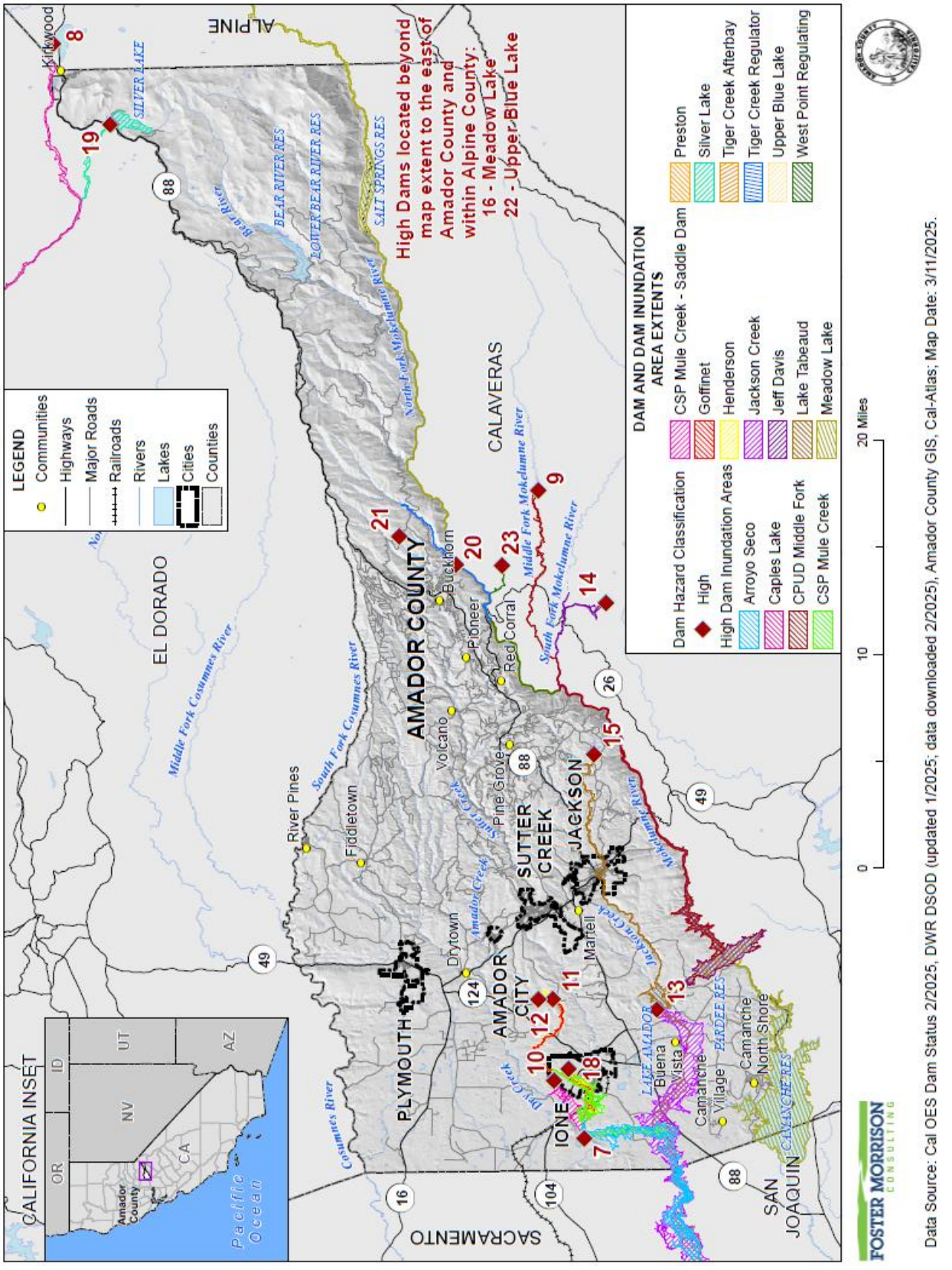


Table 4-55 Amador County Planning Area – Geographical Dam Inundation Extents

Jurisdiction / Dam Inundation Area	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Extremely High Hazard Dams						
Unincorporated Amador County						
Bear River	8,749	2.3%	300	0.2%	8,448	3.9%
Camanche	6	0.001%	0	0	6	0.003%
Lower Bear River	7,893	2.1%	268	0.2%	7,625	3.6%
Pardee	4,606	1.2%	162	0.1%	4,444	2.1%
Pardee - Spillway	3,651	1.0%	2,670	1.6%	980	0.5%
Salt Springs - Scenario 1	8,520	2.2%	334	0.2%	8,186	3.8%
Salt Springs - Scenario 2	5,548	1.5%	1,623	1.0%	3,925	1.8%
Sly Park	720	0.2%	348	0.2%	372	0.2%
High Hazard Dams						
City of Ione						
CSP Mule Creek	373	12.6%	65	9.4%	308	13.5%
CSP Mule Creek - Saddle Dam	44	1.5%	0	0.0%	44	1.9%
Goffinet	123	4.1%	18	2.7%	104	4.6%
Henderson	239	8.0%	45	6.4%	195	8.5%
Preston	179	6.0%	35	5.1%	144	6.3%
City of Jackson						
Lake Tabeaud	80	3.5%	31	3.9%	50	3.3%
Unincorporated Amador County						
Arroyo Seco	1,525	0.4%	909	0.6%	616	0.3%
Caples Lake	8	0.002%	-		8	0.004%
CPUD Middle Fork	637	0.2%	26	0.02%	612	0.3%
CSP Mule Creek	976	0.3%	636	0.4%	340	0.2%
CSP Mule Creek - Saddle Dam	1,147	0.3%	846	0.5%	301	0.1%
Goffinet	194	0.05%	113	0.07%	80	0.04%

Jurisdiction / Dam Inundation Area	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Henderson	418	0.1%	258	0.2%	160	0.1%
Jackson Creek	4,701	1.2%	3,856	2.3%	845	0.4%
Jeff Davis	1,380	0.4%	31	0.02%	1,349	0.6%
Lake Tabeaud	2,071	0.5%	1,475	0.9%	596	0.3%
Meadow Lake	5,670	1.5%	44	0.03%	5,626	2.6%
Preston	156	0.04%	71	0.04%	85	0.04%
Silver Lake	519	0.1%	510	0.3%	9	0.004%
Tiger Creek Afterbay	1,540	0.4%	39	0.02%	1,501	0.7%
Tiger Creek Regulator	151	0.04%	0	0.0003%	150	0.07%
Upper Blue Lake	645	0.2%	-		645	0.3%
West Point Regulating	65	0.02%	1	0.001%	64	0.03%

Source: DSOD/Cal OES/NID Dam Status 01/25

There is no scale with which to measure dam failure, only a scale to measure dam failure vulnerability based on size of dam and proximity to development. Dam failure may range from a small breach to a total failure. While a dam may fill slowly with runoff from winter storms, a dam break can have a very quick speed of onset. The duration of dam failure is not long – only as long as it takes to empty the reservoir of water the dam held back.

For dam overtopping, the speed of onset is somewhat slower than that of a dam break, and the duration is longer (as evidenced in the 2017 Oroville Dam event). The Amador County Planning Area would be affected for as long as the flood waters from the dam failure takes to drain downstream.

Past Occurrences

Disaster Declaration History

There have been no disaster declarations related to dam failure in Amador County, as shown in Table 4-4.

NCDC Events

There have been no NCDC dam failure events in Amador County.

National Performance of Dams Program Events

The National Performance of Dams Program at Stanford University tracks dam failures. A search of the National Performance of Dams Program database showed no past dam failure events in Amador County.

Hazard Mitigation Planning Committee Events

No other events of dam failure were noted to have occurred in Amador County.

Likelihood of Future Occurrence

Unlikely—No dam failure events have occurred in the County. Further, based on historical data and input from the HMPC, it is unlikely that major dam failure event will occur in Amador County. There is concern that many of the State's older dams, including those in Amador County, could start experiencing problems.

It is likely that climate change will increase the chance of future occurrence as well as future impacts. More information on climate change and dam failure can be found in the next section. More information on future impacts can be found in the Future Conditions/Future Development section of the Vulnerability Assessment below.

Climate Change and Dam Failure

The 2023 California State Hazard Mitigation Plan noted that modeling described in California's Fourth Climate Change Assessment projects less frequent but more extreme daily precipitation. Year-to-year precipitation will become more volatile, and the number of dry years will increase by mid-century. As the climate continues to warm, atmospheric rivers will carry more moisture, and extreme precipitation may increase. Climate model projections show a tendency for the northern part of the State to become wetter. Increases in both precipitation and heat causing snow melt in areas upstream of dams could increase the potential for dam failure and uncontrolled releases in Amador County.

Vulnerability Assessment

Vulnerability—High

Dam failure flooding can occur as the result of a partial or complete collapse of an impoundment. Dam failures often result from prolonged rainfall and flooding. An earthquake event can also contribute to a dam failure. The primary danger associated with dam failure is the high velocity flooding of those properties downstream of the dam. A dam failure can range from a small, uncontrolled release to a catastrophic failure. Vulnerability to dam failures is generally confined to the areas subject to inundation downstream of the facility. Secondary losses would include loss of the multi-use functions of the facility and associated revenues that accompany those functions. Dam failure flooding would vary by community depending on which dam fails and the nature and extent of the dam failure and associated flooding.

An assessment of a community's vulnerability to this hazard begins with an understanding of local exposure to unincorporated Amador County. This is included in the Local Concerns section below. After that, vulnerability is discussed in multiple sections that detail how this hazard can affect both the entire Amador County Planning Area as well as the unincorporated portions of Amador County. How the hazard affects the other participating jurisdictions can be found in their respective annexes to this LHMP Update. These sections below include assets at risk, impacts, and how future development may affect the vulnerability of the County to this hazard.

Local Concerns (unincorporated Amador County)

The unincorporated County has specific concerns regarding this hazard. These concerns form a portion of the basis for the mitigation strategy and mitigation actions that seek to reduce the risk and vulnerability to this hazard.

The County noted that per DWR DSOD Inundation Maps – there are multiple dams both inside the County, as well as outside the County, that could affect residents and structures in the County. These are discussed in the Assets at Risk section below. The County also noted that an early warning system could improve dam failure readiness and mitigation.

Local concerns for each of the jurisdictions can be found under the Local Concerns heading in each respective jurisdictional annex to this LHMP Update.

Assets at Risk from Dam Failure

Assets at risk from dam failure include people and populations; structures; critical facilities and infrastructure; and natural, historic, and cultural resources. These are discussed in the following sections for the Amador County Planning Area and unincorporated Amador County.

Additionally, for each hazard in the FEMA National Risk Index in Amador County, the relevant portions of the hazard analysis done by FEMA is presented below. This includes the Hazard Risk Index Rating, Expected Annual Loss Values, Exposure Values, and the Historic Loss Ratio Rating. These are presented for the Amador County Planning Area as a whole.

Methodology (Parcels and Structures)

In order to analyze people and populations, structures, and critical facilities at risk in dam inundation areas, GIS was used to quantify those values. The 2024 Amador County Parcel/Assessor Data was provided by Amador County and was used as the basis for the inventory of assessed values for both improved and unimproved parcels within the Amador County Planning Area. The dam inundation areas, obtained from DSOD, were then overlaid on the parcel layer. For the purposes of this analysis, if the dam inundation layer intersected any portion of a parcel polygon, the entire parcel was considered to be in the dam inundation area. The parcels were segregated and analyzed in this fashion for the entire Planning Area. This analysis was performed on extremely high and high hazard dam inundation areas only. No significant or low hazard dam analysis was performed, as significant and low hazard dams did not have available inundation mapping.

People and Populations

All people and populations located in dam inundation areas are vulnerable to dam failure. Certain vulnerable populations may be at increased risk to dam failure, especially during a large event with minimal advance notice. These vulnerable populations may include: the unhoused, those with limited mobility, and those that lack the resources to leave the area.

Amador County residents that live in these dam inundation areas are often the most vulnerable. Not only are the residents at risk, but their homes and contents are all at risk, compounding the impacts associated with significant dam failure events. To further evaluate the impact to the Amador County Planning Area's residential populations located in these hazard areas, a separate analysis was performed to determine residential populations in the dam inundation areas. The DSOD dam inundation areas were overlayed on the parcel layer and linked to the Assessor Data. Those residential parcel centroids that intersect the dam inundation areas were counted and multiplied by the Census Bureau average household factors for each jurisdiction. This is shown in Table 4-56.

Table 4-56 Amador County Planning Area – Improved Residential Parcels and Population by Dam Inundation Area (Extremely High and High Hazard) and Jurisdiction

Dam Hazard Class/Jurisdiction/Dam Inundation Area	Improved Residential Parcels	Population
Extremely High Hazard Dams		
Unincorporated Amador County		
Bear River	28	66
Lower Bear River	28	66
Pardee	8	19
Salt Springs	38	89
Sly Park	13	31
High Hazard Dams		
Unincorporated Amador County		
Arroyo Seco	3	7
CPUD Middle Fork	1	2
CSP Mule Creek	3	7
CSP Mule Creek Saddle	7	16
Goffinet	2	5
Henderson	3	7
Jackson Creek	52	122
Jeff Davis	2	5
Lake Tabeaud	27	63
Meadow Lake	4	9
Silver Lake	5	12
Tiger Creek Afterbay	4	9
West Point Regulating	3	7
Ione		
CSP Mule Creek	219	501
Goffinet	96	220
Henderson	185	424

Dam Hazard Class/Jurisdiction/Dam Inundation Area	Improved Residential Parcels	Population
Preston	165	378
Jackson		
Lake Tabeaud	84	185

Source: Cal OES, DSOD, 2024 Amador County Parcel/Assessor Data, 2020 US Census Bureau Average Household Size – City of Amador City (2.07); City of Ione (2.29); City of Jackson (2.20); City of Plymouth (2.80); City of Sutter Creek (2.07): Unincorporated Amador County (2.35).

Structures

Many structures in the Amador County Planning Area have some measure of risk to dam failure. Dam failure flooding can affect the built environment of many locations in the Amador County Planning Area. Structures in dam inundation areas are at risk and depending on flood depths, can range from slight damage to total inundation. Analysis by extremely high hazard dam and high hazard dam follows.

Extremely High Hazard Dam Analysis

Parcel counts, land, and improved values (i.e., those with a structure improvement on the parcel), estimated content replacement values, and total values that fall within each extremely high hazard dam inundation areas in the Planning Area are presented below by dam. For the extremely high hazard dam inundation areas, only the unincorporated County is affected. Analysis is presented in the following tables.

- Table 4-57 shows the summary counts and values of parcels in all extremely high hazard dam inundation areas in the Amador County Planning Area. It should be noted that only the unincorporated County is affected by extremely high hazard dam inundations.
- Table 4-58 shows the count and value of parcels in the Bear River Dam inundation area detailed by property use for the unincorporated County.
- Table 4-59 shows the count and value of parcels in the Camanche Dam inundation area detailed by property use for the unincorporated County.
- Table 4-60 shows the count and value of parcels in the Lower Bear River Dam inundation area detailed by property use for the unincorporated County.
- Table 4-61 shows the count and value of parcels in the Pardee Dam inundation area detailed by property use for the unincorporated County.
- Table 4-62 shows the count and value of parcels in the Pardee (Spillway) Dam inundation area detailed by property use for the unincorporated County.
- Table 4-63 shows the count and value of parcels in the Salt Springs (Scenario 1) Dam inundation area detailed by property use for the unincorporated County.
- Table 4-64 shows the count and value of parcels in the Salt Springs (Scenario 1) Dam inundation area detailed by property use for the unincorporated County.
- Table 4-65 shows the count and value of parcels in the Sly Park Dam inundation area detailed by property use for the unincorporated County.

Table 4-57 Amador County Planning Area– Summary Counts and Values of Parcels and Structures in Extremely High Hazard Dam Inundation Areas

Dam Inundation Area	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Bear River	203	39	$8,399,246	$12,512,142	$5,167,406	$26,078,794
Camanche	1	0	$0	$0	$0	$0
Lower Bear River	189	37	$8,046,063	$11,809,991	$4,465,255	$24,321,309
Pardee	49	13	$4,476,186	$5,996,392	$1,234,147	$11,706,725
Pardee - Spillway	120	69	$17,444,240	$120,892,069	$116,905,558	$255,241,867
Salt Springs - Scenario 1	209	47	$9,366,590	$13,403,332	$5,217,659	$27,987,581
Salt Springs - Scenario 2	214	66	$17,930,215	$119,893,936	$116,321,589	$254,145,740
Sly Park	65	32	$5,976,770	$3,187,889	$2,122,001	$11,286,660

Source: Cal OES/DSOD, 2024 Amador County Parcel/Assessor Data

Table 4-58 Unincorporated Amador County – Count and Value of Parcels and Structures in Bear River Dam Inundation Area by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Agricultural	17	6	$1,929,258	$849,894	$849,894	$3,629,046
Commercial	2	2	$0	$702,151	$702,151	$1,404,302
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	112	2	$1,597,046	$3,706,565	$0	$5,303,611
Residential	70	28	$4,695,072	$7,230,721	$3,615,361	$15,541,154
Unknown	2	1	$177,870	$22,811	$0	$200,681
Bear River Total	**203**	**39**	**$8,399,246**	**$12,512,142**	**$5,167,406**	**$26,078,794**

Source: Cal OES/DSOD, 2024 Amador County Parcel/Assessor Data

Table 4-59 Unincorporated Amador County – Count and Value of Parcels and Structures in Camanche Dam Inundation Area by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Agricultural	0	0	$0	$0	$0	$0
Commercial	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Miscellaneous	1	0	$0	$0	$0	$0
Residential	0	0	$0	$0	$0	$0
Unknown	0	0	$0	$0	$0	$0
Camanche Total	**1**	**0**	**$0**	**$0**	**$0**	**$0**

Source: Cal OES/DSOD, 2024 Amador County Parcel/Assessor Data

Table 4-60 Unincorporated Amador County – Count and Value of Parcels and Structures in Lower Bear River Dam Inundation Area by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Agricultural	16	6	$1,576,075	$849,894	$849,894	$3,275,863
Commercial	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	101	2	$1,597,046	$3,706,565	$0	$5,303,611
Residential	70	28	$4,695,072	$7,230,721	$3,615,361	$15,541,154
Unknown	2	1	$177,870	$22,811	$0	$200,681
Lower Bear River Total	**189**	**37**	**$8,046,063**	**$11,809,991**	**$4,465,255**	**$24,321,309**

Source: Cal OES/DSOD, 2024 Amador County Parcel/Assessor Data

Table 4-61 Unincorporated Amador County – Count and Value of Parcels and Structures in Pardee Dam Inundation Area by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Agricultural	9	3	$1,211,353	$178,467	$178,467	$1,568,287
Commercial	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	25	2	$1,208,545	$3,706,565	$0	$4,915,110
Residential	15	8	$2,056,288	$2,111,360	$1,055,680	$5,223,328
Unknown	0	0	$0	$0	$0	$0
Pardee Total	**49**	**13**	**$4,476,186**	**$5,996,392**	**$1,234,147**	**$11,706,725**

Source: Cal OES/DSOD, 2024 Amador County Parcel/Assessor Data

Table 4-62 Unincorporated Amador County – Count and Value of Parcels and Structures in Pardee Spillway Dam Inundation Area by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Agricultural	43	34	$10,169,354	$7,414,842	$7,414,842	$24,999,038
Commercial	2	2	$197,644	$105,185,102	$105,185,102	$210,567,848
Industrial	2	2	$464,990	$579,316	$868,974	$1,913,280
Miscellaneous	28	0	$0	$0	$0	$0
Residential	40	28	$6,101,998	$6,873,280	$3,436,640	$16,411,918
Unknown	5	3	$510,254	$839,529	$0	$1,349,783
Pardee Spillway Total	**120**	**69**	**$17,444,240**	**$120,892,069**	**$116,905,558**	**$255,241,867**

Source: Cal OES/DSOD, 2024 Amador County Parcel/Assessor Data

Table 4-63 Unincorporated Amador County – Count and Value of Parcels and Structures in Salt Springs (Scenario 1) Dam Inundation Area by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Agricultural	14	6	$1,554,370	$761,362	$761,362	$3,077,094
Commercial	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	103	2	$1,597,046	$3,706,565	$0	$5,303,611
Residential	89	38	$5,977,304	$8,912,594	$4,456,297	$19,346,195
Unknown	3	1	$237,870	$22,811	$0	$260,681
Salt Springs Scenario 1 Total	**209**	**47**	**$9,366,590**	**$13,403,332**	**$5,217,659**	**$27,987,581**

Source: Cal OES/DSOD, 2024 Amador County Parcel/Assessor Data

Table 4-64 Unincorporated Amador County – Count and Value of Parcels and Structures in Salt Springs (Scenario 2) Dam Inundation Area by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Agricultural	50	36	$11,003,872	$7,318,703	$7,318,703	$25,641,278
Commercial	1	1	$66,727	$105,134,247	$105,134,247	$210,335,221
Industrial	2	2	$464,990	$579,316	$868,974	$1,913,280
Miscellaneous	110	0	$388,501	$0	$0	$388,501
Residential	45	23	$5,327,374	$5,999,330	$2,999,665	$14,326,369
Unknown	6	4	$678,751	$862,340	$0	$1,541,091

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Salt Springs Scenario 1 Total	**214**	**66**	**$17,930,215**	**$119,893,936**	**$116,321,589**	**$254,145,740**

Source: Cal OES/DSOD, 2024 Amador County Parcel/Assessor Data

Table 4-65 Unincorporated Amador County – Count and Value of Parcels and Structures in Sly Park Dam Inundation Area by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Agricultural	31	18	$3,255,214	$1,037,100	$1,037,100	$5,329,414
Commercial	2	1	$36,562	$19,012	$19,012	$74,586
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	8	0	$0	$0	$0	$0
Residential	23	13	$2,684,994	$2,131,777	$1,065,889	$5,882,660
Unknown	1	0	$0	$0	$0	$0
Sly Park Total	**65**	**32**	**$5,976,770**	**$3,187,889**	**$2,122,001**	**$11,286,660**

Source: Cal OES/DSOD, 2024 Amador County Parcel/Assessor Data

High Hazard Dam Analysis

Parcel counts, land, and improved values (i.e., those with a structure improvement on the parcel), estimated content replacement values, and total values that fall within each high hazard dam inundation areas in the Planning Area are presented below by dam. For the high hazard dam inundation areas, both the cities of Ione (CSP Mule, CSP Mule Creek, Goffinet, Henderson, Preston) and Jackson (Lake Tabeaud) as well as the unincorporated County are affected. The results are presented in tables below by:

- Table 4-66 shows the shows the summary counts and values of parcels in all high hazard dam inundation areas in the Amador County Planning Area. This table includes summaries for both the unincorporated County, as well as the cities of Ione and Jackson.
- Table 4-67 shows the count and value of parcels in the Arroyo Seco Dam inundation area detailed by property use for the unincorporated County.
- Table 4-68 shows the count and value of parcels in the Caples Lake Dam inundation area detailed by property use for the unincorporated County.
- Table 4-69 shows the count and value of parcels in the CPUD Middle Fork Dam inundation area detailed by property use for the unincorporated County.
- Table 4-70 shows the count and value of parcels in the CSP Mule Creek Dam inundation area detailed by property use for the unincorporated County.
- Table 4-71 shows the count and value of parcels in the CSP Mule Creek - Saddle Dam
- Table 4-72 shows the count and value of parcels in the Goffinet Dam inundation area detailed by property use for the unincorporated County.

- Table 4-73 shows the count and value of parcels in the Henderson Dam inundation area detailed by property use for the unincorporated County.
- Table 4-74 shows the count and value of parcels in the Jackson Creek Dam inundation area detailed by property use for the unincorporated County.
- Table 4-75 shows the count and value of parcels in the Jeff Davis Dam inundation area detailed by property use for the unincorporated County.
- Table 4-76 shows the count and value of parcels in the Lake Tabeaud Dam inundation area detailed by property use for the unincorporated County.
- Table 4-77 shows the count and value of parcels in the Meadow Lake Dam inundation area detailed by property use for the unincorporated County.
- Table 4-78 shows the count and value of parcels in the Preston Dam inundation area detailed by property use for the unincorporated County.
- Table 4-79 shows the count and value of parcels in the Silver Lake Dam inundation area detailed by property use for the unincorporated County.
- Table 4-80 shows the count and value of parcels in the Tiger Creek Afterbay Dam inundation area detailed by property use for the unincorporated County.
- Table 4-81 shows the count and value of parcels in the Tiger Creek Regulator Dam inundation area detailed by property use for the unincorporated County.
- Table 4-82 shows the count and value of parcels in the Blue Lake Dam inundation area detailed by property use for the unincorporated County.
- Table 4-83 shows the count and value of parcels in the West Point Regulating Dam inundation area detailed by property use for the unincorporated County.

Table 4-66 Amador County Planning Area – Summary Counts and Values of Parcels and Structures in High Hazard Dam Inundation Areas

Dam Inundation Area	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Arroyo Seco	23	14	$20,862,899	$3,270,164	$2,928,662	$27,061,725
Caples Lake	1	0	$0	$0	$0	$0
CPUD Middle Fork	50	6	$993,450	$983,497	$728,387	$2,705,334
CSP Mule Creek*	302	244	$53,806,623	$76,590,963	$40,657,441	$171,055,027
CSP Mule Creek - Saddle Dam*	38	25	$19,158,308	$4,642,410	$3,738,516	$27,539,234
Goffinet*	153	116	$33,505,937	$35,475,863	$19,379,877	$88,361,677
Henderson*	261	211	$45,414,036	$67,183,685	$36,094,798	$148,692,519
Jackson Creek	140	104	$28,588,375	$126,907,691	$121,029,857	$276,525,923
Jeff Davis	52	7	$1,007,857	$1,101,609	$787,443	$2,896,909
Lake Tabeaud**	320	217	$39,194,635	$63,232,911	$50,887,510	$153,315,056
Meadow Lake	128	10	$2,004,451	$4,981,919	$784,547	$7,770,917

Dam Inundation Area	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Preston*	221	178	$36,796,108	$57,520,418	$29,960,587	$124,277,113
Silver Lake	19	8	$4,447,006	$3,549,172	$1,640,983	$9,637,161
Tiger Creek Afterbay	76	10	$2,145,973	$1,807,548	$1,272,912	$5,226,433
Tiger Creek Regulator	18	1	$369,457	$265,000	$265,000	$899,457
Upper Blue Lake	15	0	$0	$0	$0	$0
West Point Regulating	26	4	$1,138,221	$824,051	$544,526	$2,506,798

Source: Cal OES/DSOD, 2024 Amador County Parcel/Assessor Data

* Affect the City of Ione and the unincorporated County

** Affect the City of Jackson and the unincorporated County

Table 4-67 Unincorporated Amador County – Count and Value of Parcels and Structures in Arroyo Seco Dam Inundation Area by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Agricultural	17	10	$20,571,811	$2,851,740	$2,851,740	$26,275,291
Commercial	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
Residential	4	3	$113,615	$153,843	$76,922	$344,380
Unknown	2	1	$177,473	$264,581	$0	$442,054
Arroyo Seco Total	**23**	**14**	**$20,862,899**	**$3,270,164**	**$2,928,662**	**$27,061,725**

Source: Cal OES/DSOD, 2024 Amador County Parcel/Assessor Data

Table 4-68 Unincorporated Amador County – Count and Value of Parcels and Structures in Caples Lake Dam Inundation Area by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Agricultural	0	0	$0	$0	$0	$0
Commercial	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	1	0	$0	$0	$0	$0
Residential	0	0	$0	$0	$0	$0
Unknown	0	0	$0	$0	$0	$0

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Caples Lake Total	**1**	**0**	**$0**	**$0**	**$0**	**$0**

Source: Cal OES/DSOD, 2024 Amador County Parcel/Assessor Data

Table 4-69 Unincorporated Amador County – Count and Value of Parcels and Structures in CPUD Middle Creek Dam Inundation Area by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Agricultural	5	4	$569,033	$496,087	$496,087	$1,561,207
Commercial	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	37	0	$58,386	$0	$0	$58,386
Residential	6	1	$188,161	$464,599	$232,300	$885,060
Unknown	2	1	$177,870	$22,811	$0	$200,681
CPUD Middle Creek Total	**50**	**6**	**$993,450**	**$983,497**	**$728,387**	**$2,705,334**

Source: Cal OES/DSOD, 2024 Amador County Parcel/Assessor Data

Table 4-70 Unincorporated Amador County – Count and Value of Parcels and Structures in CSP Mule Creek Dam Inundation Area by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Agricultural	26	16	$21,427,752	$3,426,117	$3,426,117	$28,279,986
Commercial	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
Residential	7	3	$246,965	$153,843	$76,922	$477,730
Unknown	2	1	$177,473	$264,581	$0	$442,054
CSP Mule Creek Total	**35**	**20**	**$21,852,190**	**$3,844,541**	**$3,503,039**	**$29,199,770**

Source: Cal OES/DSOD, 2024 Amador County Parcel/Assessor Data

Table 4-71 Unincorporated Amador County – Count and Value of Parcels and Structures in CSP Mule Creek Saddle Dam Inundation Area by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Agricultural	23	16	$18,010,322	$3,093,488	$3,093,488	$24,197,298

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Commercial	0	0	$0	$0	$0	$0
Industrial	1	1	$360,228	$2,857	$4,286	$367,371
Miscellaneous	0	0	$0	$0	$0	$0
Residential	11	7	$610,285	$1,281,484	$640,742	$2,532,511
Unknown	2	1	$177,473	$264,581	$0	$442,054
CSP Mule Creek Saddle Total	**37**	**25**	**$19,158,308**	**$4,642,410**	**$3,738,516**	**$27,539,234**

Source: Cal OES/DSOD, 2024 Amador County Parcel/Assessor Data

Table 4-72 Unincorporated Amador County – Count and Value of Parcels and Structures in Goffinet Dam Inundation Area by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Agricultural	23	16	$12,512,288	$3,302,580	$3,302,580	$19,117,448
Commercial	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
Residential	5	2	$839,343	$881,608	$440,804	$2,161,755
Unknown	2	0	$4,564,425	$0	$0	$4,564,425
Goffinet Total	**30**	**18**	**$17,916,056**	**$4,184,188**	**$3,743,384**	**$25,843,628**

Source: Cal OES/DSOD, 2024 Amador County Parcel/Assessor Data

Table 4-73 Unincorporated Amador County – Count and Value of Parcels and Structures in Henderson Dam Inundation Area by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Agricultural	26	19	$12,641,098	$3,880,628	$3,880,628	$20,402,354
Commercial	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	1	0	$0	$0	$0	$0
Residential	6	3	$908,202	$1,091,345	$545,673	$2,545,220
Unknown	2	0	$4,564,425	$0	$0	$4,564,425
Henderson Total	**35**	**22**	**$18,113,725**	**$4,971,973**	**$4,426,301**	**$27,511,999**

Source: Cal OES/DSOD, 2024 Amador County Parcel/Assessor Data

Table 4-74 Unincorporated Amador County – Count and Value of Parcels and Structures in Jackson Creek Dam Inundation Area by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Agricultural	5	4	$569,033	$496,087	$496,087	$1,561,207
Commercial	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	38	0	$58,386	$0	$0	$58,386
Residential	7	2	$202,568	$582,711	$291,356	$1,076,635
Unknown	2	1	$177,870	$22,811	$0	$200,681
Jackson Creek Total	**52**	**7**	**$1,007,857**	**$1,101,609**	**$787,443**	**$2,896,909**

Source: Cal OES/DSOD, 2024 Amador County Parcel/Assessor Data

Table 4-75 Unincorporated Amador County – Count and Value of Parcels and Structures in Jeff Davis Dam Inundation Area by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Agricultural	5	4	$569,033	$496,087	$496,087	$1,561,207
Commercial	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	38	0	$58,386	$0	$0	$58,386
Residential	7	2	$202,568	$582,711	$291,356	$1,076,635
Unknown	2	1	$177,870	$22,811	$0	$200,681
Jeff Davis Total	**52**	**7**	**$1,007,857**	**$1,101,609**	**$787,443**	**$2,896,909**

Source: Cal OES/DSOD, 2024 Amador County Parcel/Assessor Data

Table 4-76 Unincorporated Amador County – Count and Value of Parcels and Structures in Lake Tabeaud Dam Inundation Area by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Agricultural	68	56	$10,810,626	$7,448,050	$7,448,050	$25,706,726
Commercial	0	0	$0	$0	$0	$0
Industrial	1	1	$325,680	$90,189	$135,284	$551,153
Miscellaneous	26	0	$0	$0	$0	$0
Residential	38	27	$4,228,593	$6,034,698	$3,017,349	$13,280,640
Unknown	4	3	$435,547	$695,400	$0	$1,130,947

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Lake Tabeaud Total	**137**	**87**	**$15,800,446**	**$14,268,337**	**$10,600,683**	**$40,669,466**

Source: Cal OES/DSOD, 2024 Amador County Parcel/Assessor Data

Table 4-77 Unincorporated Amador County – Count and Value of Parcels and Structures in Meadow Lake Dam Inundation Area by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Agricultural	8	4	$813,874	$272,722	$272,722	$1,359,318
Commercial	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	103	1	$388,501	$3,662,736	$0	$4,051,237
Residential	15	4	$624,206	$1,023,650	$511,825	$2,159,681
Unknown	2	1	$177,870	$22,811	$0	$200,681
Meadow Lake Total	**128**	**10**	**$2,004,451**	**$4,981,919**	**$784,547**	**$7,770,917**

Source: Cal OES/DSOD, 2024 Amador County Parcel/Assessor Data

Table 4-78 Unincorporated Amador County – Count and Value of Parcels, and Structures in Preston Dam Inundation Area by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Agricultural	15	9	$11,795,247	$1,275,473	$1,275,473	$14,346,193
Commercial	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
Residential	3	0	$133,350	$0	$0	$133,350
Unknown	0	0	$0	$0	$0	$0
Preston Total	**18**	**9**	**$11,928,597**	**$1,275,473**	**$1,275,473**	**$14,479,543**

Source: Cal OES/DSOD, 2024 Amador County Parcel/Assessor Data

Table 4-79 Unincorporated Amador County – Count and Value of Parcels and Structures in Silver Lake Dam Inundation Area by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Agricultural	0	0	$0	$0	$0	$0

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Commercial	3	2	$1,076,800	$1,418,746	$1,418,746	$3,914,292
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	9	1	$1,280,819	$1,685,952		$2,966,771
Residential	7	5	$2,089,387	$444,474	$222,237	$2,756,098
Unknown	0	0	$0	$0	$0	$0
Silver Lake Total	**19**	**8**	**$4,447,006**	**$3,549,172**	**$1,640,983**	**$9,637,161**

Source: Cal OES/DSOD, 2024 Amador County Parcel/Assessor Data

Table 4-80 Unincorporated Amador County – Count and Value of Parcels and Structures in Tiger Creek Afterbay Dam Inundation Area by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Agricultural	8	5	$955,396	$761,087	$761,087	$2,477,570
Commercial	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	51	0	$388,501	$0	$0	$388,501
Residential	15	4	$624,206	$1,023,650	$511,825	$2,159,681
Unknown	2	1	$177,870	$22,811	$0	$200,681
Tiger Creek Afterbay Total	**76**	**10**	**$2,145,973**	**$1,807,548**	**$1,272,912**	**$5,226,433**

Source: Cal OES/DSOD, 2024 Amador County Parcel/Assessor Data

Table 4-81 Unincorporated Amador County – Count and Value of Parcels and Structures in Tiger Creek Regulator Dam Inundation Area by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Agricultural	2	1	$353,351	$265,000	$265,000	$883,351
Commercial	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	15	0	$16,106	$0	$0	$16,106
Residential	1	0	$0	$0	$0	$0
Unknown	0	0	$0	$0	$0	$0
Tiger Creek Regulator Total	**18**	**1**	**$369,457**	**$265,000**	**$265,000**	**$899,457**

Source: Cal OES/DSOD, 2024 Amador County Parcel/Assessor Data

Table 4-82 Unincorporated Amador County – Count and Value of Parcels and Structures in Upper Blue Lake Regulator Dam Inundation Area by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Agricultural	0	0	$0	$0	$0	$0
Commercial	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	15	0	$0	$0	$0	$0
Residential	0	0	$0	$0	$0	$0
Unknown	0	0	$0	$0	$0	$0
Upper Blue Lake Total	**15**	**0**	**$0**	**$0**	**$0**	**$0**

Source: Cal OES/DSOD, 2024 Amador County Parcel/Assessor Data

Table 4-83 Unincorporated Amador County – Count and Value of Parcels and Structures in West Point Regulating Dam Inundation Area by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Agricultural	2	1	$372,061	$265,000	$265,000	$902,061
Commercial	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	14		$330,115	$0	$0	$330,115
Residential	10	3	$436,045	$559,051	$279,526	$1,274,622
Unknown	0	0	$0	$0	$0	$0
West Point Regulating Total	**26**	**4**	**$1,138,221**	**$824,051**	**$544,526**	**$2,506,798**

Source: Cal OES/DSOD, 2024 Amador County Parcel/Assessor Data

Critical Facilities and Infrastructure

Dam failure presents a threat to critical facilities and infrastructure. For example, transportation routes, including bridges and highways, are vulnerable to dam inundation and have the potential to be unpassable and even destroyed, creating isolation and supply chain issues. Those critical facilities that are most vulnerable are those that are already in poor condition and would not be able to withstand a large water surge. The following GIS analysis identifies critical facilities and infrastructure at risk to dam inundation flooding, separated out by extremely high hazard and high hazard dams.

Extremely High Hazard Dam Inundation Analysis

Dam failure present a threat to critical facilities and infrastructure. The following analysis discusses critical facilities and infrastructure. A separate analysis was performed on the critical facility inventory in the Amador County Planning Area to determine critical facilities in extremely high hazard dam inundation areas. Using GIS, the DSOD extremely high hazard dam inundation areas were overlayed on the critical facility GIS layer. Figure 4-68 shows critical facilities, as well as the extremely high hazard dam inundation areas. Table 4-84 details critical facilities by extremely high hazard dam inundation areas by facility type and count for the Planning Area. Details of critical facility category, type, name and address by extremely high hazard dam inundation areas are listed in Appendix F. As shown, all critical facilities that fall in the extremely high hazard dam inundation area are located in the unincorporated County.

Figure 4-68 Amador County Planning Area – Critical Facilities in Extremely High Hazard Dam Inundation Areas

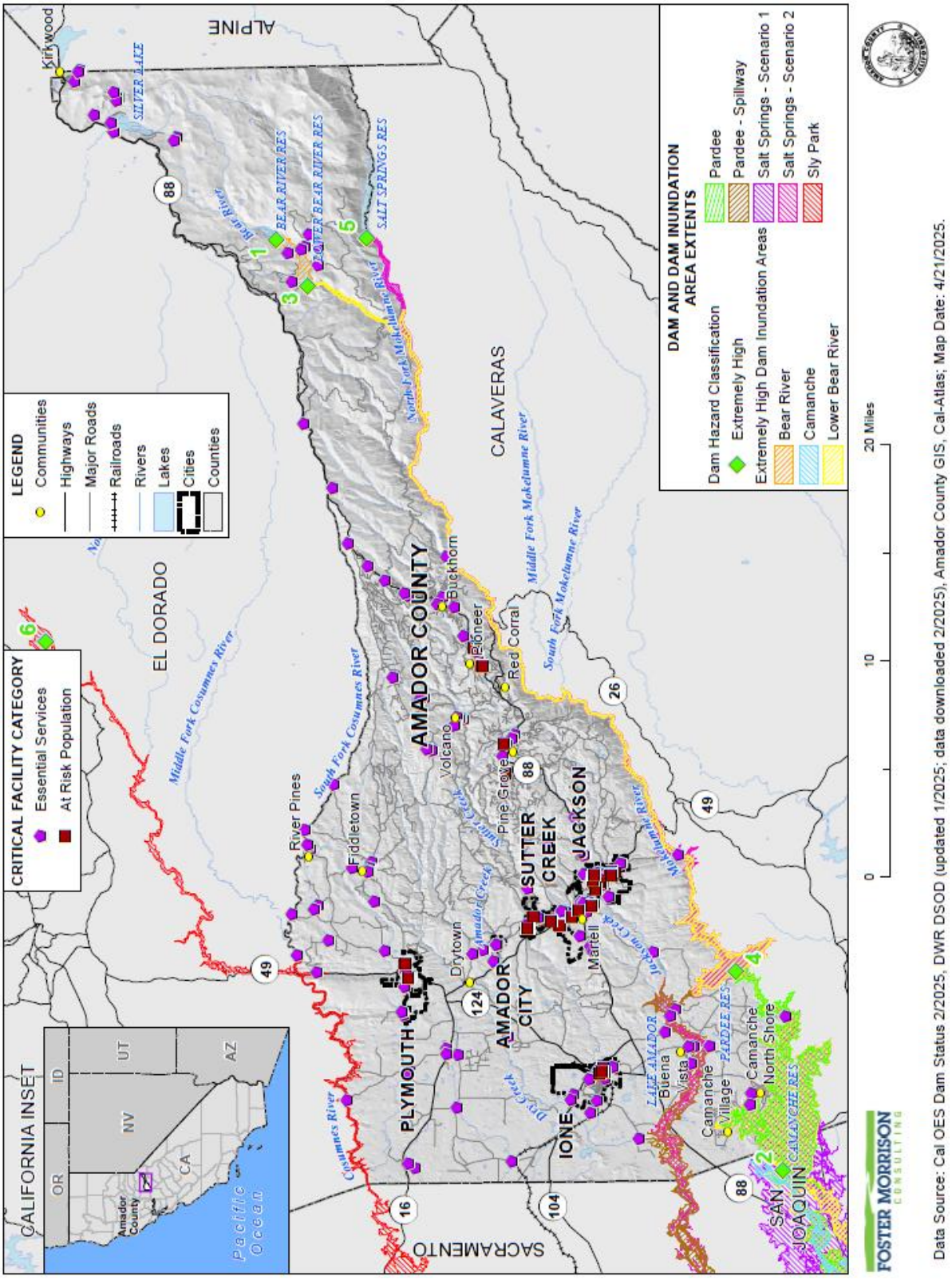


Table 4-84 Amador County Planning Area – Critical Facilities in Extremely High Hazard Dam Inundation Zones by Jurisdiction and Category

Jurisdiction / Category / Critical Facility Type	Dam Inundation Area						
	Bear River	Lower Bear River	Pardee	Pardee - Spillway	Salt Springs - Scenario 1	Salt Springs - Scenario 2	Sly Park
Unincorporated Amador County							
Essential Services							
Bridge	2	2	1	2	2	3	3
Public Water System	2	2	0	1	3	3	0
Essential Services Total	**4**	**4**	**1**	**3**	**5**	**6**	**3**
Unincorporated Amador County Total	**4**	**4**	**1**	**3**	**5**	**6**	**3**

Source: Cale OES/DSOD; Amador County GIS

High Hazard Dam Inundation Analysis

Dam failure present a threat to critical facilities and infrastructure. The following analysis discusses critical facilities and infrastructure. A separate analysis was performed on the critical facility inventory in the Amador County Planning Area to determine critical facilities in high hazard dam inundation areas. Using GIS, the DSOD high hazard dam inundation areas were overlayed on the critical facility GIS layer. Figure 4-69 shows critical facilities, as well as the high hazard dam inundation areas. Table 4-85 details critical facilities by high hazard dam inundation areas by facility type and count for the Planning Area. Details of critical facility category, type, name and address by high hazard dam inundation areas are listed in Appendix F. As shown, all critical facilities that fall in the extremely high hazard dam inundation area are located in the City of Ione, the City of Jackson, or the unincorporated County.

Figure 4-69 Amador County Planning Area – Critical Facilities in High Hazard Dam Inundation Areas

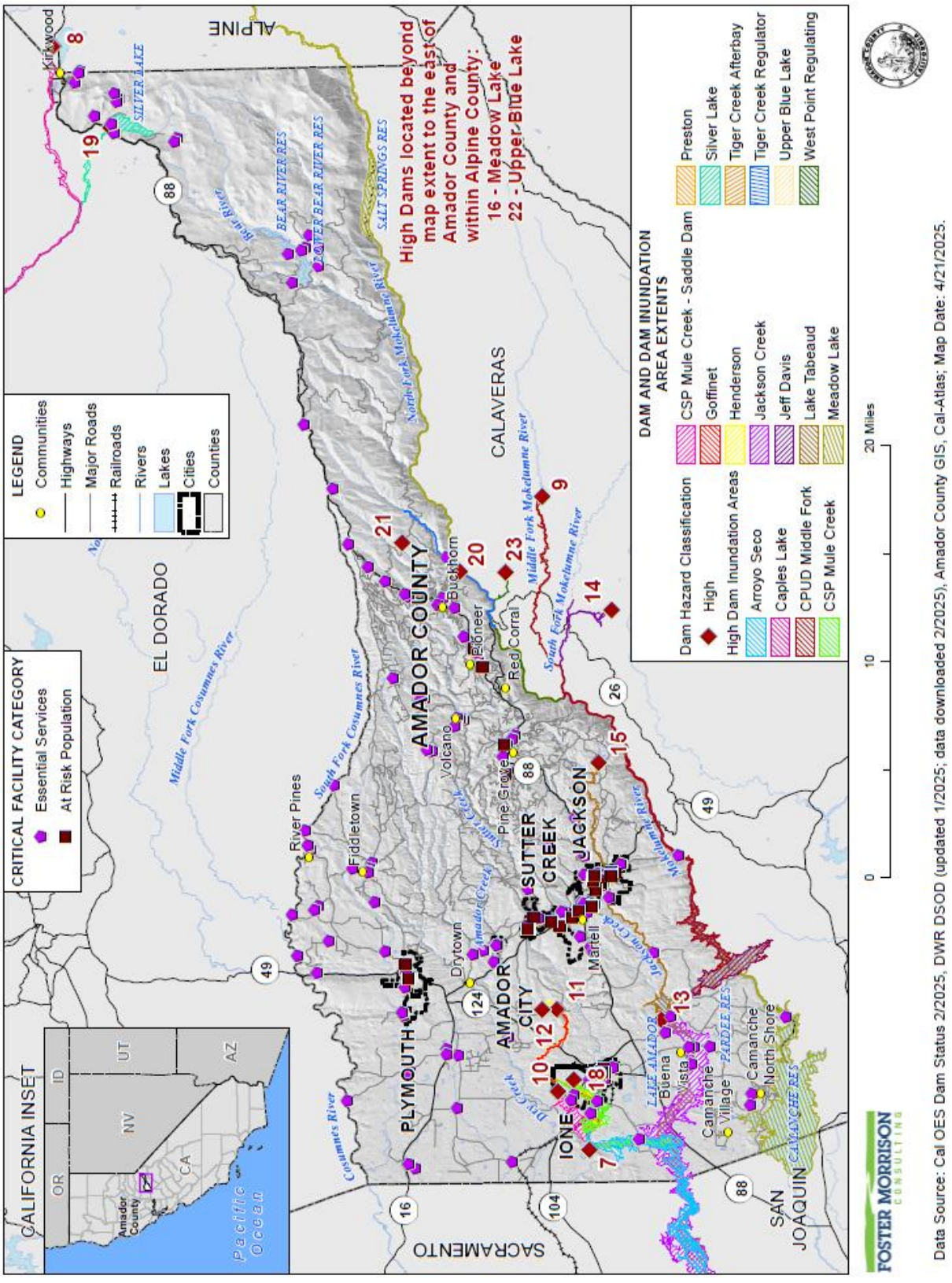


Table 4-85 Amador County Planning Area – Critical Facilities in High Hazard Dam Inundation Zones by Jurisdiction and Category

Jurisdiction / Critical Facility Category	Facility Count
City of Ione	
Essential Services Facilities	1
At Risk Population Facilities	0
City of Ione Total	**1**
City of Jackson	
Essential Services Facilities	5
At Risk Population Facilities	0
City of Jackson Total	**5**
Unincorporated Amador County	
Essential Services Facilities	11
At Risk Population Facilities	0
Unincorporated Amador County Total	**11**

Source: Cale OES/DSOD; Amador County GIS

Natural, Historic, and Cultural Resources

A major dam failure event and associated flooding could have a devastating impact on the Amador County Planning Area. Large flood events can affect all natural, historic, and cultural resources that lie in the dam inundation areas. There are a number of ways floodwaters associated with a dam failure event can impact natural resources and the environment. Wildlife habitats can be destroyed by floodwaters. Contaminated floodwater can pollute rivers and habitats. Silt and sediment can destroy natural areas. Riverbanks and natural levées can be eliminated as rivers reach bankfull capacity. Rivers can be widened, and deposition can increase downstream. Trees can be uprooted by high-velocity water flow. Plants that survive the initial flood may die due to being inundated with water. Historic structures and cultural resources may also be significantly affected and even destroyed. Generally, the impacts are associated with damage to these structures within the inundated areas Other cultural resources such as those associated with Native Americans and old tribal areas can also be disturbed, damaged, and lost during extreme flood events.

FEMA NRI Hazard Vulnerability Assessment

Dam failure is not an NRI hazard and thus has no data to present.

Impacts from Dam Failure

Impacts to the Amador County Planning Area from dam failure flooding could be extensive and widespread and include loss of life and injury, flooding and damage to property and structures, damage to critical facilities and infrastructure, loss of natural resources, and all other flood related impacts. Additionally, mass evacuations and associated economic losses can also be significant.

Other impacts associated with dam failure include landslides, bank erosion, and destruction of habitat. Dam failures can cause downstream flooding and can transport large volumes of sediment and debris and contaminants from the floodwaters. Other environmental impacts can include contamination from septic system failures and releases of contaminants from hazardous materials facilities, contamination of potable water supplies; changes in configurations of streams; loss of wildlife habitats; and degradation of wetlands. A large dam failure event could have significant and catastrophic impacts.

Impacts to identified assets at risk to this hazard and the overall vulnerability of the County may be affected in the future by climate change (which was discussed in the hazard profile section above), changes in population patterns, and changes in land use and development. The influencing effects of these factors on this hazard are discussed further in the Future Conditions/Future Development discussion below.

Future Conditions/Future Development

Future hazard conditions may be affected by climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. Findings on this for Amador County include the following:

- Climate change is likely to exacerbate future rain and storm conditions and associated impacts and vulnerability of the County to dam failure.
- Population growth in Amador County is expected to slowly continue. Additional growth within the dam inundation areas of the County would place additional populations at risk to dam failure. Additional population growth would likely bring continued diversity to the County. Vulnerable population groups could face disproportionate effects from a dam failure and should be planned for. Changes in population and population patterns may or may not increase the impacts and vulnerability of the County to this hazard depending on the location and nature of growth and continued planning for future hazard conditions.
- Land use planning should be proactive to address future hazard conditions. Locating new development, structures, and critical facilities and infrastructure within or near areas of dam failure risk may put additional development at risk. However, County building codes are in effect to partially reduce this risk and should be updated as necessary to continue to address future dam failure conditions. Thus, depending on the location of new development and adherence to protective building codes, changes in land use and development may or may not increase the impacts and associated vulnerabilities of the County to this hazard.

Future development considerations should be ongoing and proactive. Ensuring that comprehensive land use planning is conducted, regulatory requirements, such as building codes, are followed, and varying needs for different demographic groups with intersecting identities that reside within the County are considered can help to make for a more resilient community. Although new growth and development corridors would fall in the area flooded by a dam failure, given the limited potential of total dam failure and the large area that a dam failure would affect, development in the dam inundation area will continue to occur.

GIS Analysis

Amador County provided five future development areas which were used as the basis for the inventory of future development for the unincorporated County. These were mapped in GIS. Figure 4-70 and Figure

4-71 show the locations of the future development areas overlayed on the extremely high and high hazard dam inundation areas, respectively. As shown, no future development areas are located in either the extremely high and high hazard dam inundation areas; as such, no tabular analysis is presented.

Figure 4-70 Unincorporated Amador County – Future Development Areas in Extremely High Hazard Dam Inundation Areas

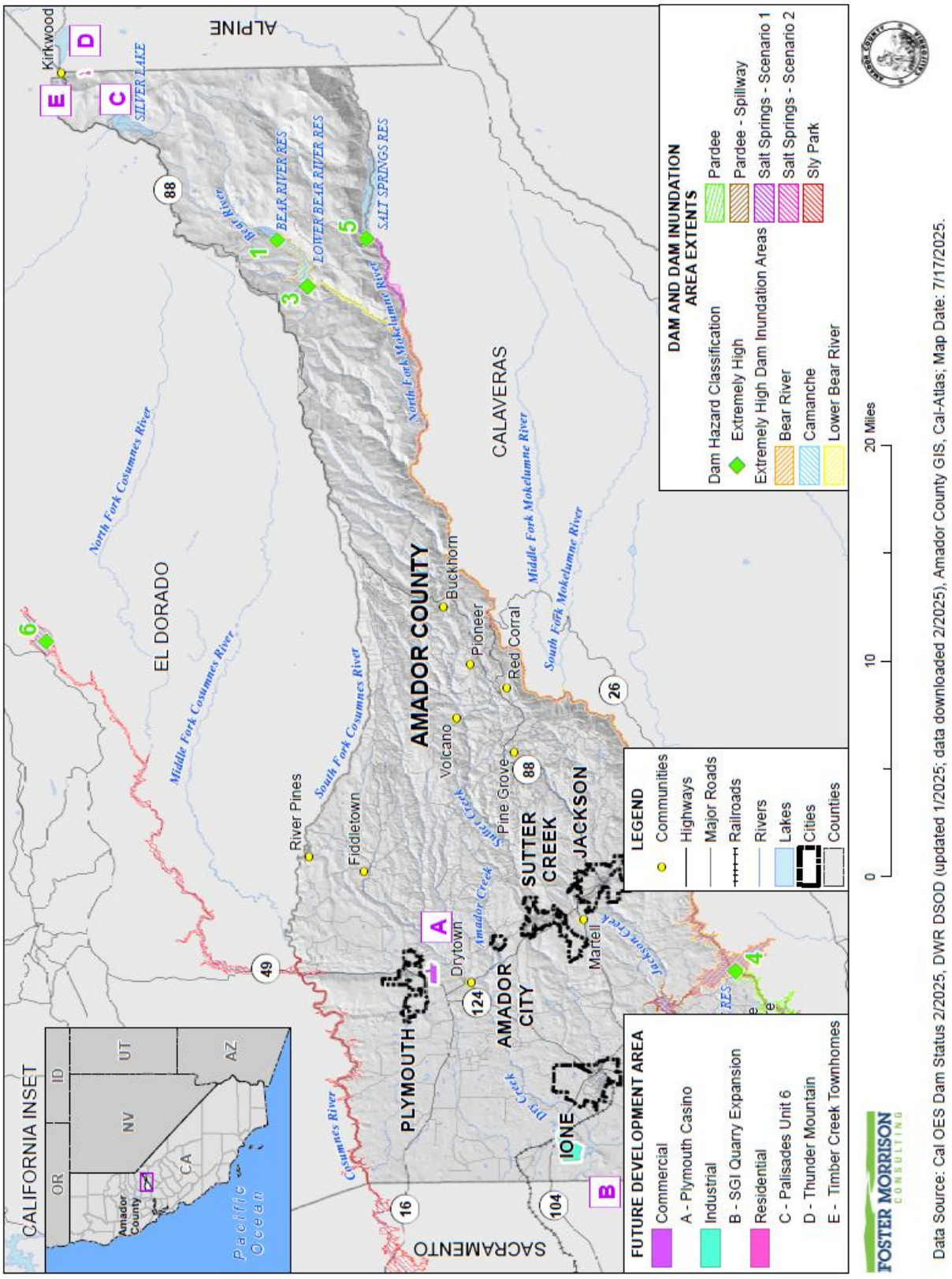
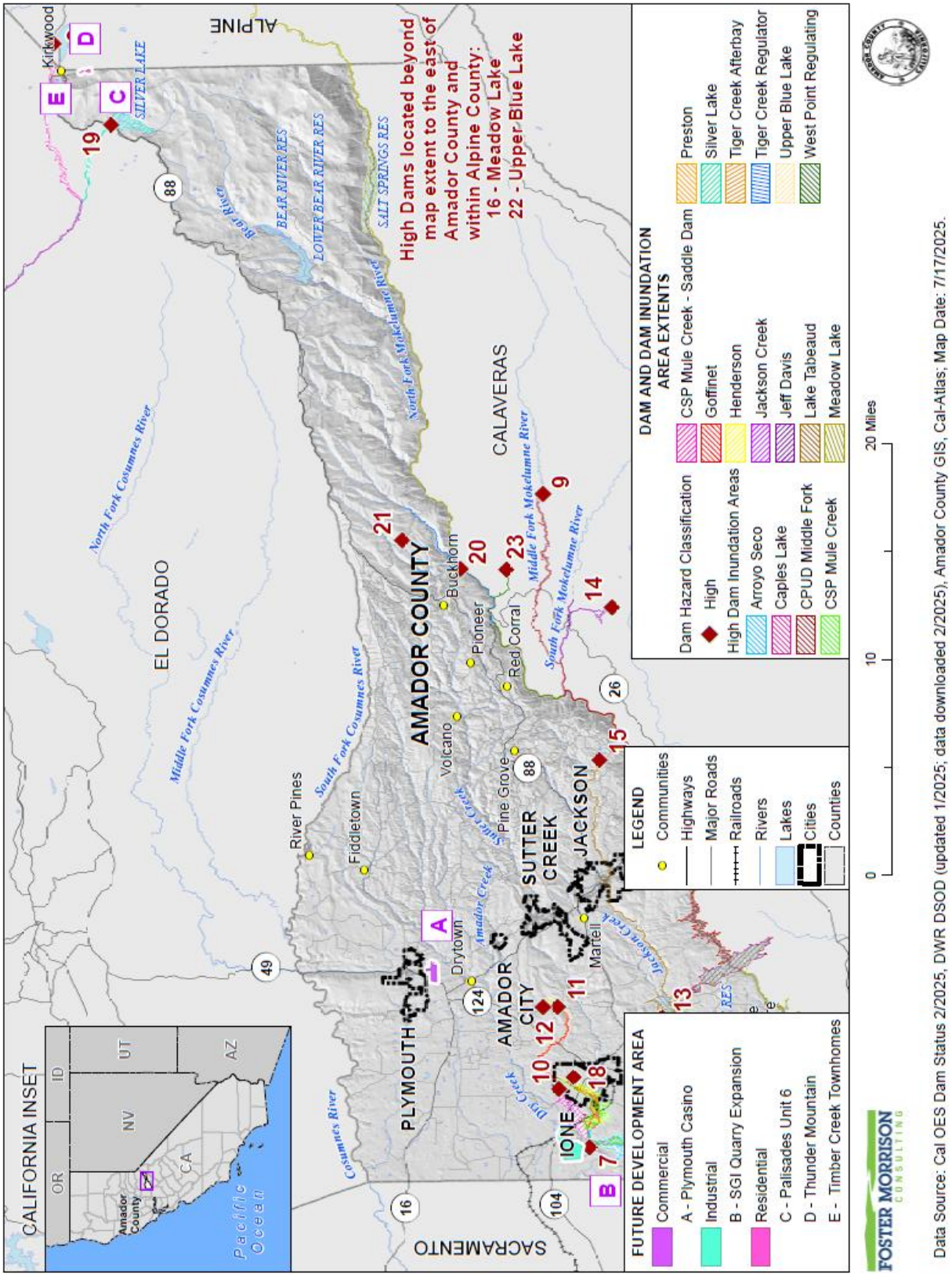


Figure 4-71 Unincorporated Amador County – Future Development Areas in High Hazard Dam Inundation Areas



4.3.10. Drought and Water Shortage (w/Tree Mortality)

Hazard Profile

This hazard profile contains multiple sections that detail how this hazard can affect the Amador County Planning Area. These sections include a hazard/problem description; description of location and extent; past occurrences of this hazard; likelihood of future occurrences; and how climate change can affect or influence this hazard.

Hazard/Problem Description

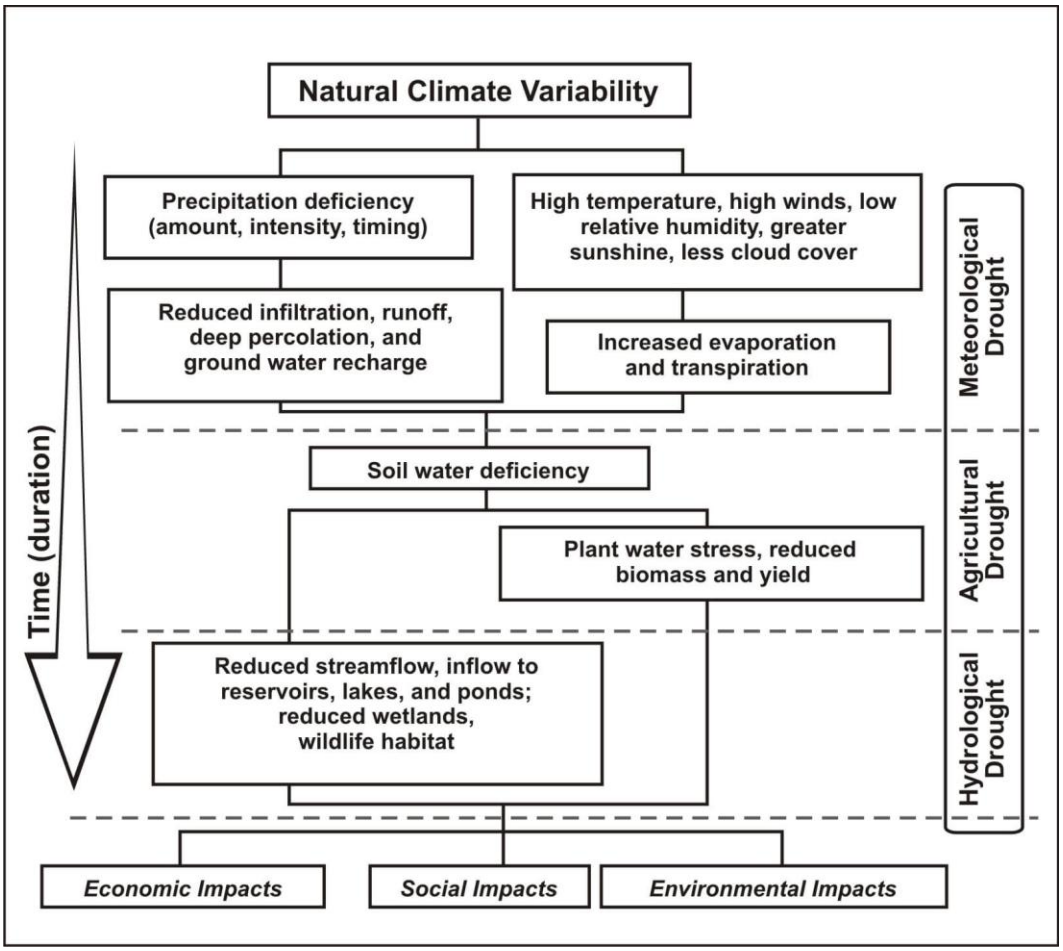
Drought

Drought is a gradual phenomenon. 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. Droughts occur slowly, over a multi-year period, and it is often not obvious or easy to quantify when a drought begins and ends.

Drought is a complex issue involving (see Figure 4-72) many factors—it occurs when a normal amount of precipitation and snow is not available to satisfy an area's usual water-consuming activities. Drought can often be defined regionally based on its effects:

- **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, and as 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.

Figure 4-72 Causes and Impacts of Drought

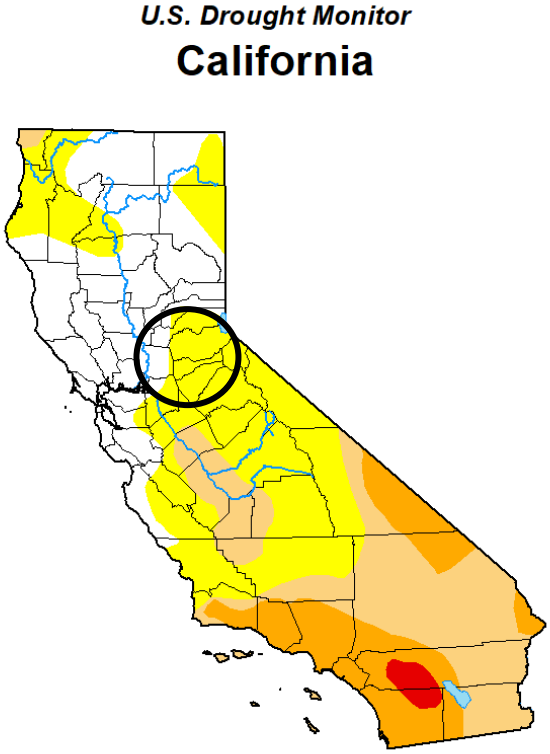


Source: National Drought Mitigation Center (NDMC)

Location and Extent of Drought

Drought is a regional phenomenon that affects the entire Amador County Planning Area. Drought in the United States is monitored by the National Integrated Drought Information System (NIDIS). A major component of this portal is the U.S. Drought Monitor. The Drought Monitor concept was developed jointly by the NOAA's Climate Prediction Center, the NDMC, and the USDA's Joint Agricultural Weather Facility in the late 1990s as a process that synthesizes multiple indices, outlooks and local impacts, into an assessment that best represents current drought conditions. The final outcome of each Drought Monitor is a consensus of federal, state, and academic scientists who are intimately familiar with the conditions in their respective regions. A snapshot of the current (and 2024) drought conditions in California and the Amador County Planning Area can be found in Figure 4-73. Snapshots from 2014 to 2023 are shown in Figure 4-74 and Figure 4-75. As seen in these figures and related data, the Planning Area has been in and out of drought over the past ten years since the last drought started in 2014.

Figure 4-73 Amador County Planning Area – Current (2025) and 2024 Drought Status



October 14, 2025
(Released Thursday, Oct. 16, 2025)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

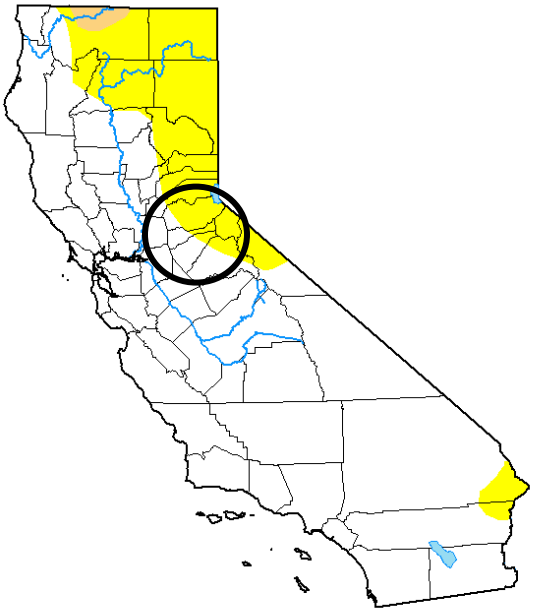
	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	27.30	72.70	38.52	15.64	1.25	0.00
Last Week 10-07-2025	27.20	72.80	38.52	15.64	1.25	0.00
3 Months Ago 07-15-2025	23.98	76.02	39.56	23.01	5.90	0.10
Start of Calendar Year 01-07-2025	39.11	60.89	35.93	10.43	1.06	0.00
Start of Water Year 10-01-2024	28.40	71.60	10.67	0.08	0.00	0.00
One Year Ago 10-15-2024	24.68	75.32	14.05	4.30	0.00	0.00

Intensity:
None
D0 Abnormally Dry
D1 Moderate Drought
D2 Severe Drought
D3 Extreme Drought
D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to https://droughtmonitor.unl.edu/About.aspx

Author:
Richard Tinker
CPC/NOAA/NWS/NCEP

droughtmonitor.unl.edu



July 9, 2024
(Released Thursday, Jul. 11, 2024)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	80.72	19.28	0.77	0.00	0.00	0.00
Last Week 07-02-2024	94.25	5.75	0.00	0.00	0.00	0.00
3 Months Ago 04-09-2024	97.32	2.68	0.00	0.00	0.00	0.00
Start of Calendar Year 01-02-2024	96.65	3.35	0.00	0.00	0.00	0.00
Start of Water Year 09-26-2023	94.01	5.99	0.07	0.00	0.00	0.00
One Year Ago 07-11-2023	71.95	28.05	6.29	0.00	0.00	0.00

Intensity:
None
D0 Abnormally Dry
D1 Moderate Drought
D2 Severe Drought
D3 Extreme Drought
D4 Exceptional Drought

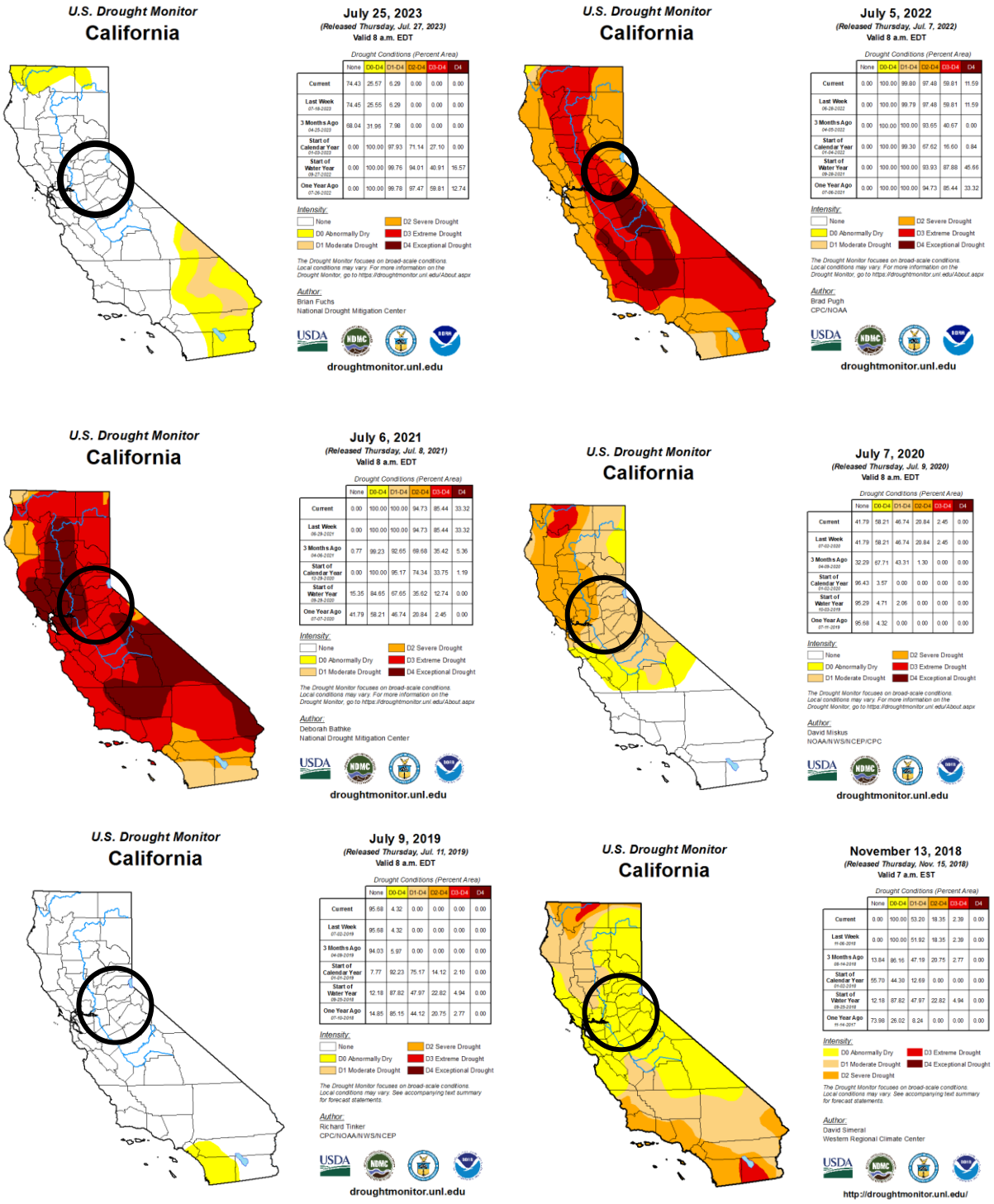
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to https://droughtmonitor.unl.edu/About.aspx

Author:
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National Drought Mitigation Center

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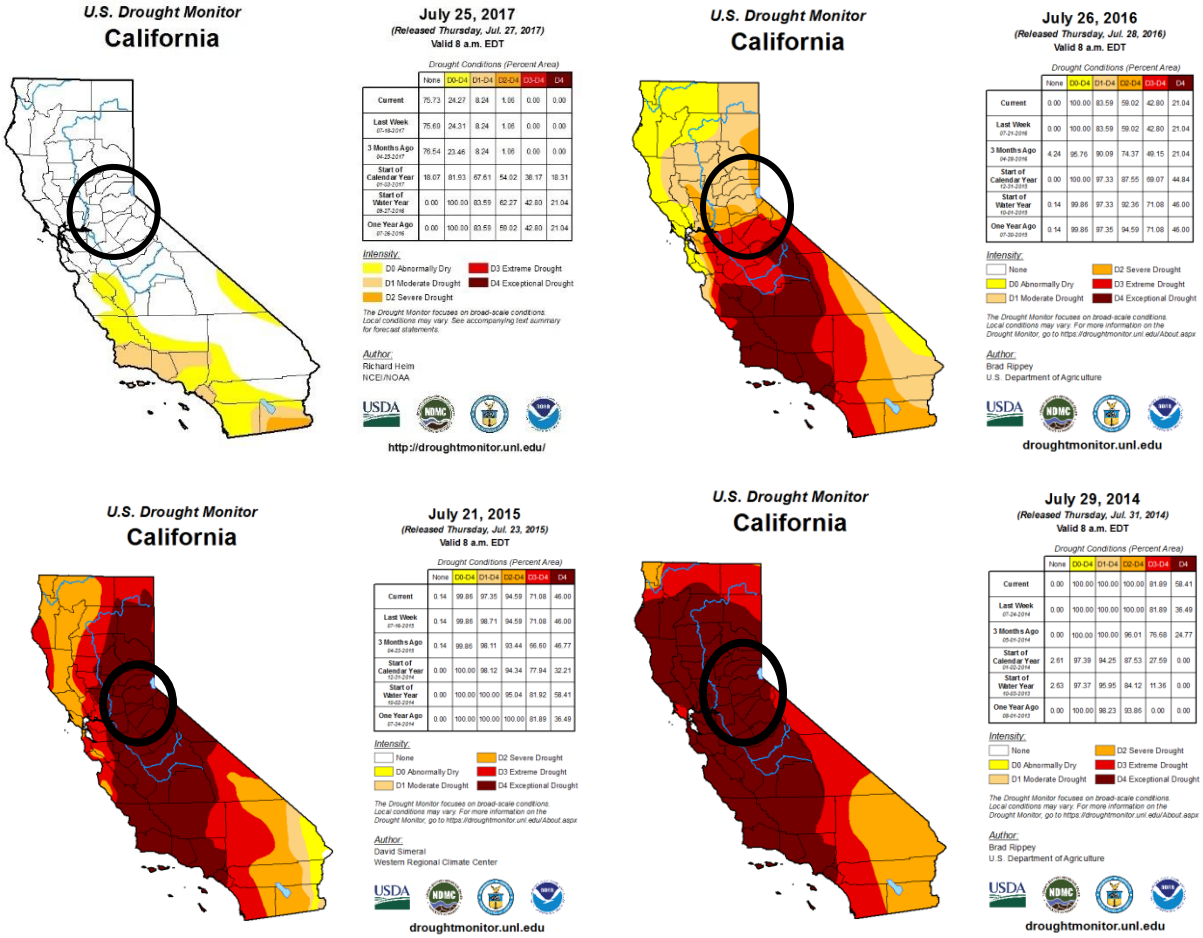
Source: US Drought Monitor

Figure 4-74 Previous Drought Status in Amador County (2018-2023)



Source: US Drought Monitor

Figure 4-75 Previous Drought Status in Amador County (2014-2017)



Source: US Drought Monitor

Cal DWR says the following about drought:

> ***One dry year does not normally constitute a drought in California. California's extensive system of water supply infrastructure—its reservoirs, groundwater basins, and inter-regional conveyance facilities—mitigates the effect of short-term dry periods for most water users. Defining when a drought begins is a function of drought impacts to water users. Hydrologic conditions constituting a drought for water users in one location may not constitute a drought for water users elsewhere, or for water users having a different water supply. Individual water suppliers may use criteria such as rainfall/runoff, amount of water in storage, or expected supply from a water wholesaler to define their water supply conditions.***

The drought issue in California is further compounded by water rights. Water is a commodity possessed under a variety of legal doctrines. The prioritization of water rights between domestic uses, farming and federally protected fish habitats in California further contributes to this issue.

As shown on the previous figures, drought is tracked by the US Drought Monitor. The Drought Monitor includes a scale to measure drought intensity:

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

Drought has a slow onset and long duration. Drought is not initially recognized as a problem because it normally originates in what is considered good weather, which typically includes a dry late spring and summer in Mediterranean climates, such as in California. This is particularly true in Northern California where drought impacts are delayed for most of the population by the wealth of stored surface and ground water. The drought complications normally appear more than a year after a drought begins. The most direct and likely most difficult drought impact to quantify is to local economies, especially agricultural economies. Drought has the potential to affect the entire Amador County Planning Area.

Water Shortage

Northern Sacramento Valley counties, including Amador County, generally have sufficient groundwater and surface water supplies to mitigate even the severest droughts of the past century. Many other areas of the State, however, also place demands on these water resources during severe drought

The 2016 Amador County General Plan Conservation Element noted that groundwater from individual wells represents a major water source in the unincorporated portions of the County. In most of Amador County, groundwater-bearing units and aquifers are poorly defined. The majority of available groundwater is transient and found in fractured rock. This fractured bedrock aquifer has not been adequately studied, and no information is available concerning the capacity of the aquifer. The Cosumnes Groundwater Subbasin underlies southwestern Amador County. The Cosumnes Subbasin is in overdraft; in other words, more water is leaving the groundwater basin than entering it.

According to the Amador Water Agency (AWA) 2024-2025 Annual Water Supply & Demand Assessment Shortage Report, the Agency has a significant surplus of water supply above current and projected demands. The Amador Water System (AWS) water supply is a pre-1914 water right that has never been curtailed in the most severe single-year or a multiple-year drought. In addition, while the water supply associated with the Central Amador Water Project (CAWP) was temporarily curtailed during the 2021/2022 drought years, the significant storage volume in the Lower Bear Reservoir has allowed previous water supply demands to be met, and are expected to be met in the future, even in dry years. The total well capacity for the portion of both systems reliant on groundwater are larger than current and projected demands.

Location and Extent of Water Shortage

Since water shortage generally happens on a regional scale, the entirety of the Amador County Planning Area is at risk. There is no established scientific scale to measure water shortage. The speed of onset of water shortage tends to be lengthy. The duration of water shortage can vary, depending on the severity of

the drought that accompanies it and the status of the water sources going into the drought. The extent of the drought considers several factors, including the nature, source, and reliability of water. While drought conditions persist, the Planning Area has generally sufficient water supply from water supplies, which lessens the extent of water shortage impacts in the Planning Area.

Past Occurrences

Disaster Declaration History

There have been 2 state and 1 federal disaster declarations for Amador County. These are shown on Table 4-86. More information on USDA disaster declarations from drought (24 events) can be found in Table 4-48 in the Past Occurrences in Section 4.3.6.

Table 4-86 Amador County – Federal and State Drought Disaster Declarations 1950-2025

Disaster Type	State Declarations		Federal Declarations	
	Count	Years	Count	Years
Drought	2	1976, 2015	1	1977

Source: Cal OES, FEMA

NCDC Events

There have been 158 NCDC drought events in Amador County. This is shown on Table 4-87.

*Table 4-87 NCDC Drought Events for Amador County 1993-7/31/2024**

Event Type	Number of Events	Deaths	Deaths (indirect)	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Drought	158	0	0	0	0	$0	$1,500,000,000

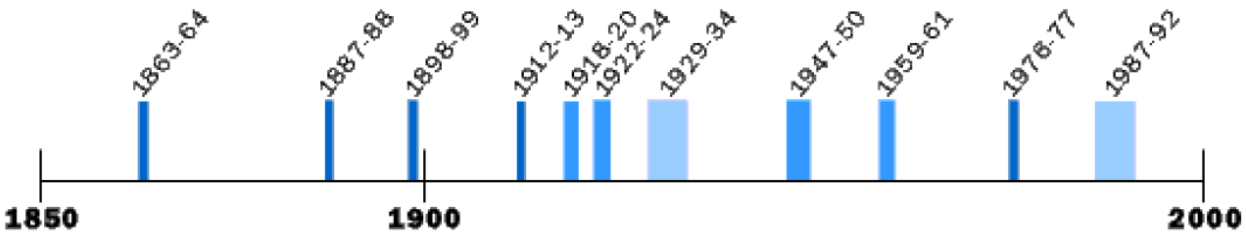
Source: NCDC

*Note: Losses reflect totals for all impacted areas, some of which fell outside of Amador County

CA DWR Events (with Hazard Mitigation Planning Committee Input)

Historically, California has experienced multiple severe droughts. According to the DWR, droughts exceeding three years are relatively rare in Northern California, the source of much of the State's developed water supply. Figure 4-76 depicts California's Multi-Year Historical Dry Periods, 1850-2000. The 1929-34 drought established the criteria commonly used in designing storage capacity and yield of large northern California reservoirs. Figure 4-77 compares the 1929-34 drought to the 1976-77, 1987-92, 2007-09, and 2012-2016 droughts.

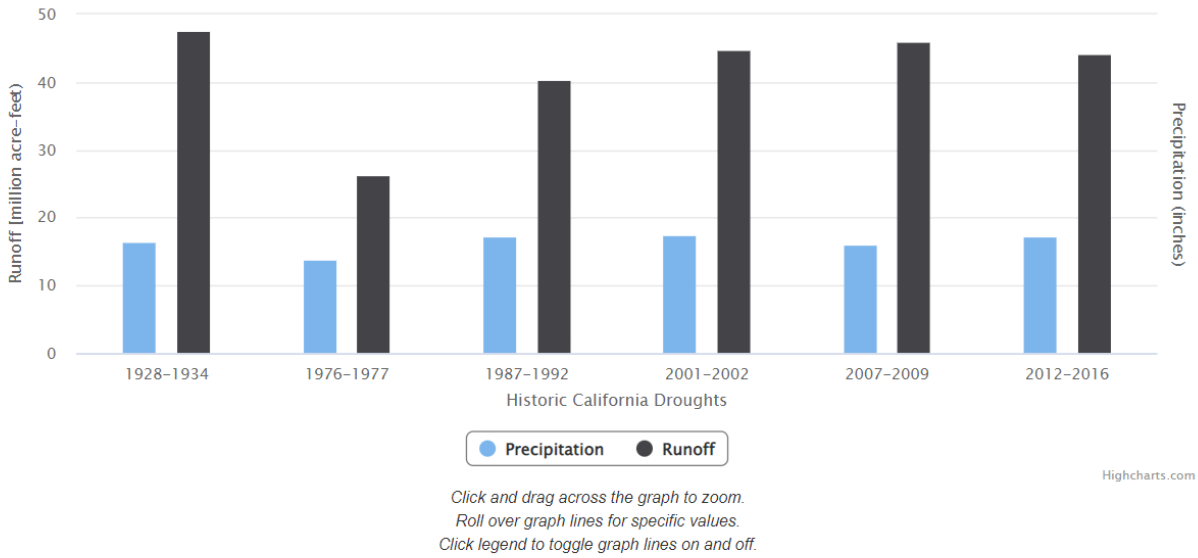
Figure 4-76 California's Multi-Year Historical Dry Periods, 1850-2000



Source: Cal DWR

Notes: Dry periods prior to 1900 estimated from limited data; covers dry periods of statewide or major regional extent

Figure 4-77 Average Annual Runoff and Precipitation for Historic Droughts

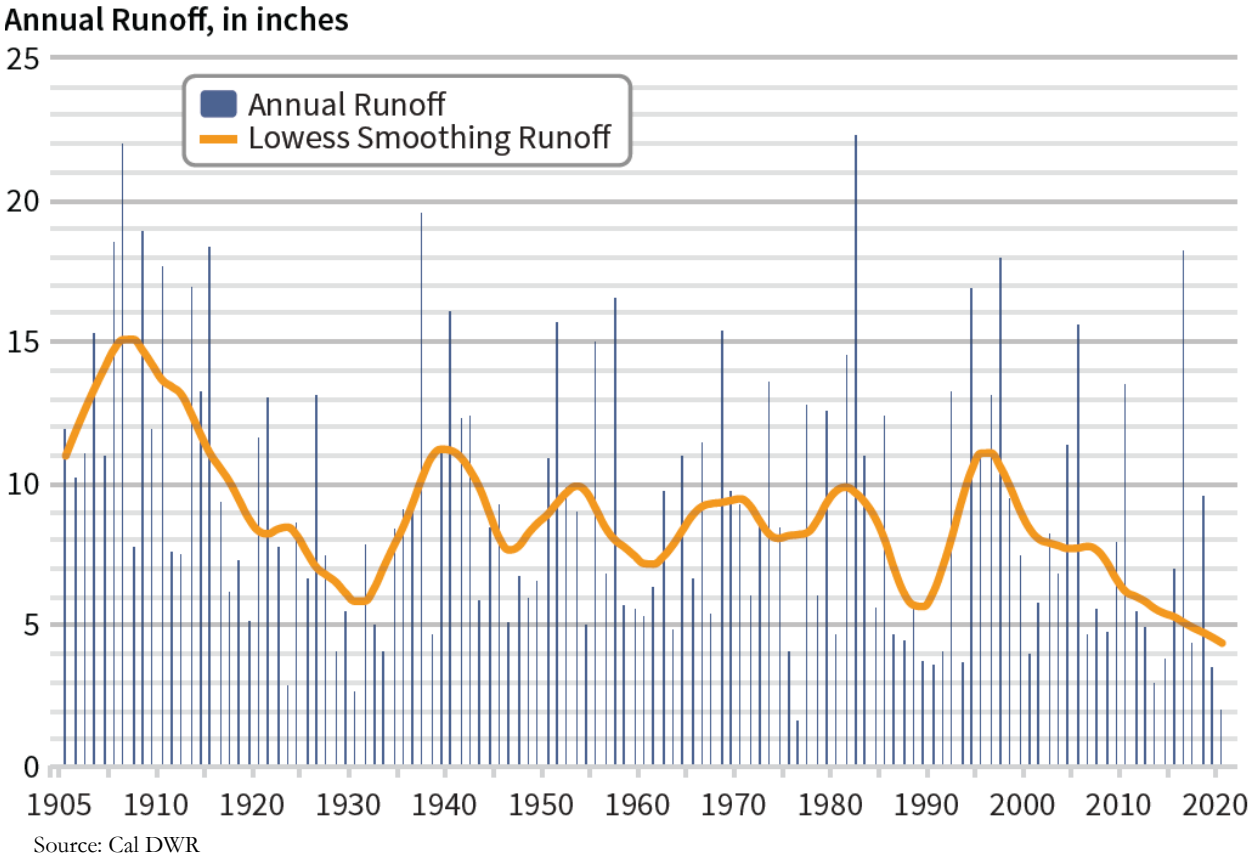


Runoff and precipitation conditions for California's six historical droughts. The most severe drought both in terms of precipitation and runoff was the drought of 1976-77. However, because it was just a two-year drought, the water supply impacts were not as severe as those associated with the longer duration droughts because shorter droughts can be partially mitigated by surface and groundwater storage.

Source: CA DWR – 2012-2016 California Drought: Historical Perspective (https://ca.water.usgs.gov/california-drought/california-drought-comparisons.html)

Figure 4-78 depicts runoff for the State from 1905 to 2021. This gives a historical context for the 2014-2021 drought to compare against past droughts.

Figure 4-78 Annual California Runoff –1905 to 2021



Source: Cal DWR

The 2018 and 2023 California State Hazard Mitigation Plan discussed the major droughts from 1900 to 2022. The discussion below appends to the tables and figures above.

The 1975-1977 Drought

From November 1975 through November 1977, California experienced one of its most severe droughts. Although people in many areas of the state are accustomed to very little precipitation during the growing season (April to October), they expect it in the winter. In 1976 and 1977, the winters brought only one-half and one-third of normal precipitation, respectively. Most surface storage reservoirs were substantially drained in 1976, leading to widespread water shortages when 1977 turned out to be even drier.

The 1987-1992 Drought

From 1987 to 1992, California again experienced a serious drought due to low precipitation and run-off levels. The hardest-hit region was the Central Coast, roughly from San Jose to Ventura. In 1988, 45 California counties experienced water shortages that adversely affected about 30 percent of the state's population, much of the dry-farmed agriculture, and over 40 percent of the irrigated agriculture. Fish and wildlife resources suffered, recreational use of lakes and rivers decreased, forestry losses and fires increased, and hydroelectric power production decreased. In February 1991, DWR and Cal OES surveyed drought conditions in all 58 California counties and found five main problems: extremely dry rangeland,

irrigated agriculture with severe surface water shortages and falling groundwater levels, widespread rural areas where individual and community supplies were going dry, urban area water rationing at 25 to 50 percent of normal usage, and environmental impacts.

Storage in major reservoirs had dropped to 54 percent of average, the lowest since 1977. The shortages led to stringent water rationing and severe cutbacks in agricultural production, including threats to survival of permanent crops such as trees and vines. Fish and wildlife resources were in critical shape as well. Not since the 1928-1934 drought had there been such a prolonged dry period. In response to those conditions, the Governor established the Drought Action Team. This team almost immediately created an emergency drought water bank to develop a supply for four critical needs: municipal and industrial uses, agricultural uses, protection of fish and wildlife, and carryover storage for 1992. The large-scale transfer program, which involved over 800,000 acre-feet of water, was implemented in less than 100 days with the help and commitment of the entire water community and established important links between state agencies, local water interests, and local governments for future programs.

The 2007-2009 Drought

Water years 2007-2009 were collectively the 15th driest three-year period for DWR's eight-station precipitation index, which is a rough indicator of potential water supply availability to the State Water Project (SWP) and Central Valley Project (CVP). Water year 2007 was the driest single year of that drought and fell within the top 20 percent of dry years based on computed statewide runoff. In June 2008, a state emergency proclamation was issued due to water shortage in selected Central Valley counties. In February 2009, for the first time in its history, the State of California proclaimed a statewide drought. The state placed unprecedented restrictions on CVP and SWP diversions from the Delta to protect listed fish species, a regulatory circumstance that exacerbated the impacts of the drought for water users.

The greatest impacts of the 2007–2009 drought were observed in the CVP service area on the west side of the San Joaquin Valley, where hydrologic conditions combined with reduced CVP exports resulted in substantially reduced water supplies (50 percent supplies in 2007, 40 percent in 2008, and 10 percent in 2009) for CVP south-of Delta agricultural contractors. Small communities on the west side highly dependent on agricultural employment were especially affected by land fallowing due to lack of irrigation supplies, as well as by factors associated with current economic recession. The coupling of the drought and economic recession necessitated emergency response actions related to social services, such as food banks and unemployment assistance.

The 2012-Current Drought (which is ongoing after a pause in 2017 and 2023)

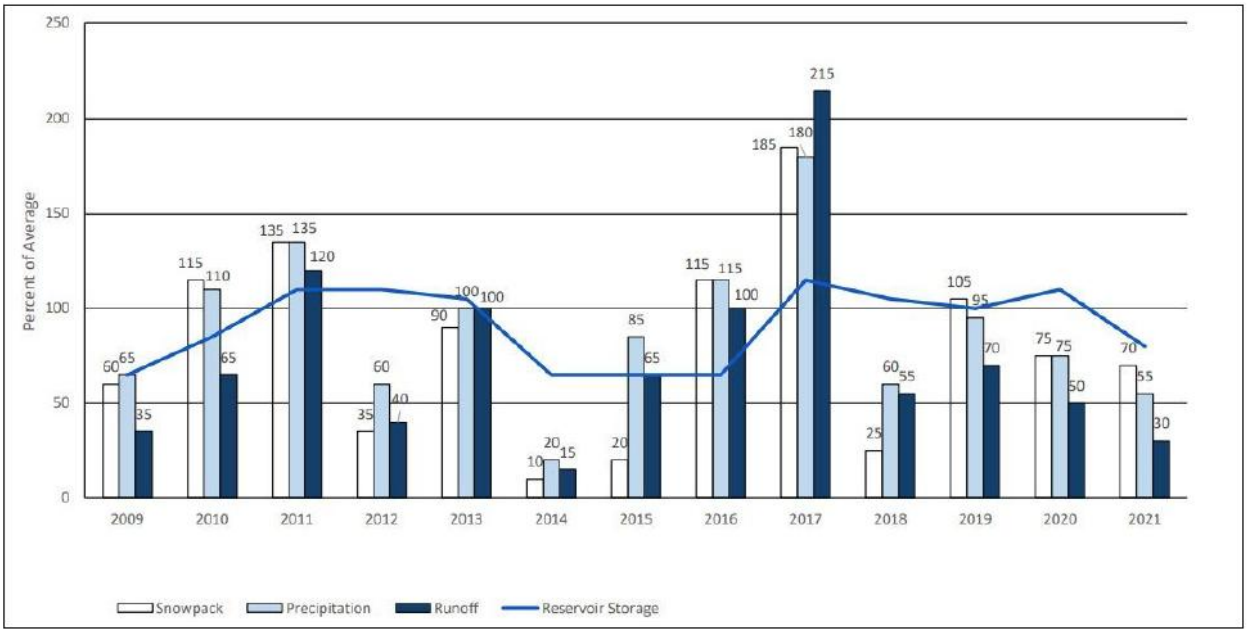
The statewide drought of 2012-2017, which is still ongoing, will be remembered as one of the most severe and costliest droughts of record in California. The drought that spanned water years 2012 through 2017 included the driest four-year statewide precipitation on record (2012-2015) and the smallest Sierra-Cascades snowpack on record (2015, with 5 percent of average). It was marked by extraordinary heat: 2014, 2015, and 2016 were California's first, second, and third warmest years in terms of statewide average temperatures. By the time the drought was declared officially over in April 2017, the state had expended $6.6 billion in drought response and mitigation programs and had been declared a federal disaster area.

Amador County issues a local proclamation for drought on March 5, 2021. This coincides with many of the drought declarations from the USDA (discussed in more detail in Section 4.3.6 above). The HMPC reported that fire danger in 2013 and 2014 reached record levels as the drought produced dry, highly flammable fuel loads. The HMPC also noted that multiple tree mortality declarations were issued in 2020, 2021, 2023, and 2024 from the elevated risk to tree mortality from drought. The Caldor Fire resulted from this drought.

Water Shortage

Figure 4-79 illustrates several indicators commonly used to evaluate water conditions in California. The percent of average values are determined by measurements made in each of the ten major hydrologic regions. The chart describes water conditions in California between 2009 and 2021. The chart illustrates the cyclical nature of weather patterns in California.

Figure 4-79 Water Supply Conditions, 2009 to 2021



Source: 2023 State of California Hazard Mitigation Plan

Likelihood of Future Occurrence

Drought

Likely—Historical drought data for the Amador County Planning Area indicate there have been 5 significant droughts in the last 87 years. This equates to a drought every 16.4 years on average or a 6.1 percent chance of a drought in any given year. Based on this data and given the multi-year length of droughts and future climate change affects, the Amador County Planning Area determined that future drought occurrence continues to be likely.

Water Shortage

Occasional — Recent historical data for water shortage indicates that Amador County may at some time be at risk to both short and prolonged periods of water shortage. Based on this it is possible that water shortages will affect the County in the future during extreme drought conditions. However, to date, Amador County has continued to have relatively consistent water supply.

It is likely that climate change will increase the chance of future occurrence as well as future impacts. More information on climate change and drought and water shortage can be found in the next section. More information on future impacts can be found in the Future Conditions/Future Development section of the Vulnerability Assessment below.

Climate Change and Drought and Water Shortage

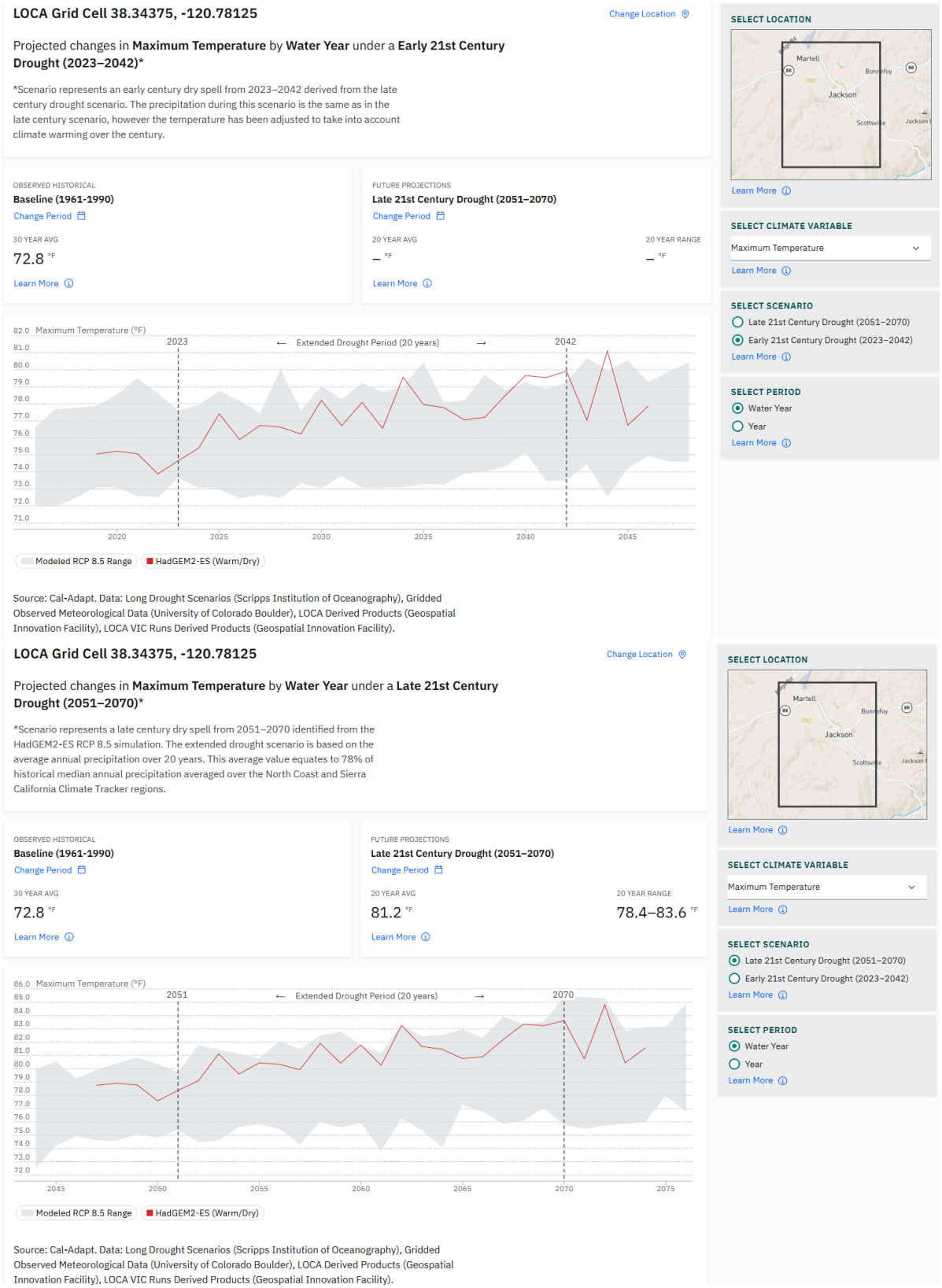
Climate scientists studying California find that drought conditions are likely to become more frequent and persistent over the 21st century due to climate change. The experiences of California during recent years underscore the need to examine more closely the state's water storage, distribution, management, conservation, and use policies. The 2021 CAS (as well as the 2024 Draft CAS) stresses the need for public policy development addressing long term climate change impacts on water supplies. The CAS notes that climate change is likely to significantly diminish California's future water supply, stating that: California must change its water management and uses because climate change will likely create greater competition for limited water supplies needed by the environment, agriculture, and cities.

A 2018 report from the Public Policy Institute of California noted that thousands of Californians – mostly in rural, small, disadvantaged communities – already face acute water scarcity, contaminated groundwater, or complete water loss. Climate change would make these effects worse.

Cal-Adapt has modeled future risk of drought. Recent research suggests that extended drought occurrence ("mega-drought") could become more pervasive in future decades. This tool explores data for two 20-year drought scenarios (using the quad that contains the City of Jackson in Figure 4-80) derived from LOCA downscaled meteorological and hydrological simulations – one for the earlier part of the 21st century, and one for the latter part:

- The upper chart represents a mid-century dry spell from 2023-2042 identified from the HadGEM2-ES RCP 8.5 simulation. The extended drought scenario is based on the average annual precipitation over 20 years. This average value equates to 78% of historical median annual precipitation averaged over the North Coast and Sierra California Climate Tracker regions.
- The lower chart represents a late century dry spell from 2051–2070 identified from the HadGEM2-ES RCP 8.5 simulation. The extended drought scenario is based on the average annual precipitation over 20 years. This average value equates to 78% of historical median annual precipitation averaged over the North Coast and Sierra California Climate Tracker regions.

Figure 4-80 Amador County Planning Area – Future Extended Drought Scenarios



Source: Cal Adapt – Extended Drought Scenarios (retrieved 2/26/2025)

Vulnerability Assessment

Vulnerability—High

Based on historical information, the occurrence of drought in California, including the Amador County Planning Area, is cyclical, driven by weather patterns. Drought has occurred in the past and will occur in the future. Periods of actual drought with adverse impacts can vary in duration, and the period between droughts can be extended. Although an area may be under an extended dry period, determining when it becomes a drought is based on impacts to individual water users. The vulnerability to drought may vary and include reduction in water supply, turf losses, impacts to natural resources, and an increase in dry fuels and tree dieback.

An assessment of a community's vulnerability to this hazard begins with an understanding of local exposure to unincorporated Amador County. This is included in the Local Concerns section below. After that, vulnerability is discussed in multiple sections that detail how this hazard can affect both the entire Amador County Planning Area as well as the unincorporated portions of Amador County. How the hazard affects the other participating jurisdictions can be found in their respective annexes to this LHMP Update. These sections below include assets at risk, impacts, and how future development may affect the vulnerability of the County to this hazard.

Tree Mortality and Drought

One of the specific impacts of drought in the Amador County Planning Area is the increased risk to trees from beetle kill and other insects, pathogens and parasites, and other tree mortality and die back issues. Drought weakens trees and makes them more susceptible to insect infestation and other pathogens. Insects, such as bark beetles and others, frequently attack trees weakened by drought, disease, injuries, or other factors that may stress the tree. These insects and other pathogens can contribute to the decline and eventual death of trees throughout the Planning Area, especially in those areas on the west where the elevations increase.

The tree mortality and dieback problem are a high priority because of the issue of hazardous trees and increased wildfire hazard in the wildland areas and the potential for worsening conditions and expansion into other forested sites in future years. Fuel loading and fire potential are greater in stands as compared to healthy stands due to the higher proportion of dead and dying material. Removal of dead and dying trees near structures, powerlines, and roadways is also a high priority because of the immediate falling hazard.

University of California, Berkeley's Department of Environmental Science, Policy, and Management (ESPM) was commissioned in 2021 to investigate the symptoms and possible causes of the dieback. Preliminary results show that the dieback is driven mostly by environmental stressors, including but not limited to drought, predisposing trees to disease caused by opportunistic pathogens. The report includes best management practices to limit the spread of pathogens. It is important to continue investigating the causes of the tree mortality and dieback to help Planning Area jurisdictional staff track changes over time, recognize where other areas may potentially be susceptible to tree mortality, and apply appropriate best management practices.

Under current drought conditions, competition for resources within forested areas will likely continue to intensify with greater stress increasing tree susceptibility to insect damage and disease, and ultimately increase mortality. In all vegetation types, drought extends the length of the fire season because of its effect on live and dead fuel moisture, with critical low fuel moisture levels occurring early in spring or summer and extending at least through the first significant rains that typically come in late fall.

According to the 2024 Strategic Fire Plan for the Amador-El Dorado Unit, in 2023, an estimated 28.8 million dead trees were counted across California. According to the 2023 USFS Aerial Detection Survey, the estimated number of dead trees by forested county within AEU was 2.2 million in El Dorado County, 930,000 in Alpine County, and 520,000 in Amador County. Unlike the previous wave of tree mortality across the state (2015-2016) that mostly impacted pine species, tree mortality in 2022 consisted of 77% true fir species (white fir and red fir), more true fir mortality than has ever been recorded.

The HMPC noted that noted several large trees which have fallen across the Amador Canal and Ione Canal causing damage to canal berms and embankments which were most likely aggravated by recent droughts in combination with recent high wind events. The HMPC noted that there have been multiple local emergency proclamations from tree mortality since 2020, including:

- 2021 (12 proclamations)
- 2022 (11 proclamations)
- 2023 (11 proclamations)
- 2024 (6 proclamations)

Following the record rain and snowfall of the 2022-2023 winter, tree mortality moderated over the summer of 2023; however, the quantity of standing and fallen dead trees from previous mortality waves remains high in forested areas and contributes to fuel loading and fire hazard in the forest.

Local Concerns (unincorporated Amador County)

The unincorporated County has specific concerns regarding this hazard. These concerns form a portion of the basis for the mitigation strategy and mitigation actions that seek to reduce risk and vulnerabilities to this hazard.

The drawdown of the groundwater table is one factor that has been recognized to occur during repeated dry years. Lowering of groundwater levels results in the need to deepen wells, which subsequently lead to increased pumping costs (which has happened in the recent past). These costs are a major consideration for residents relying on domestic wells and agricultural producers that irrigate with groundwater and/or use it for frost protection. Amador Water Agency (AWA) is the primary water company in the County. The primary concern they noted for the County is increased risk of wildfire due to extreme heat events and droughts which cause damage to AWA tanks, treatment plants, pump stations, homes, businesses, and other above or below ground infrastructure. In August 2021, Amador Water Agency received orders from the State Water Resources Control Board curtailing most pre- and post-1914 water rights, which stopped Amador Water Agency's ability to draw water from the Mokelumne River which is the single source of water for almost 90% of AWA water customers. These orders significantly impacted the County and AWA as AWA was then only authorized to use the limited stored water in the mountain reservoirs. This limited AWAs ability to produce potable water as there was no end date associated with the curtailment. Prolonged

curtailment orders can risk AWA's ability to produce potable water for AWA customers in Amador County, including at-risk populations, as well as provide fire suppression water to combat wildfires in critical areas. This has since been lifted.

In addition, the Amador County Air Quality District noted that within the last five years, Amador County has experienced extreme droughts that have affected the health of the forest. The lack of rain lead to the Bark Beetle infestation, causing thousands upon thousands of trees to die. This has led to large areas of Amador County to be declared high fire hazardous zones as well. The combined effects of the drought, decline in the health of the forest, temperature changes, and wildfires in and around neighboring counties, much contributed to climate change, have also steered our way to poor air quality.

Local concerns for each of the jurisdictions can be found under the Local Concerns heading in each respective jurisdictional annex to this LHMP Update.

Assets at Risk

Assets at risk from drought and water shortage include people and populations; structures; critical facilities and infrastructure; and natural, historic, and cultural resources. These are discussed in the following sections for the Amador County Planning Area and unincorporated Amador County.

Additionally, for each hazard in the FEMA National Risk Index in Amador County, the relevant portions of the hazard analysis done by FEMA is presented below. This includes the Hazard Risk Index Rating, Expected Annual Loss Values, Exposure Values, and the Historic Loss Ratio Rating. These are presented for the Amador County Planning Area as a whole.

People and Populations

The people and populations of the Amador County Planning Area are not directly affected by general drought conditions; although, their turfed areas, trees, and other water dependent resources can all be affected. In extreme drought conditions, however, residents and other populations within the Planning Area may be vulnerable to drought and water shortage issues. Drought and water shortage can lead to an increase in wildfires threatening Planning Area residents. Water shortages can have an effect on all of the population in the Planning Area, but often have a greater effect on the unhoused and other vulnerable populations that may be unable to access and afford clean drinking water during shortages. During periods of drought as the costs of water usage may increase, those who are economically disadvantaged may be unable to afford the increased costs of potable water.

Structures

Structures have a limited vulnerability to drought and water shortage. It is the secondary hazard of drought (wildfire) which causes risks to structures. Drought can also stress trees, causing die off. These trees may fall on structures adjacent to them.

Critical Facilities and Infrastructure

Most critical facilities and infrastructure have a limited vulnerability to drought and water shortage. Should drought conditions be severe enough to cause water shortage reliability issues, some facilities and infrastructure may be affected. Water and wastewater systems may be impacted during times of reduced water supply and need to employ contingencies to remain functional and fully operational. Other water dependent systems may also be adversely affected. Further, the secondary hazards of drought (increased tree mortality and potential for spread of urban fires and wildfire) can pose a significant risk to critical facilities and infrastructure. Drought can also stress trees, causing die off and lead to increased tree mortality. Dead and weakened trees may fall on critical infrastructure adjacent to them and impact power lines and other utilities. Fallen trees can also temporarily block roads and access which can impact first responders in an emergency.

Natural, Historic, and Cultural Resources

Drought and water shortage can have a significant impact on natural resources. Water levels in reservoirs and lakes may be reduced and a loss of wetlands and marsh areas may occur. Severe drought conditions can contribute to an increase in erosion of soils and lead to poor soil quality. Further, all of the trees in the Planning Area are at risk to drought impacts and a reduction in water supply. These trees provide a wealth of social and environmental benefits to Planning Area residents and visitors, from shade and beauty to air quality, carbon reduction and stormwater management. Increased tree mortality during extended droughts can be substantial and widespread. Increased tree mortality in the Planning Area can also add to the available fuel which can exacerbate the spread of wildfires. Drought can devastate crops and dry out pastures, dry out forests and critical habitat areas, and reduce food and water available for wildlife and livestock. Additionally, drought conditions can also cause soil to compact and not absorb water well, potentially making an area more susceptible to flooding. It is unlikely that drought and water shortage would have a significant impact on historic and cultural resources in the Planning Area unless they are impacted by a drought precipitated wildfire type event.

FEMA NRI Hazard Vulnerability Assessment

The FEMA NRI was queried for additional specific data on Amador County's vulnerability to drought. The NRI contains data and analysis for 18 separate natural hazards, including drought. As shown in Table 4-88, drought could cause a total of $5,114,470 in expected annual losses, with a historic loss rating of relatively high. Drought has a relatively moderate rating for both social vulnerability and community resilience, with a risk index score of 98.7 out of 100. According to the NRI, there have been 1,260 drought events between the years 2000-2021 with an average of 53.4 events per year.

Table 4-88 Amador County Planning Area – Drought Vulnerability Ratings from FEMA NRI

NRI Hazard	Hazard Risk Index Rating*	Expected Annual Loss Values (total)**	Exposure Value (total)***	Historic Loss Ratio Rating
Drought	98.7	$5,114,470	$26,500,133	Relatively High

Source: FEMA NRI Report, retrieved 4/1/2025.

*Hazard Risk Index is calculated using data for only a single hazard type, and reflect a communities expected annual loss value, community risk factors, and the adjustment factor used to calculate the risk value.
**Expected annual loss represents the average economic loss in dollars resulting from natural hazards each year.
***Exposure is a natural hazard consequence factor that is the representative value of buildings, populations, or agriculture potentially exposed to a natural hazard occurrence.

Additional information on the FEMA NRI can be found in Section 4.2 and Appendix G.

Impacts from Drought and Water Shortage

The vulnerability to drought is Countywide, but impacts may vary and include reduction in water supply and an increase in dry fuels. The potential for a reduction in water supply during drought conditions generally leads to both mandated and voluntary conservations measures during extended droughts. During these times, the costs of water can also increase. Also of concern, the increased dry fuels and fuel loads associated with drought conditions can result in an increased fire danger. In areas of extremely dry fuels, the intensity and speed of fires can be significant. Water supply and flows for fire suppression can also be an issue during extended droughts. Drought that occurs during periods of extreme heat and high winds is a contributing factor to PSPS events to be declared in the Planning Area. More information on PSPS can be found in Section 4.3.1.

Other qualitative impacts associated with drought in the Amador County Planning Area are those related to water intensive activities such as municipal usage, commerce, tourism, and recreation use. With more precipitation likely falling as rain instead of snow and warmer temperatures causing decreased snowfall to melt faster and earlier, water supply is likely to become more unreliable. In addition, drought and water shortage is predicted to become more common. This means less water available for use over the long run, and additional challenges for water supply reliability, especially during periods of extended drought.

Drought Impact Reporter

Drought impacts are wide-reaching and may be economic, environmental, and/or societal. Tracking drought impacts can be difficult. The Drought Impact Reporter from the NDMC is a useful reference tool that compiles reported drought impacts nationwide. Table 4-89 show drought impacts for County from 1850 to March 2025. The data represented is skewed, with the majority of these impacts from records within the past ten years.

Table 4-89 Amador County Drought Impacts 1850-3/1/2025

Category	Amador County Number of Impacts
Agriculture	274
Business and Industry	79
Energy	41
Fire	104
Plants & Wildlife	137
Relief, Response, and Restrictions	366
Society and Public Health	237

Category	Amador County Number of Impacts
Tourism and Recreation	27
Water Supply and Quality	371
Total	**1,636**

Source: National Drought Mitigation Center. Retrieved 3/12/2025.

Impacts to identified assets at risk to this hazard and the overall vulnerability of the County may be affected in the future by climate change (which was discussed in the hazard profile section above), changes in population patterns, and changes in land use and development. The influencing effects of these factors on this hazard are discussed further in the Future Conditions/Future Development discussion below.

Future Conditions/Future Development

Future hazard conditions may be affected by climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. Findings on this for Amador County include the following:

- Climate change is likely to exacerbate future drought conditions and associated impacts and vulnerability of the County to drought and water shortage.
- Future population growth should be considered as having more or less people in a community affects the overall hazard vulnerability to the County. Population growth in Amador County is expected to slowly increase. Amador County has access to large quantities of water through its groundwater as well as surface water. However, any future population growth in the County will add additional pressure to water companies during periods of drought and water shortage. Water companies will need to continue to plan for and add infrastructure capacity for population growth. As the population grows, the nature and makeup of populations will shift and change along with it. Vulnerable and underserved populations, such as those with low incomes and the unhoused that might not always have access to affordable, clean water, will need to be considered as future development continues, since they may experience a disproportionate impact from drought and water shortage. Potential population growth will be a challenge not only with regard to Amador County's water access for agricultural production, but state- and nation-wide with regard to food production. Should the County see a growth in population, it will increase the vulnerability and impacts to the County from this hazard.
- Land use planning should be proactive to address future hazard conditions. As the County continues to grow, more cropland will be taken out of production to provide housing to accommodate for population growth. As Amador's agricultural lands are reduced, it seems likely that there would be less of a competing demand for water. However, more development will also require an increase in water supply and associated infrastructure. Changes in land use and development may or may not increase the impacts and associated vulnerabilities of the County to this hazard depending on where and how this future growth occurs.

Future development considerations should be ongoing and proactive. Ensuring that comprehensive land use planning is conducted, regulatory requirements, such as building codes, are followed, and varying needs for different demographic groups with intersecting identities that reside within the County are considered can help to make for a more resilient community.

4.3.11. Earthquake

Hazard Profile

This hazard profile contains multiple sections that detail how this hazard can affect the Amador County Planning Area. These sections include a hazard/problem description; description of location and extent; past occurrences of this hazard; and how climate change can affect or influence this hazard.

Hazard/Problem Description

An earthquake is caused by a sudden slip on a fault. Stresses in the earth's outer layer push the sides of the fault together. Stress builds up, and the rocks slip suddenly, releasing energy in waves that travel through the earth's crust and cause the shaking that is felt during an earthquake. Earthquakes can cause structural damage, injury, and loss of life, as well as damage to infrastructure networks, such as water, power, gas, communication, and transportation. Earthquakes may also cause collateral emergencies including dam and levee failures, seiches, hazmat incidents, fires, avalanches, and landslides. The degree of damage depends on many interrelated factors. Among these are: the magnitude, focal depth, distance from the causative fault, source mechanism, duration of shaking, high rock accelerations, type of surface deposits or bedrock, degree of consolidation of surface deposits, presence of high groundwater, topography, and the design, type, and quality of building construction. This section briefly discusses issues related to types of seismic hazards.

Ground Shaking

Ground shaking is motion that occurs as a result of energy released during faulting. The damage or collapse of buildings and other structures caused by ground shaking is among the most serious seismic hazards. Damage to structures from this vibration, or ground shaking, is caused by the transmission of earthquake vibrations from the ground to the structure. The intensity of shaking and its potential impact on buildings is determined by the physical characteristics of the underlying soil and rock, building materials and workmanship, earthquake magnitude and location of epicenter, and the character and duration of ground motion.

Actual ground breakage generally affects only those buildings directly over or nearby the fault. Ground shaking generally has a much greater impact over a greater geographical area than ground breakage. The amount of breakage and shaking is a function of earthquake magnitude, type of bedrock, depth and type of soil, general topography, and groundwater. As with most communities in Northern California near active faults, much of Amador County would be susceptible to violent ground shaking.

Seismic Structural Safety

Older buildings constructed before building codes were established, and even newer buildings constructed before earthquake-resistance provisions were included in the codes, are the most likely to be damaged during an earthquake. Buildings one or two stories high of wood-frame construction are considered to be the most structurally resistant to earthquake damage. Older masonry buildings without seismic

reinforcement (unreinforced masonry) and soft story buildings are the most susceptible to the type of structural failure that causes injury or death.

The susceptibility of a structure to damage from ground shaking is also related to the underlying foundation material. A foundation of rock or very firm material can intensify short-period motions which affect low-rise buildings more than tall, flexible ones. A deep layer of water-logged soft alluvium can cushion low-rise buildings, but it can also accentuate the motion in tall buildings. The amplified motion resulting from softer alluvial soils can also severely damage older masonry buildings.

Other potentially dangerous conditions include, but are not limited to: building architectural features that are not firmly anchored, such as parapets and cornices; roadways, including column and pile bents and abutments for bridges and overcrossings; and above-ground storage tanks and their mounting devices. Such features could be damaged or destroyed during strong or sustained ground shaking.

Liquefaction Potential

Liquefaction is a process whereby soil is temporarily transformed to a fluid formed during intense and prolonged ground shaking. Areas most prone to liquefaction are those that are water saturated (e.g., where the water table is less than 30 feet below the surface) and consist of relatively uniform sands that are loose to medium density. In addition to necessary soil conditions, the ground acceleration and duration of the earthquake must be of sufficient energy to induce liquefaction.

Liquefaction during major earthquakes can cause severe damage to structures on level ground as a result of settling, titling, or floating. Such damage occurred in San Francisco on bay-filled areas during the 1989 Loma Prieta earthquake, even though the epicenter was several miles away. If liquefaction occurs in or under a sloping soil mass, the entire mass may flow toward a lower elevation. Also of particular concern in terms of developed and newly developing areas are fill areas that have been poorly compacted.

No known liquefaction areas exist in Amador County.

Landslide/Debris Flows

Landslides can occur as a result of horizontal seismic inertia induced in the slopes by the ground shaking. The most common earthquake-induced landslides include shallow, disrupted landslides such as rock falls, rockslides, and soil slides. Debris flows are created when surface soil on steep slopes becomes totally saturated with water. Once the soil liquefies, it loses the ability to hold together and can flow downhill at very high speeds, taking vegetation and/or structures with it. Slide risks increase after an earthquake during a wet winter. This is discussed in the vulnerability section below, and as a stand-alone hazard in Section 4.3.14.

Settlement

Settlement can occur in poorly consolidated soils during ground shaking. During settlement, the soil materials are physically rearranged by the shaking to result in a less stable alignment of the individual minerals. Settlement of sufficient magnitude to cause significant structural damage is normally associated with rapidly deposited alluvial soils or improperly founded or poorly compacted fill. These areas are known

to undergo extensive settling with the addition of irrigation water, but evidence due to ground shaking is not available.

Fire Following Earthquake

Fire ignitions and spread in following a major earthquake can further compound the potentially catastrophic impacts of a large earthquake event. Fire following earthquake is a major hazard in earthquake-prone areas which are densely developed and have high inventories of wood frame buildings. The capability of fire departments to combat fires following an earthquake is impacted by the regional nature of an earthquake, damage to transportation and water supply systems, and the potential failure of telecommunications. A local fire department may suffer impacts to its personnel, buildings, equipment, and communications systems. Moreover, fewer resources are immediately available as mutual aid – due to the commitment of nearby fire departments responding to the earthquake withing their own jurisdictions. Transportation system damage may adversely impact the mobilization of off-duty personnel and fire and rescue mutual aid resources from unaffected areas. Maneuvering fire crews within the affected areas of the earthquake may be impeded by debris or damage to roads and bridges. Additionally, the municipal water supply system which ordinarily supports firefighting operations is likely to be impacted.

Fire following earthquake is an issue that could impact any California community that experiences an earthquake – both urban and rural. According to the FM Global Insurance company, "Fires after earthquakes commonly initiate from electrical or fuel related sources because their use is widespread. In the US, natural gas is a factor 15 to 50 percent of the time, and electrical ignitions account for 40 percent or more of post-earthquake wildfires. Ignitable liquid spills, chemical reactions, and the contact of combustibles with heat sources have also initiated or contributed to many fires after earthquakes."

Location and Extent

California is seismically active because it sits on the boundary between two of the earth's tectonic plates. Most of the state - everything east of the San Andreas Fault (such as Amador) - is on the North American Plate. The cities of Monterey, Santa Barbara, Los Angeles, and San Diego are on the Pacific Plate, which is constantly moving northwest past the North American Plate. The relative rate of movement is about two inches per year. The San Andreas Fault is considered the boundary between the two plates, although some of the motion is taken up on faults as far away as central Utah.

Faults

A fault is defined as "a fracture or fracture zone in the earth's crust along which there has been displacement of the sides relative to one another." For the purpose of planning there are two types of faults, active and inactive. Active faults have experienced displacement in historic time, suggesting that future displacement may be expected. Inactive faults show no evidence of movement in recent geologic time, suggesting that these faults are dormant. This does not mean, however, that faults having no evidence of surface displacement within the last 11,000 years are necessarily inactive. For example, the 1975 Oroville earthquake, the 1983 Coalinga earthquake, and the 1987 Whittier Narrows earthquake occurred on faults not previously recognized as active. Potentially active faults are those that have shown displacement within

the last 1.6 million years (Quaternary). An inactive fault shows no evidence of movement in historic (last 200 years) or geologic time, suggesting that these faults are dormant.

Two types of fault movement represent possible hazards to structures in the immediate vicinity of the fault: fault creep and sudden fault displacement. Fault creep, a slow movement of one side of a fault relative to the other, can cause cracking and buckling of sidewalks and foundations even without perceptible ground shaking. Sudden fault displacement occurs during an earthquake event and may result in the collapse of buildings or other structures that are found along the fault zone when fault displacement exceeds an inch or two. The only protection against damage caused directly by fault displacement is to prohibit construction in the fault zone.

Amador County is located in a relatively aseismic area with respect to other more seismically active areas in California. Amador County itself is traversed by the Foothills fault system, a complex series of northwest trending-faults that are related to the Sierra Nevada uplift, and whose activity is little understood, running from about Oroville in the north to east of Fresno in the south. This system contains the closest and most potentially significant faults in the area, and includes the potentially active or active Bear Mountains fault, Melones fault, and Cleveland Hills fault, among others.

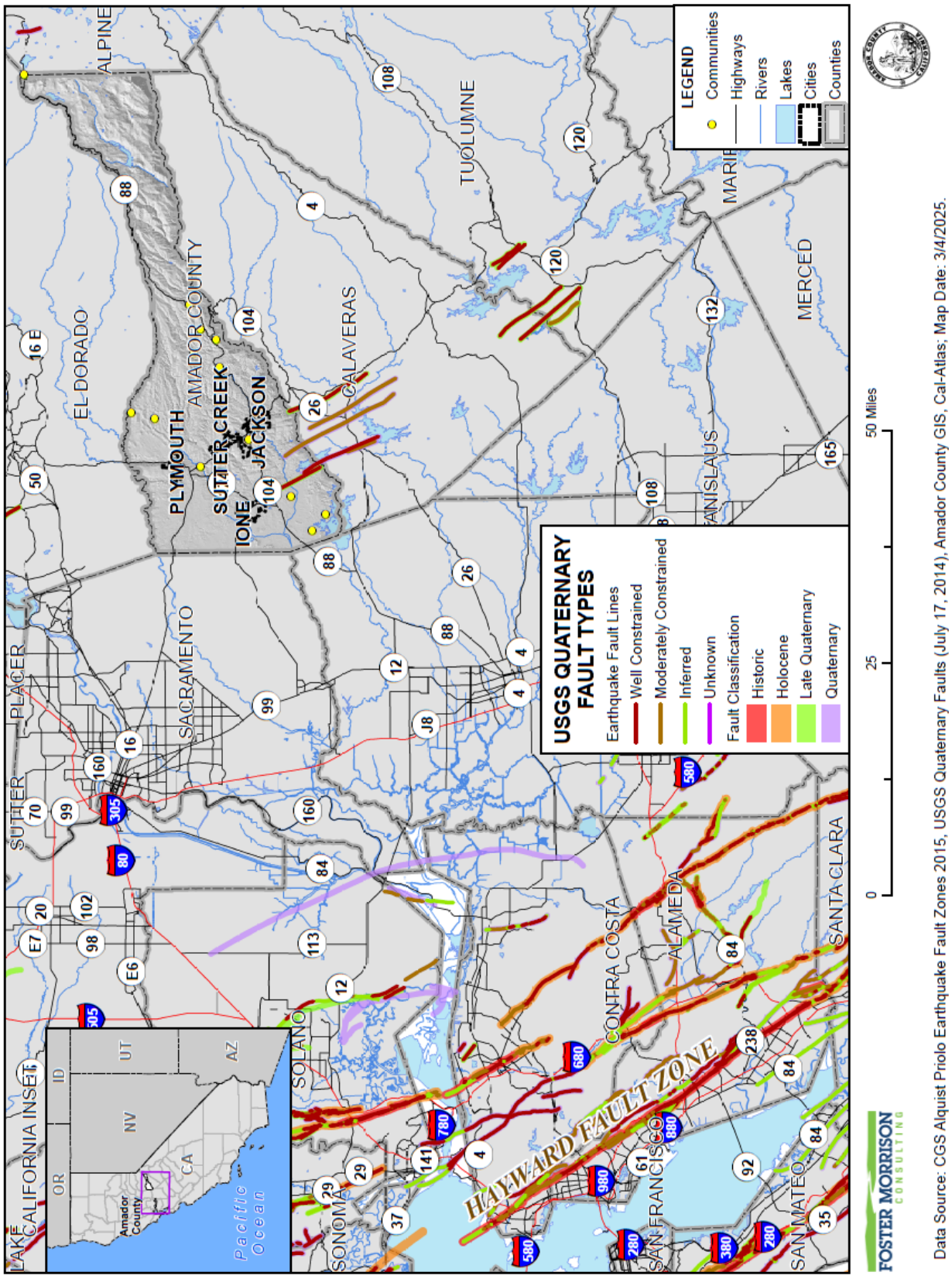
The California Division of Mines and Geology Open File Report 84-52 (1994) reports that special seismic zoning is not recommended for the fault system as the individual faults of the system are either poorly defined at the surface or lack evidence of Holocene (recent) faulting. The closest known source of large earthquakes is the Sierra Frontal Fault System along the eastern margin of the Sierra Nevada, which includes the Carson Valley Fault. This fault is located within a few miles of the eastern border to the County and has been evaluated as being able to generate earthquakes that produce levels of damage up to VII on the Mercalli Scale.

Additionally, western Amador County may experience ground shaking from distant major to great earthquakes on faults to the west and east. For example, to the west, both the San Andreas fault (source of the 8.0 estimated Richter magnitude San Francisco earthquake that caused damage in Sacramento in 1906, including the State Capitol, the full extent of which was not discovered until the mid-1970s) and the closer Hayward fault have the potential for experiencing major to great events (i.e., >6.7). The US Geological Survey recently (February 2004) estimated that there is a 62 percent probability of at least one 6.7 or greater magnitude earthquake occurring that could cause widespread damage in the greater San Francisco Bay area before 2032.

Another potential source for earthquakes in Amador County is the faults associated with the western edge of the Central Valley, recently defined as the Coast Range Central Valley (CRCV) boundary thrust fault system. Various documents define portions of this little known system as the Midland Fault Zone or the Dunnigan Hills fault where, as noted above, the 1892 Vacaville-Winters earthquake occurred. A southern part of the CRCV system may have been the source of the very damaging 1983 Coalinga earthquake.

Figure 4-81 shows fault locations in and near Amador County.

Figure 4-81 Faults in and near Amador County



The amount of energy released during an earthquake is usually expressed as a magnitude and is measured directly from the earthquake as recorded on seismographs. An earthquake's magnitude is expressed in whole numbers and decimals (e.g., 6.8). Seismologists have developed several magnitude scales. One of the first was the Richter Scale, developed in 1932 by the late Dr. Charles F. Richter of the California Institute of Technology. The Richter Magnitude Scale is used to quantify the magnitude or strength of the seismic energy released by an earthquake. Another measure of earthquake severity is intensity. Intensity is an expression of the amount of shaking at any given location on the ground surface (see Table 4-90). Seismic shaking is typically the greatest cause of losses to structures during earthquakes.

Table 4-90 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, and 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

Other Hazards

Earthquakes can also cause landslides and dam failures. Earthquakes may cause landslides (discussed in Section 4.3.14), particularly during the wet season, in areas of high water or saturated soils. Finally, earthquakes can cause dams to fail (see Section 4.3.7 Dam Failure). Earthquakes can also cause levees to fail (see Section 4.3.12 Flood: 1%/0.2% Annual Chance in the levee failure section).

Past Occurrences

Disaster Declaration History

There have been no disaster declarations in the County related to earthquakes, as shown on Table 4-4.

NCDC Events

Earthquake events are not tracked by the NCDC database.

USGS Events

The USGS National Earthquake Information Center database contains data on earthquakes in the Amador County area. Table 4-91 shows the approximate distances earthquakes can be felt away from the epicenter. According to the table, a magnitude 5.0 earthquake could be felt up to 90 miles away. The USGS database was searched for magnitude 5.0 or greater on the Richter Scale within 90 miles of the City of Jackson in Amador County. These 65 results are detailed in Table 4-92.

Table 4-91 Approximate Relationships between Earthquake Magnitude and Intensity

Richter Scale Magnitude	Maximum Expected Intensity (MM)*	Distance Felt (miles)
2.0 - 2.9	I – II	0
3.0 - 3.9	II – III	10
4.0 - 4.9	IV – V	50
5.0 - 5.9	VI – VII	90
6.0 - 6.9	VII – VIII	135
7.0 - 7.9	IX – X	240
8.0 - 8.9	XI – XII	365

*Modified Mercalli Intensity Scale.
Source: USGS Earthquake Intensity Zonation and Quaternary Deposits, Miscellaneous Field Studies Map 9093, 1977.

*Table 4-92 Magnitude 5.0 Earthquakes or greater within 90 Miles of Amador County**

Date	Richter Magnitude	Location
10/25/2022	5.06	15km ESE of Alum Rock, CA
7/8/2021	5.03	32km SE of Markleeville, CA
7/8/2021	6	Antelope Valley, CA
8/24/2014	6.02	South Napa
4/26/2008	5.1	1km NW of Mogul, Nevada
10/31/2007	5.45	San Francisco Bay area, California
9/12/1994	5.1	Northern California
9/12/1994	5.7	11km SE of Gardnerville Ranchos, Nevada
10/24/1990	5.8	Central California
6/13/1988	5.3	San Francisco Bay area, California
3/31/1986	5.7	Northern California
4/24/1984	6.2	Northern California
11/28/1980	5.1	Northern California
1/27/1980	5.4	San Francisco Bay area, California
1/24/1980	5.1	San Francisco Bay area, California

Date	Richter Magnitude	Location
1/24/1980	5.8	San Francisco Bay area, California
10/7/1979	5	Central California
8/2/1975	5.2	Northern California
8/2/1975	5.1	Northern California
8/1/1975	5.7	0km WSW of Palermo, California
9/12/1966	5.91	Northern California
4/13/1962	5.1	Central California
10/24/1955	5.4	San Francisco Bay area, California
9/5/1955	5.5	San Francisco Bay area, California
9/26/1953	5.3	Nevada
3/22/1953	5	Northern California
5/9/1952	5.1	Nevada
12/29/1948	6	Northern California
3/30/1943	5.3	Northern California
12/17/1942	5.1	Northern California
6/25/1933	6.1	Nevada
12/19/1919	5.2	Central California
4/5/1915	5	Central California
7/1/1911	6.6	San Francisco Bay area, California
6/23/1909	5.7	Northern California
3/3/1909	5	Northern California
8/3/1903	5.8	San Francisco Bay area, California
6/11/1903	5.8	San Francisco Bay area, California
5/19/1902	5.4	Northern California
6/7/1899	5.8	Northern California
3/31/1898	6.2	San Francisco Bay area, California
4/30/1892	5.5	Northern California
4/21/1892	6.2	Northern California
4/19/1892	6.4	Northern California
10/12/1891	5.5	Northern California
1/2/1891	5.5	San Francisco Bay area, California
7/31/1889	5.2	San Francisco Bay area, California
5/19/1889	6	San Francisco Bay area, California
6/3/1887	6.3	Nevada
4/10/1881	5.9	Northern California
7/10/1877	5	Nevada
4/2/1870	5.8	Near Berkeley, California
12/27/1869	6.2	Near Carson City, Nevada
12/27/1869	6.4	Northwest of Virginia City, Nevada

Date	Richter Magnitude	Location
10/21/1868	6.8	The 1868 Hayward Fault Earthquake, California
9/17/1868	5.6	Near Markleeville, California
5/30/1868	6	Near Virginia City, Nevada
7/15/1866	6	Southwest of Stockton, California
5/21/1864	5.8	Alameda County, California
3/5/1864	6.1	Alameda County, California
2/26/1864	6.1	Santa Clara County, California
7/4/1861	5.8	San Francisco Bay area, California
11/26/1858	6.1	San Francisco Bay area, California
9/3/1857	6	California-Nevada Border east of Truckee
1/25/1855	5.5	Sierra County, California

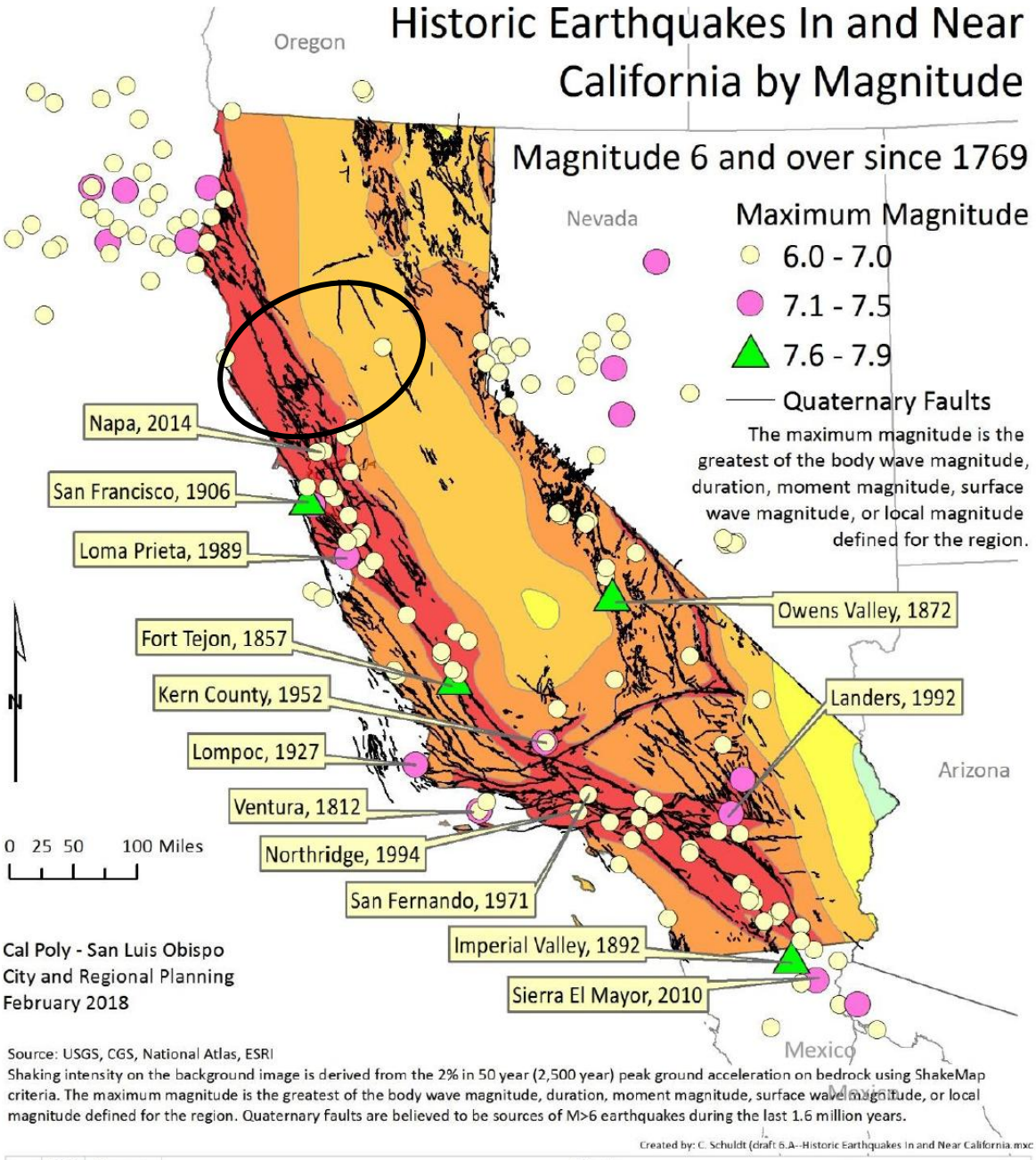
Source: USGS, National Earthquake Information Center
*Search dates 1950 – January 31, 2025

Figure 4-82 shows major historical earthquakes in California from 1769 to 2017. Since 2017, California has experienced four additional 6.0 or greater earthquakes:

- 2022 - 6.4 Ferndal
- 2021 - 6.0 Antelope Valley
- 2019 - 6.4 and 7.1 Ridgecrest

None of these earthquakes (over 6.0) since 2017 have affected the Amador County Planning Area.

Figure 4-82 Historic Earthquakes in California 1769 to 2017



	MMI	Damage	Effects
	X	Very Heavy	Some well-built, wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.
	IX	Heavy	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
	VIII	Moderate to Heavy	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
	VII	Moderate	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly-built or badly designed structures; some chimneys broken.
	VI	Light	Felt by all, many frightened. Some heavy furniture moved; a few instance of fallen plaster. Damage slight.
	V	Very Light	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.

Source: 2023 State of California Multi-Hazard Mitigation Plan

Hazard Mitigation Planning Committee Events

The HMPC noted that during past regional earthquake events, Amador County has experienced groundshaking. In addition, in some instances, nearby earthquake events have caused cracking in the plaster on walls and in windowsills. This was the case on December 9, 2024. There was a 5.7 magnitude earthquake in Yerington, NV, that was felt in several areas of Amador County. No significant damages or injuries were reported.

Likelihood of Future Occurrence

Unlikely (major earthquake); Likely (minor earthquake) – No major earthquakes have been recorded within the County; although the County has felt ground shaking from earthquakes with epicenters located elsewhere. However, the possibility of an earthquake is an ever-present phenomenon in California and Amador County. The combination of plate tectonics and associated California coastal mountain range building geology essentially guarantees earthquake as a result of the periodic release of tectonic stresses.

It is likely that climate change will not affect the chance of future occurrence as well as future impacts. More information on climate change and earthquake can be found below the Mapping of Future Occurrences section. More information on future impacts can be found in the Future Conditions/Future Development section of the Vulnerability Assessment below.

Mapping of Future Occurrences

Mapping of future occurrences is presented in the following sections:

- CGS Analysis
- UCERF Analysis

CGS Analysis

Maps indicating the maximum expectable intensity of ground shaking for the County are available through several sources. Figure 4-83, prepared in 2016 by the California Division of Mines and Geology, shows the expected relative intensity of ground shaking and damage in California from anticipated future earthquakes. The shaking potential is calculated as the level of ground motion that has a 2% chance of being exceeded in 50 years, which is the same as the level of ground-shaking with about a 2,500-year average repeat time. Although the greatest hazard is in areas of highest intensity as shown on the map, no region is immune from potential earthquake damage.

Figure 4-83 Maximum Expectable Earthquake Intensity – 2% Chance in 50 Years

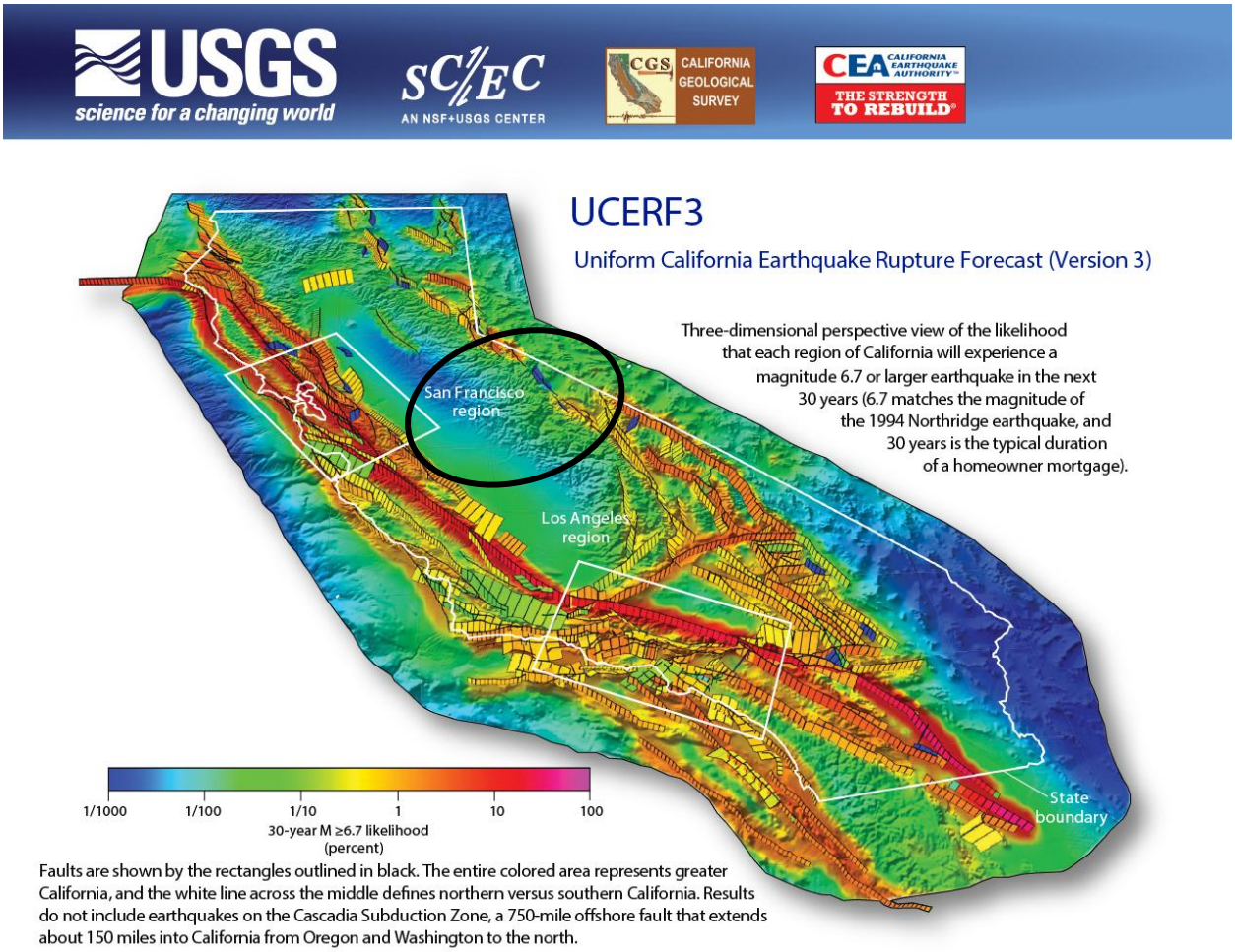


Source: California Division of Mines and Geology (2016)

UCERF Analysis

In 2014, the USGS and the California Geological Survey (CGS) released the time-dependent version of the Uniform California Earthquake Rupture Forecast (UCERF III) model. The UCERF III results have helped to reduce the uncertainty in estimated 30-year probabilities of strong ground motions in California. The UCERF map is shown in Figure 4-84 and indicates that Amador County has a low to moderate risk of earthquake occurrence.

Figure 4-84 Probability of Earthquake Magnitudes Occurring in 30 Year Time Frame



Source: United States Geological Survey Open File Report 2015-3009

Climate Change and Earthquake

Climate change is unlikely to increase earthquake frequency or strength.

Vulnerability Assessment

Vulnerability—Extremely High

Earthquake vulnerability is primarily based on population and the built environment. Urban areas in high seismic hazard zones are the most vulnerable, while more rural areas, such as Amador are less vulnerable. The primary impacts of concern are life safety and property damage. Several faults are in and near the Amador County Planning Area, and seismic hazard mapping indicates that the Planning Area has low to moderate seismic hazard potential. Depending on the location and magnitude of an earthquake event, some degree of structural damage due to stronger seismic shaking could be expected.

An assessment of a community's vulnerability to this hazard begins with an understanding of local exposure to unincorporated Amador County. This is included in the Local Concerns section below. After that, vulnerability is discussed in multiple sections that detail how this hazard can affect both the entire Amador County Planning Area as well as the unincorporated portions of Amador County. How the hazard affects the other participating jurisdictions can be found in their respective annexes to this LHMP Update. These sections below include assets at risk, impacts, and how future development may affect the vulnerability of the County to this hazard.

Local Concerns (unincorporated Amador County)

The unincorporated County has certain specific concerns regarding this hazard. These concerns form a portion of the basis for the mitigation strategy and mitigation actions that seek to reduce the risk and vulnerability to this hazard.

Seismic events can have particularly negative effects on older buildings constructed of unreinforced masonry (URM), including materials such as brick, concrete and stone. The Uniform Building Code (UBC) identifies four seismic zones in the United States. The zones are numbered one through four, with Zone 4 representing the highest level of seismic hazard. The UBC establishes more stringent construction standards for areas within Zones 3 and 4. All of California lies within either Zone 3 or Zone 4. Amador County is within the less hazardous Zone 3. Amador County noted there are no URM or soft story buildings in the unincorporated County.

Amador County is home to a multitude of older and/or historic buildings with limited or no retrofitting, which can exacerbate risks. The HMPC noted that the California Building Code has appropriately addressed most local concerns. The Amador County Building Official noted that the chief concern would be foundation type concerns for habitable buildings. In the more developed western portion and the Kirkwood area located in the eastern portion of the County, which are generally the most vulnerable, new development is addressed appropriately by engineers and design professionals.

Amador County OES noted that Amador County has limited public transportation and the rural nature of the County means not everyone has an opportunity to use it. Further, and also due to the rural nature of Amador County, cellular coverage is lacking, or spotty in large swaths which can complicate emergency response efforts, and/or create situations where residents do not receive emergency notifications. This could cause issues during an earthquake emergency.

Finally, the County noted that given that they are in a fairly aseismic areas, one of the major concerns is if a big earthquake hits the Bay Area or other highly populated seismically active areas. There is concern that folks there will flee to Amador. This would cause housing and sheltering issues in the County.

Local concerns for each of the jurisdictions can be found under the Local Concerns heading in each respective jurisdictional annex to this LHMP Update.

Assets at Risk

Assets at risk from earthquake include people and populations; structures; critical facilities and infrastructure and community lifelines; natural, historic, and cultural resources; and economic assets and

community activities of value. These are discussed in the following sections for the Amador County Planning Area and unincorporated Amador County.

People and Populations

All people and populations are at risk from earthquake shaking. Those at heightened risk include:

- The unsheltered
- Infants and children under age five and their caregivers
- Elderly (65 and older)
- Individuals with disabilities
- Individuals dependent on medical equipment
- Individuals with impaired mobility

The greatest risk to people and populations from earthquake is death and injury. More information on people and populations at risk to earthquake shaking events can be seen in the Hazus scenarios developed for this LHMP and described in the Hazus Analysis section below.

Structures

All structures in the Amador County Planning Area are vulnerable to earthquakes, depending on the severity and location of the shake. Older buildings, unreinforced masonry and soft story buildings are at a much greater risk to earthquakes. More information on structures at risk can be seen in the Hazus scenarios below.

Critical Facilities and Infrastructure

Earthquakes present a tremendous threat to critical facilities and infrastructure. More information on structures at risk can be seen in the Hazus scenarios below.

Natural, Historic, and Cultural Resources

The 2023 State Hazard Mitigation Plan noted that environmental problems from earthquakes can be numerous. Earthquakes can significantly damage surrounding habitats. It is also possible for earthquakes to reroute streams, which can change the water quality, possibly damaging habitat and feeding areas. Streams fed by groundwater and/or springs may dry up because of changes in underlying geology. Another threat to the environment from earthquakes is the potential release of hazardous materials. Historical and cultural resources are at risk, often due to their age and construction types. The Hazus scenarios below are relatively silent on the vulnerability to natural, historic, and cultural resources, but impacts to these resources could be long lasting.

Hazus Analysis

Earthquake losses will vary across the Amador County Planning Area depending on the source and magnitude of the event. To further evaluate potential losses associated with earthquake activity in the

Planning Area, three Hazus-MH earthquake scenarios were run for this 2025 LHMP Update as detailed below.

FEMA's Hazus model, utilizing GIS technology, estimates potential losses from earthquakes by analyzing the built environment, including buildings, infrastructure, and population, along with hazard data and damage functions. The model incorporates inventory information about buildings, infrastructure (roads, utilities, etc.), and population to assess the potential impact of a hazard. It uses hazard-specific data, such as earthquake intensity and employs damage functions that relate the intensity of the hazard to the level of damage to buildings and infrastructure based on research and historical data. By combining the inventory, hazard, and damage function data, HAZUS estimates the potential losses in terms of direct physical damage, induced damage, and direct losses (e.g., building damage, debris generation, casualty rates, economic impacts). The results of HAZUS analysis can be used to identify vulnerable areas, prioritize mitigation actions, and develop disaster preparedness plans.

Hazus-MH 6.1 was utilized to model earthquake losses for the County. Level 1 analyses were run, meaning that only the default data was used and not supplemented with local building inventory or hazard data. This is a planning level analysis.

HAZUS Level 1 Runs

General Description of the Region: Amador County, California

- The geographical size of the region is 606.83 square miles and contains 10 census tracts.
- There are over 15 thousand households in the region which has a total population of 40,474 people.
- There are an estimated 17 thousand buildings in the region with a total building replacement value (excluding contents) of 8,125 (millions of dollars). Approximately 90.00 % of the buildings (and 69.00% of the building value) are associated with residential housing.
- The replacement value of the transportation and utility lifeline systems is estimated to be 2,267 and 2,439 (millions of dollars), respectively.

Hazus Scenarios

These events were chosen from data gathered from the Amador County General Plan Safety Element and the USGS' seismic scenarios catalog. For deterministic Hazus scenarios, a single scenario event is selected based on a specific fault, the epicenter location, and the potential magnitude of the event.

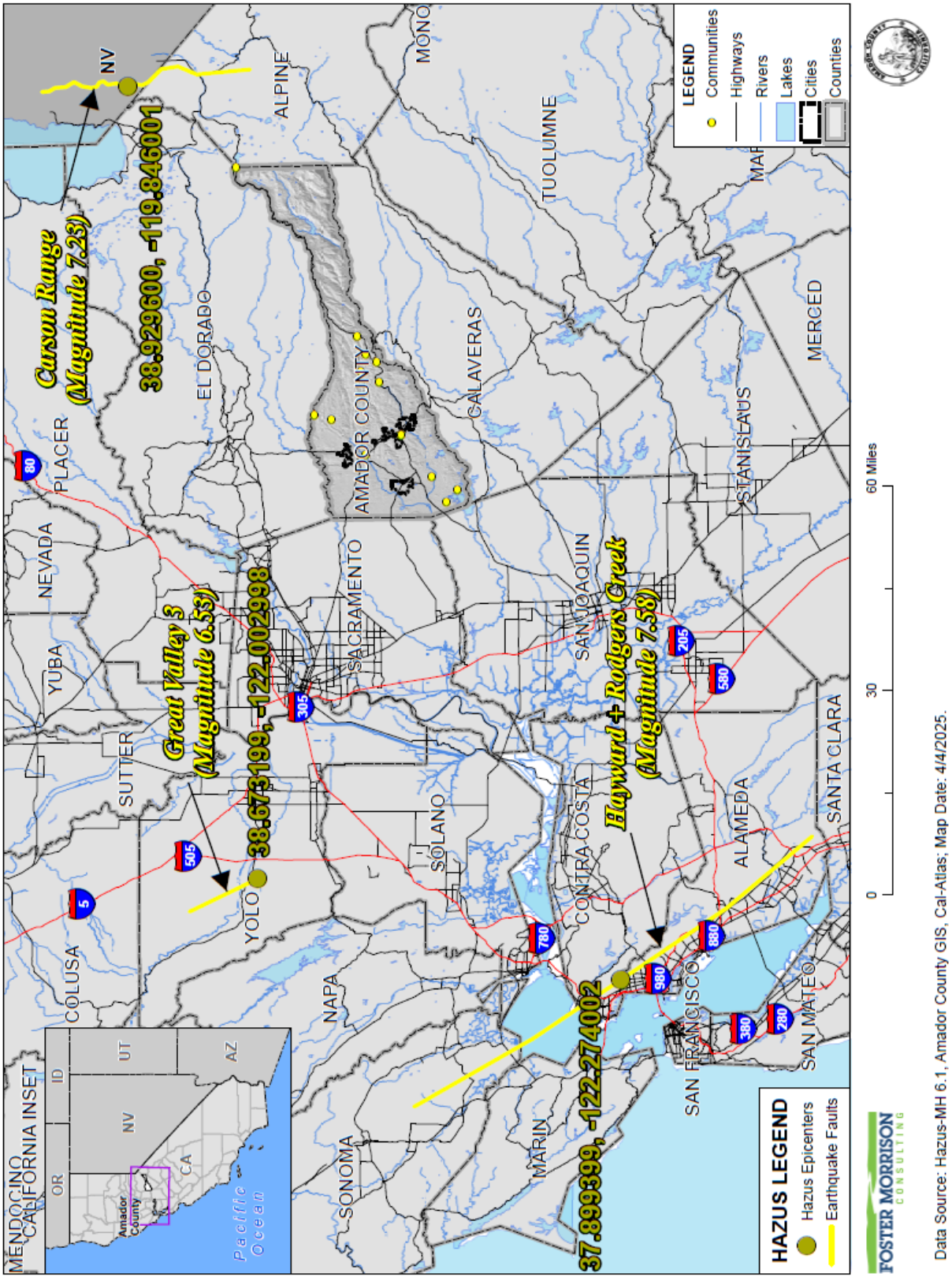
Table 4-93 Hazus Scenario Data from the USGS Earthquake Hazards Program Catalog

Hazus Fault Info	Hazus Catalog Information
Earthquake Fault	**Carson Range**
Epicenter	38.929600 , -119.846001
Scenario	Carson Range7.2M
Ruptures	Carson Range fault
Location	Carson Range-Kings Canyon fault
Magnitude	7.23
MMI	8.69

Hazus Fault Info	Hazus Catalog Information
Event ID	bssc20141285_1654_m7p23_se
Earthquake Fault	**Great Valley 3**
Epicenter	38.673199 , -122.002998
Scenario	Great Valley 03a Dunnigan Hills
Ruptures	Great Valley 03a Dunnigan Hills
Location	Great Valley 03a Dunnigan Hills
Magnitude	6.53
MMI	8.42
Event ID	bssc2014greatvalley03adunnig_m6p53_se
URL	https://earthquake.usgs.gov/scenarios/eventpage/bssc2014greatvalley03adunnig_m6p53_se/origin/detail
Earthquake Fault	**Hayward + Rodgers Creek**
Epicenter	37.899399 , -122.274002
Scenario	DETERM SH_NH_RC 7.58M EQ CT
Ruptures	Hayward: RC+HN+HS+HE
Location	Hayward: RC+HN+HS+HE
Magnitude	7.58
MMI	8.97
Event ID	bssc2014haywardrchnhsheshaw0_m7p58_se
URL	https://earthquake.usgs.gov/scenarios/eventpage/bssc2014haywardrchnhsheshaw0_m7p58_se/executive

These Hazus scenarios can be seen on Figure 4-85 and are captured in totality in Appendix H.

Figure 4-85 Amador County Planning Area – Hazus Earthquake Faults and Epicenter Locations



Carson Range Fault 7.23 Hazus Scenario

The Carson Range Fault deterministic scenario was developed utilizing data from the County General Plan and based on a seismic scenario obtained from the USGS seismic scenario catalog.

The results of the deterministic scenario are captured in Table 4-94. Key losses included the following:

- Total economic loss estimated for the earthquake was $59,140,000, which includes building losses and lifeline losses based on the Hazus-MH inventory.
- The total building-related losses were $5,870,000; 16 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 53 % of the total loss.
- 27 buildings in the County were at least moderately damaged. No buildings were completely destroyed.
- Before the earthquake, the region had 52 hospital beds available for use. On the day of the earthquake, the model estimates that only 51 hospital beds (98.00%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, 100.00% of the beds will be back in service.
- Regardless of the time of earthquake, none had casualties.
- No households experienced a loss of potable water the first day after the earthquake.
- No households experienced a loss of electricity the first day after the earthquake.

Table 4-94 Amador County Planning Area – Carson Range Fault 7.23 Magnitude Deterministic Scenario Results

Type of Impact	Carson Range 7.23 Deterministic Scenario
Total Buildings Damaged (based on 17,747 buildings)	Slight: 231 Moderate: 26 Extensive: 1 Complete: 0
Building and Income Related Losses	$5,870,000
Total Economic Losses (Includes building, income and lifeline losses)	$59,140,000
Casualties (Based on 2 a.m. time of occurrence)	Without requiring hospitalization: 0 Requiring hospitalization: 0 Life threatening: 0 Fatalities: 0
Casualties (Based on 2 p.m. time of occurrence)	Without requiring hospitalization: 1 Requiring hospitalization: 0 Life threatening: 0 Fatalities: 0
Casualties (Based on 5 p.m. time of occurrence)	Without requiring hospitalization: 0 Requiring hospitalization: 0 Life threatening: 0 Fatalities: 0
Damage to Transportation Systems	None with at least moderate damage
Damage to Essential Facilities	None with at least moderate damage

Type of Impact	Carson Range 7.23 Deterministic Scenario	
Damage to Utility Systems	No facilities with at least moderate damage. 3 potable water line breaks, 2 wastewater line breaks, and 0 natural gas line breaks.	
Households without Power/Water Service (Based on 15,678 total households)	Power loss, Day 1: 0 Power loss, Day 3: 0 Power loss, Day 7: 0 Power loss, Day 30: 0 Power loss, Day 90: 0	Water loss, Day 1: 0 Water loss, Day 3: 0 Water loss, Day 7: 0 Water loss, Day 30: 0 Water loss, Day 90: 0
Displaced Households	0 displaced households	
Shelter Requirements	0 persons	
Debris Generation	0 tons	

Source: Hazus 6.1

Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. Hazus uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 0 ignitions that will burn about 0.00 sq. mi 0.00 % of the region's total area.). The model also estimates that the fires will displace about 0 people and burn about 0 (millions of dollars) of building value.

Figure 4-86 shows the peak ground acceleration due to the Carson Range 7.23 earthquake. Figure 4-87 shows the total losses by census tract in Amador County due to the Carson Range 7.23 earthquake.

Figure 4-86 Amador County Planning Area – Carson Range 7.23 Magnitude Peak Ground Accelerations

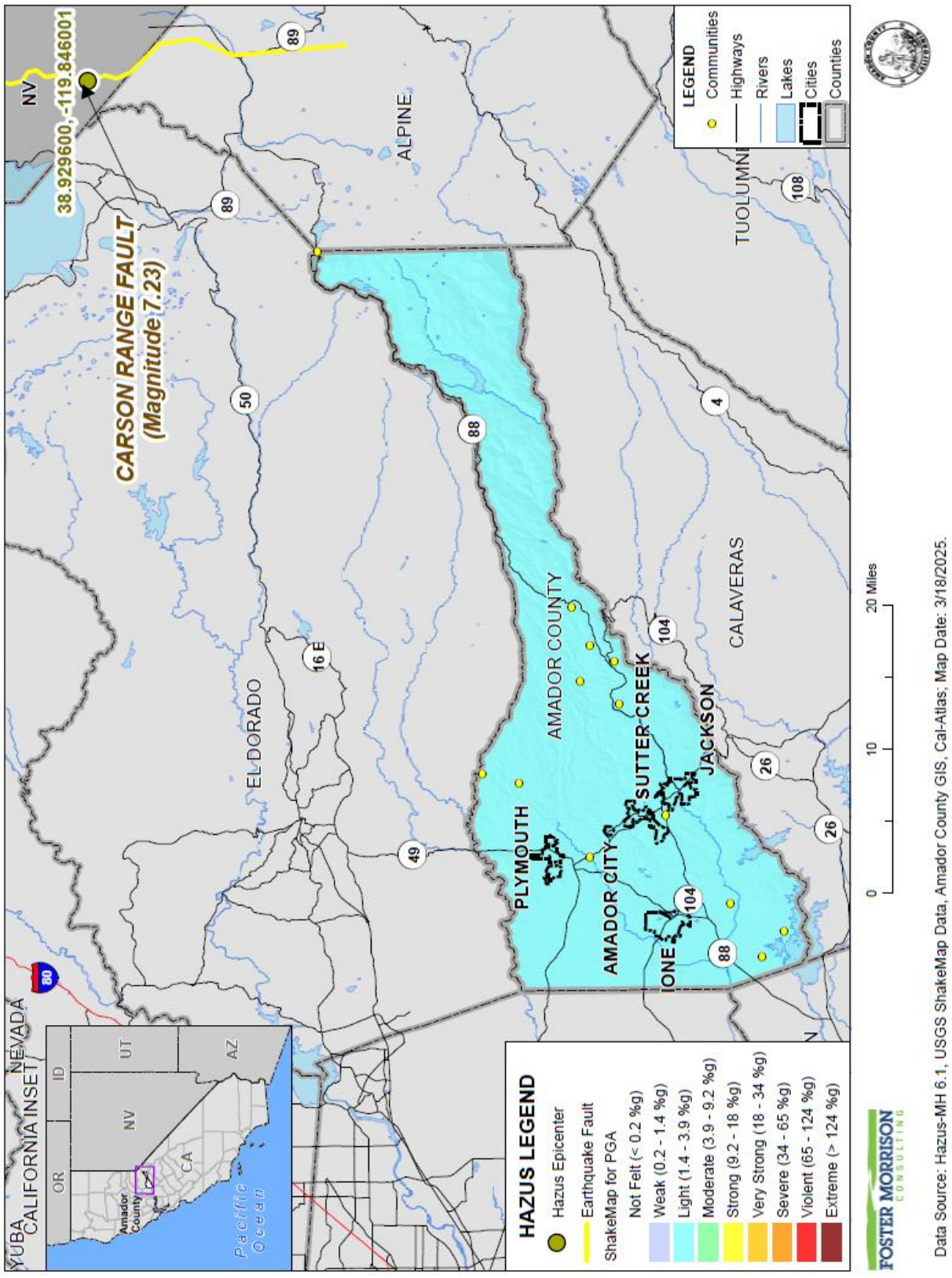
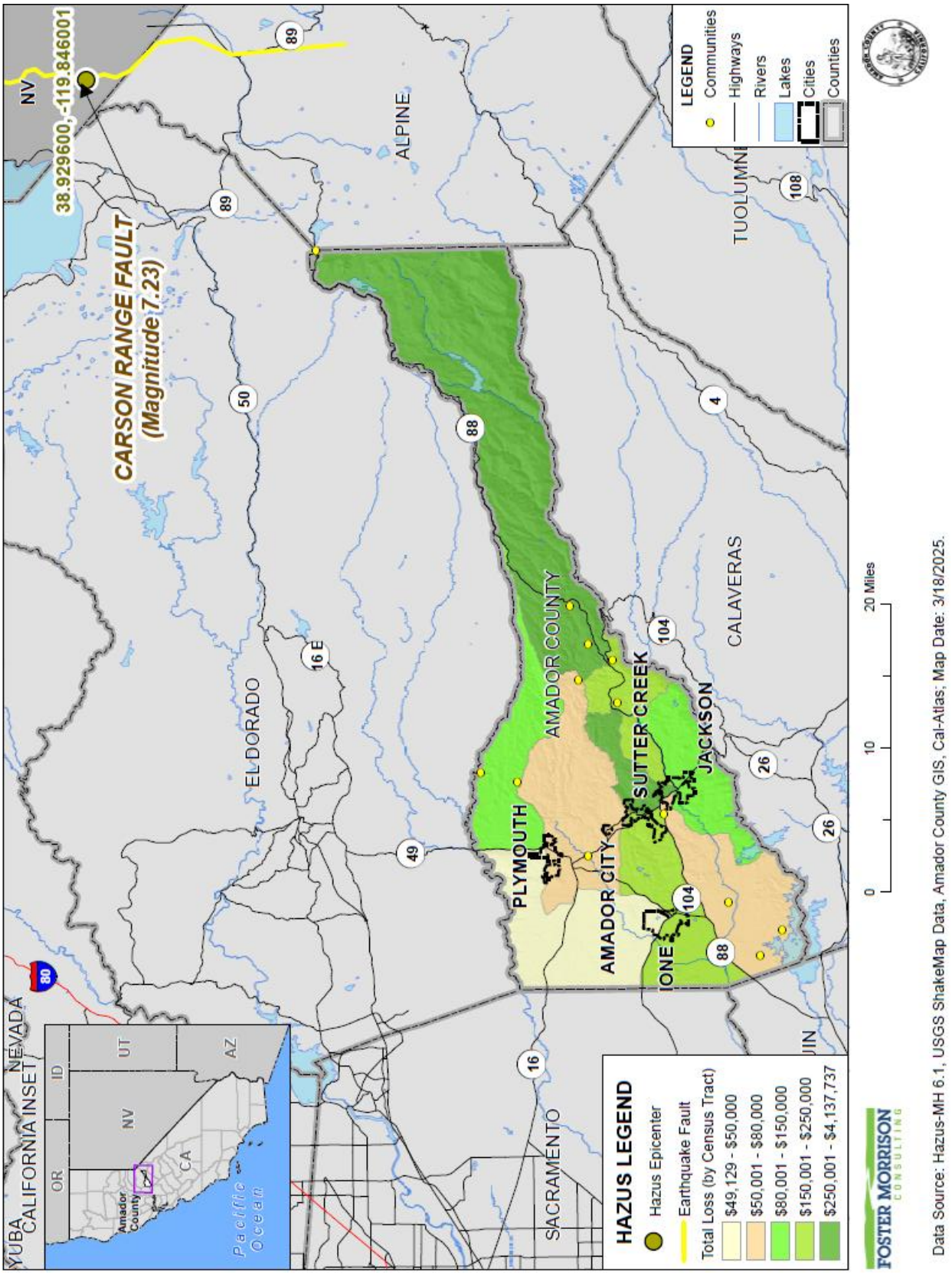


Figure 4-87 Amador County Planning Area – Carson Range 7.23 Magnitude Hazus Total Loss



Great Valley Fault 6.53 Hazus Scenario

The Great Valley Fault deterministic scenario was developed utilizing data from the County General Plan and based on a seismic scenario obtained from the USGS seismic scenario catalog.

The results of the deterministic scenario are captured in Table 4-95. Key losses included the following:

- Total economic loss estimated for the earthquake was $2,090,000, which includes building losses and lifeline losses based on the Hazus-MH inventory.
- The total building-related losses were $1,310,000; 23% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 53 % of the total loss.
- 6 buildings in the County were at least moderately damaged. No buildings were completely destroyed.
- Before the earthquake, the region had 52 hospital beds available for use. On the day of the earthquake, the model estimates that only 51 hospital beds (98.00%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, 100.00% of the beds will be back in service.
- Regardless of the time of earthquake, none had casualties.
- No households experienced a loss of potable water the first day after the earthquake.
- No households experienced a loss of electricity the first day after the earthquake.

Table 4-95 Amador County Planning Area – Great Valley Fault 6.53 Magnitude Deterministic Scenario Results

Type of Impact	Great Valley 6.53 Deterministic Scenario
Total Buildings Damaged (based on 17,747 buildings)	Slight: 51 Moderate: 6 Extensive: 0 Complete: 0
Building and Income Related Losses	$2,090,000
Total Economic Losses (Includes building, income and lifeline losses)	$1,310,000
Casualties (Based on 2 a.m. time of occurrence)	Without requiring hospitalization: 0 Requiring hospitalization: 0 Life threatening: 0 Fatalities: 0
Casualties (Based on 2 p.m. time of occurrence)	Without requiring hospitalization: 0 Requiring hospitalization: 0 Life threatening: 0 Fatalities: 0
Casualties (Based on 5 p.m. time of occurrence)	Without requiring hospitalization: 0 Requiring hospitalization: 0 Life threatening: 0 Fatalities: 0
Damage to Transportation Systems	None with at least moderate damage
Damage to Essential Facilities	None with at least moderate damage

Type of Impact	Great Valley 6.53 Deterministic Scenario	
Damage to Utility Systems	No facilities with at least moderate damage. 1 potable water line breaks, 0 wastewater line breaks, and 0 natural gas line breaks.	
Households without Power/Water Service (Based on 15,678 total households)	Power loss, Day 1: 0 Power loss, Day 3: 0 Power loss, Day 7: 0 Power loss, Day 30: 0 Power loss, Day 90: 0	Water loss, Day 1: 0 Water loss, Day 3: 0 Water loss, Day 7: 0 Water loss, Day 30: 0 Water loss, Day 90: 0
Displaced Households	0 displaced households	
Shelter Requirements	0 persons	
Debris Generation	0 tons	

Source: Hazus 6.1

Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. Hazus uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 0 ignitions that will burn about 0.00 sq. mi 0.00 % of the region's total area.). The model also estimates that the fires will displace about 0 people and burn about 0 (millions of dollars) of building value.

Figure 4-88 shows the peak ground acceleration due to the Great Valley 6.53 earthquake. Figure 4-89 shows the total losses by census tract in Amador County due to the Great Valley 6.53 earthquake.

Figure 4-88 Amador County Planning Area – Great Valley 6.53 Magnitude Hazus Peak Ground Acceleration

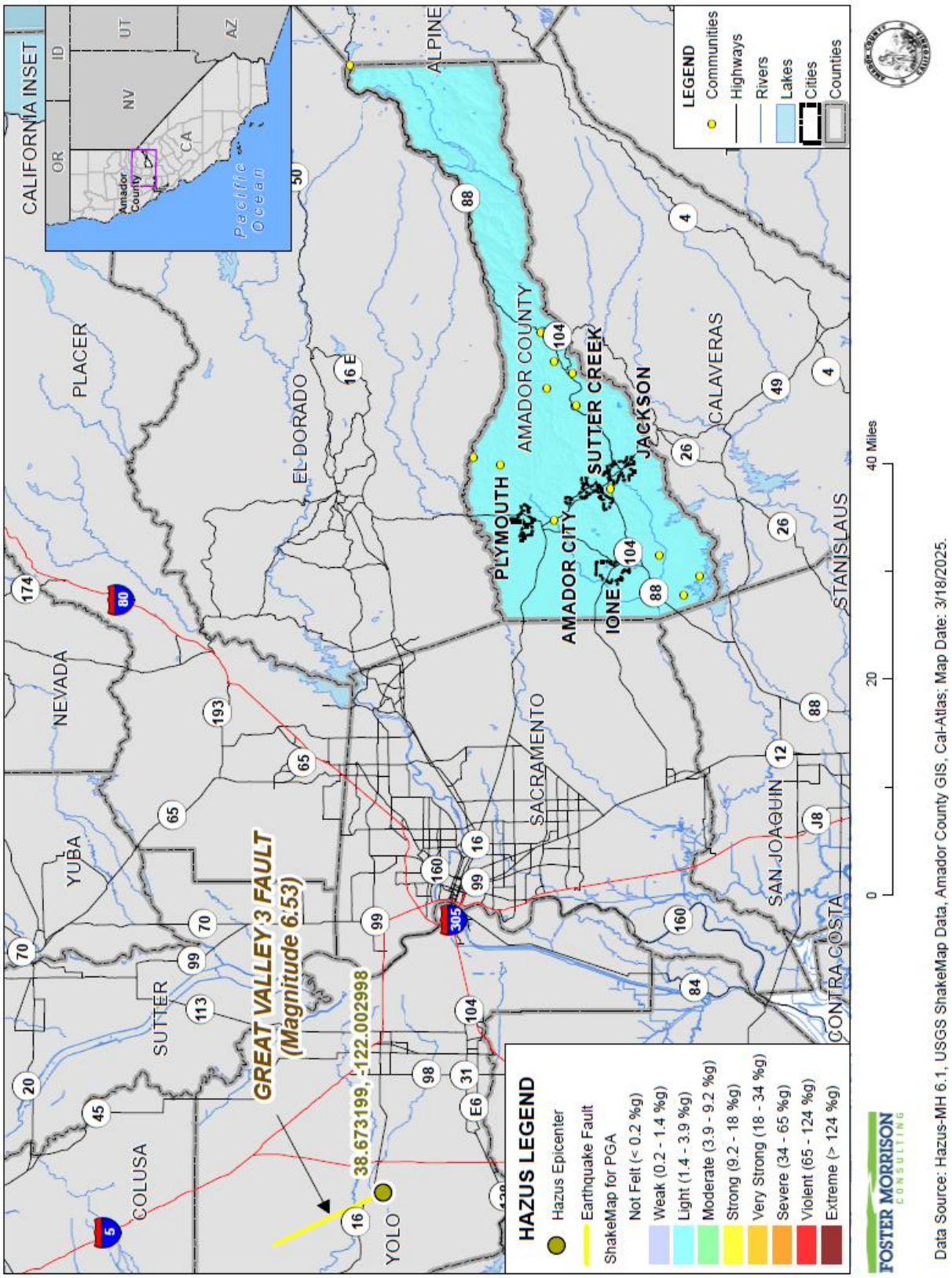
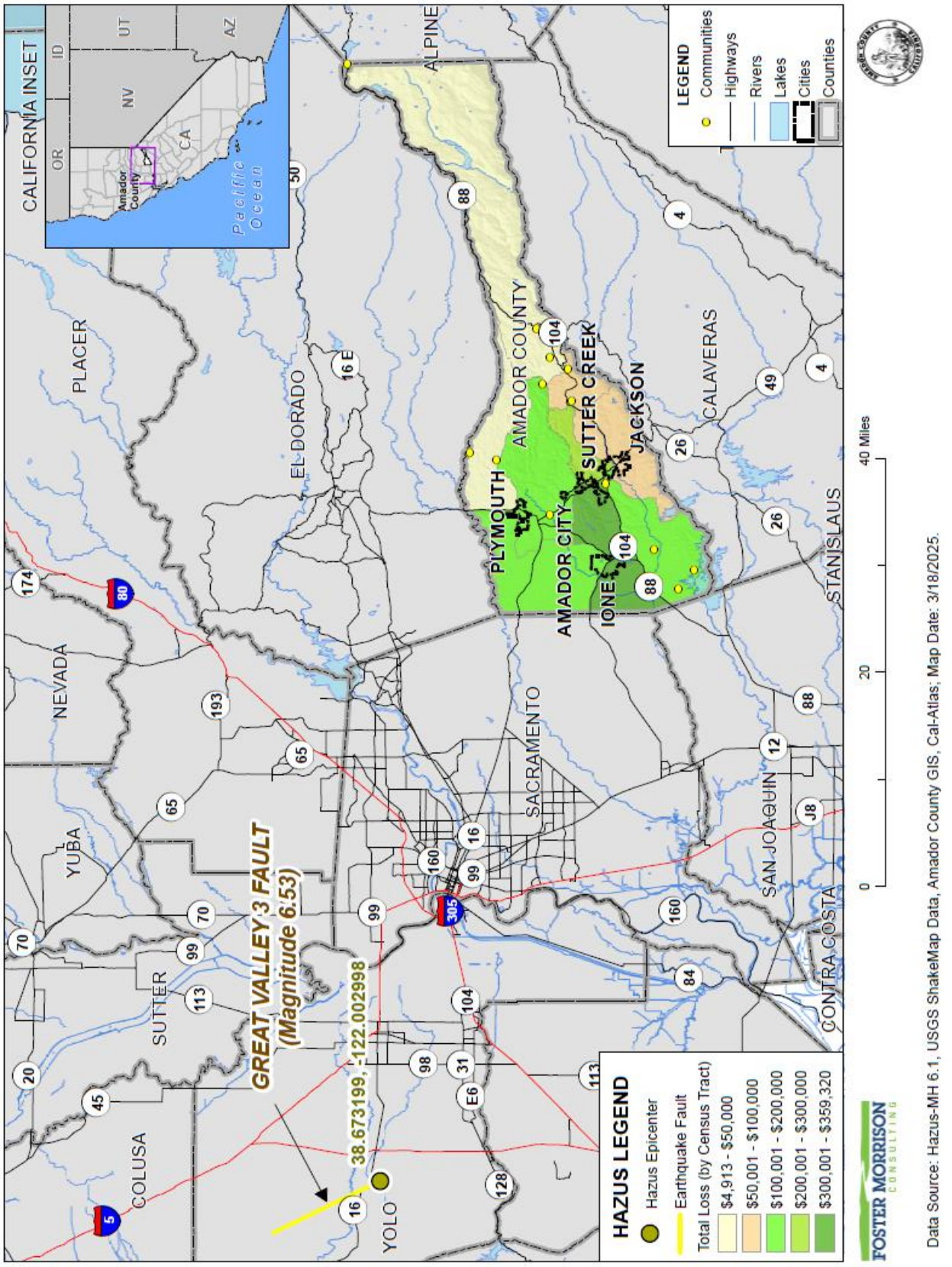


Figure 4-89 Amador County Planning Area – Great Valley 6.53 Magnitude Hazus Total Loss



Hayward + Rogers Creek 7.58 Hazus Scenario

The Great Valley Fault deterministic scenario was developed utilizing data from the County General Plan and based on a seismic scenario obtained from the USGS seismic scenario catalog.

The results of the probabilistic scenario are captured in Table 4-96. Key losses included the following:

- Total economic loss estimated for the earthquake was $9,930,000, which includes building losses and lifeline losses based on the Hazus-MH inventory.
- The total building-related losses were $3,680,000; 19% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 53 % of the total loss.
- 27 buildings in the County were at least moderately damaged. No buildings were completely destroyed.
- Before the earthquake, the region had 52 hospital beds available for use. On the day of the earthquake, the model estimates that only 51 hospital beds (98.00%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, 100.00% of the beds will be back in service.
- Regardless of the time of earthquake, none had casualties.
- No households experienced a loss of potable water the first day after the earthquake.
- No households experienced a loss of electricity the first day after the earthquake.

Table 4-96 Amador County Planning Area – Hayward + Rodgers Creek 7.58 Probabilistic Scenario Results

Type of Impact	Hayward + Rogers Creek 7.58 Deterministic Scenario
Total Buildings Damaged (based on 17,747 buildings)	Slight: 127 Moderate: 16 Extensive: 1 Complete: 0
Building and Income Related Losses	$5,870,000
Total Economic Losses (Includes building, income and lifeline losses)	$9,930,000
Casualties (Based on 2 a.m. time of occurrence)	Without requiring hospitalization: 0 Requiring hospitalization: 0 Life threatening: 0 Fatalities: 0
Casualties (Based on 2 p.m. time of occurrence)	Without requiring hospitalization: 0 Requiring hospitalization: 0 Life threatening: 0 Fatalities: 0
Casualties (Based on 5 p.m. time of occurrence)	Without requiring hospitalization: 0 Requiring hospitalization: 0 Life threatening: 0 Fatalities: 0
Damage to Transportation Systems	None with at least moderate damage
Damage to Essential Facilities	None with at least moderate damage

Type of Impact	Hayward + Rogers Creek 7.58 Deterministic Scenario	
Damage to Utility Systems	No facilities with at least moderate damage. 3 potable water line breaks, 1 wastewater line breaks, and 0 natural gas line breaks.	
Households without Power/Water Service (Based on 15,678 total households)	Power loss, Day 1: 0 Power loss, Day 3: 0 Power loss, Day 7: 0 Power loss, Day 30: 0 Power loss, Day 90: 0	Water loss, Day 1: 0 Water loss, Day 3: 0 Water loss, Day 7: 0 Water loss, Day 30: 0 Water loss, Day 90: 0
Displaced Households	0 displaced households	
Shelter Requirements	0 persons	
Debris Generation	0 tons	

Source: Hazus 6.1

Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. Hazus uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 0 ignitions that will burn about 0.00 sq. mi 0.00 % of the region's total area.). The model also estimates that the fires will displace about 0 people and burn about 0 (millions of dollars) of building value.

Figure 4-86 shows the peak ground acceleration due to the Hayward + Rodgers Creek 7.58 earthquake. Figure 4-91 shows the total losses by census tract in Amador County due to the Hayward + Rodgers Creek 7.58 earthquake.

Figure 4-90 Amador County Planning Area – Hayward + Rogers Creek 7.58 Magnitude Hazus Peak Ground Acceleration

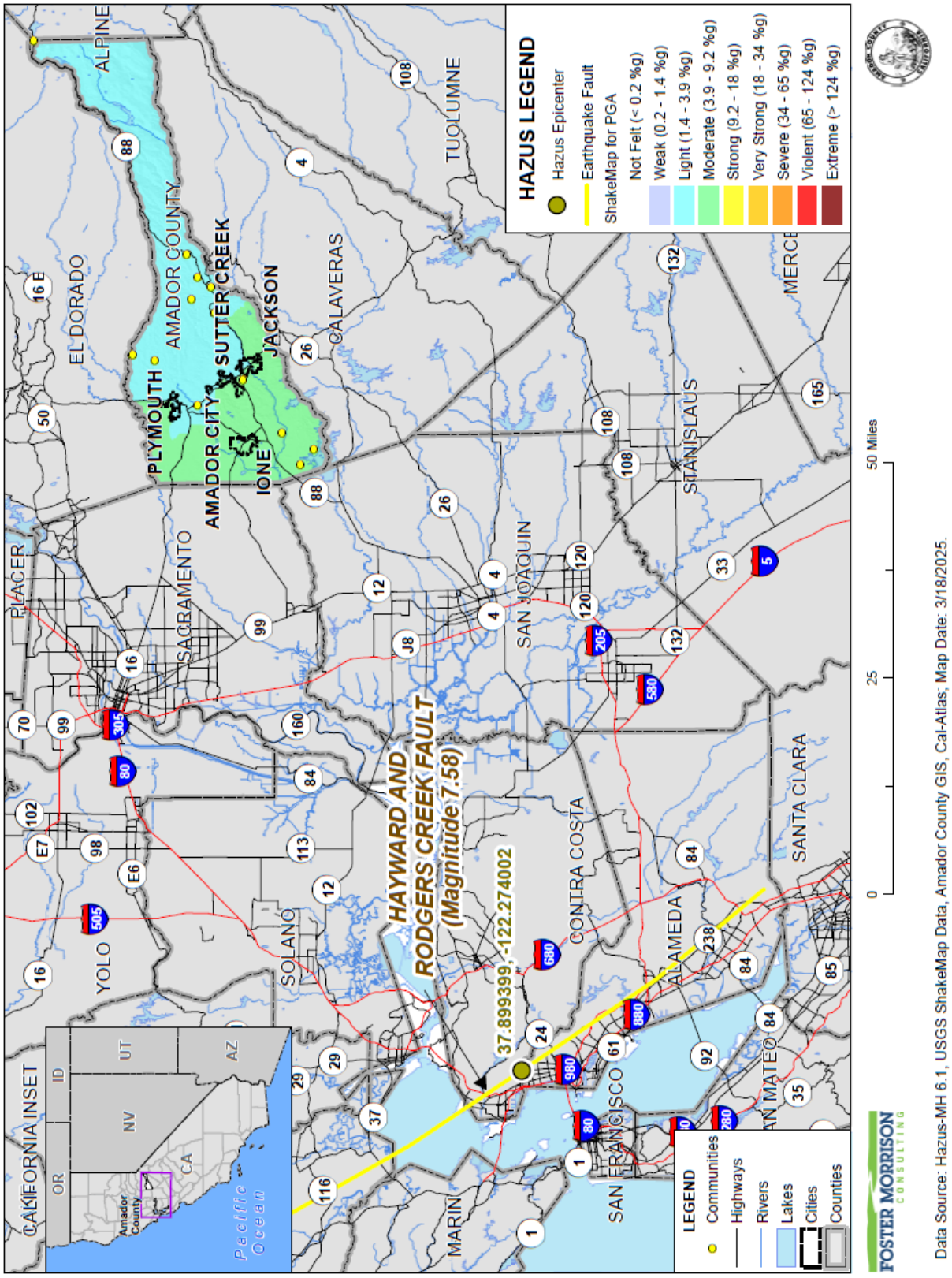
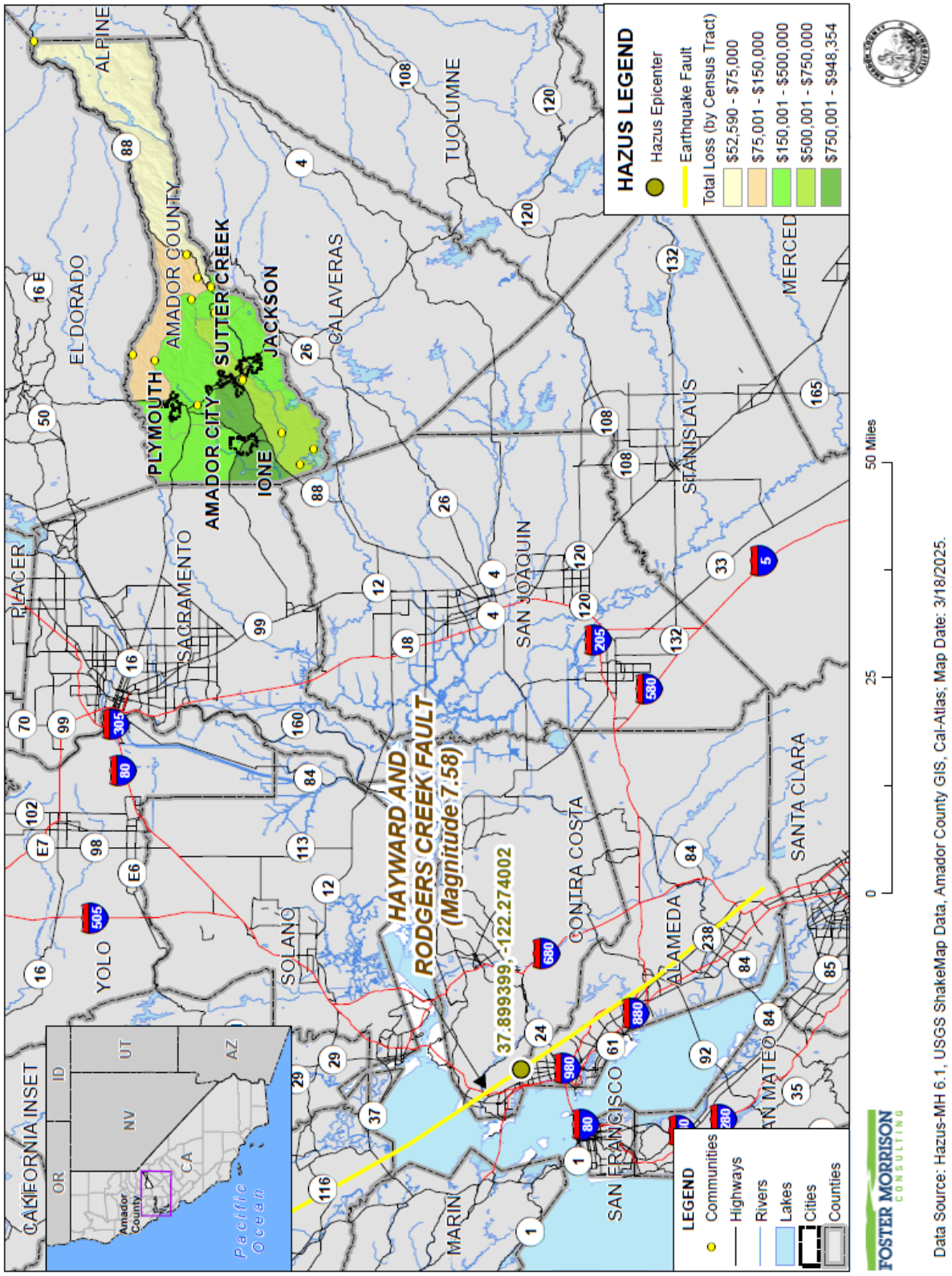


Figure 4-91 Amador County Planning Area – Hayward + Rogers Creek 7.58 Magnitude Hazus Total Loss



Hazus Scenario Comparisons

A comparison of the results of the three Hazus scenarios is shown on Table 4-97. Each of these reports are shown in their totality in Appendix H.

Table 4-97 Amador County – Comparison of Hazus Scenarios

Type of Impact	Carson Range 7.23 Deterministic Scenario		Great Valley 6.53 Deterministic Scenario		Hayward + Rogers Creek 7.58 Deterministic Scenario	
Total Buildings Damaged (based on 17,747 buildings)	Slight: 231 Moderate: 26 Extensive: 1 Complete: 0		Slight: 51 Moderate: 6 Extensive: 0 Complete: 0		Slight: 127 Moderate: 16 Extensive: 1 Complete: 0	
Building and Income Related Losses	$5,870,000		$2,090,000		$5,870,000	
Total Economic Losses (Includes building, income and lifeline losses)	$59,140,000		$1,310,000		$9,930,000	
Casualties (Based on 2 a.m. time of occurrence)	Without requiring hospitalization: 0 Requiring hospitalization: 0 Life threatening: 0 Fatalities: 0		Without requiring hospitalization: 0 Requiring hospitalization: 0 Life threatening: 0 Fatalities: 0		Without requiring hospitalization: 0 Requiring hospitalization: 0 Life threatening: 0 Fatalities: 0	
Casualties (Based on 2 p.m. time of occurrence)	Without requiring hospitalization: 1 Requiring hospitalization: 0 Life threatening: 0 Fatalities: 0		Without requiring hospitalization: 0 Requiring hospitalization: 0 Life threatening: 0 Fatalities: 0		Without requiring hospitalization: 0 Requiring hospitalization: 0 Life threatening: 0 Fatalities: 0	
Casualties (Based on 5 p.m. time of occurrence)	Without requiring hospitalization: 0 Requiring hospitalization: 0 Life threatening: 0 Fatalities: 0		Without requiring hospitalization: 0 Requiring hospitalization: 0 Life threatening: 0 Fatalities: 0		Without requiring hospitalization: 0 Requiring hospitalization: 0 Life threatening: 0 Fatalities: 0	
Damage to Transportation Systems	None with at least moderate damage		None with at least moderate damage		None with at least moderate damage	
Damage to Essential Facilities	None with at least moderate damage		None with at least moderate damage		None with at least moderate damage	
Damage to Utility Systems	No facilities with at least moderate damage. 3 potable water line breaks, 2 wastewater line breaks, and 0 natural gas line breaks.		No facilities with at least moderate damage. 1 potable water line breaks, 0 wastewater line breaks, and 0 natural gas line breaks.		No facilities with at least moderate damage. 3 potable water line breaks, 1 wastewater line breaks, and 0 natural gas line breaks.	
Households without Power/Water Service (Based on 15,678 total households)	Power loss, Day 1: 1,427 Power loss, Day 3: 802	Water loss, Day 1: 0 Water loss, Day 3: 0	Power loss, Day 1: 0 Power loss, Day 3: 0	Water loss, Day 1: 0 Water loss, Day 3: 0	Power loss, Day 1: 0 Power loss, Day 3: 0	Water loss, Day 1: 0 Water loss, Day 3: 0

Type of Impact	Carson Range 7.23 Deterministic Scenario		Great Valley 6.53 Deterministic Scenario		Hayward + Rogers Creek 7.58 Deterministic Scenario	
	Power loss, Day 7: 272 Power loss, Day 30: 16 Power loss, Day 90: 2	Water loss, Day 7: 0 Water loss, Day 30: 0 Water loss, Day 90: 0	Power loss, Day 7: 0 Power loss, Day 30: 0 Power loss, Day 90: 0	Water loss, Day 7: 0 Water loss, Day 30: 0 Water loss, Day 90: 0	Power loss, Day 7: 0 Power loss, Day 30: 0 Power loss, Day 90: 0	Water loss, Day 7: 0 Water loss, Day 30: 0 Water loss, Day 90: 0
Displaced Households	0 displaced households		0 displaced households		0 displaced households	
Shelter Requirements	0 persons		0 persons		0 persons	
Debris Generation	0 tons		0 tons		0 tons	

Source: Hazus 6.1

FEMA NRI Hazard Vulnerability Assessment

The FEMA NRI was queried for additional specific data on Amador County's vulnerability to earthquakes. The NRI contains data and analysis for 18 separate natural hazards, including earthquakes. As shown in Table 4-98, earthquakes could cause a total of $1,188,592 in expected annual losses, with a historic loss rating of relatively low. Earthquake has a relatively moderate rating for both social vulnerability and community resilience, with a risk index score of 82.4 out of 100. According to the NRI, there have been 0 earthquake events during the 2021 dataset with a 0.32% annual chance per year.

Table 4-98 Amador County Planning Area – Earthquake Vulnerability Ratings from FEMA NRI

NRI Hazard	Hazard Risk Index Rating*	Expected Annual Loss Values (total)**	Exposure Value (total)***	Historic Loss Ratio Rating
Earthquake	82.4	$1,188,592	$477,624,156,000	Relatively Low

Source: FEMA NRI Report, retrieved 4/1/2025.

*Hazard Risk Index is calculated using data for only a single hazard type, and reflect a communities expected annual los value, community risk factors, and the adjustment factor used to calculate the risk value.

**Expected annual loss represents the average economic loss in dollars resulting from natural hazards each year.

***Exposure is a natural hazard consequence factor that is the representative value of buildings, populations, or agriculture potentially exposed to a natural hazard occurrence.

Additional information on the FEMA NRI can be found in Section 4.2 and Appendix G.

Impacts from Earthquake

Earthquakes can strike without warning and cause dramatic changes to the landscape of an area that can have devastating impacts on the built environment. The greatest impact is to life safety of Amador County residents and visitors. Earthquakes can cause loss of life and injuries in affected areas. Other impacts to the Amador County Planning Area would include damages to infrastructure such as roads, bridges, and dams; damages and loss of services to utilities and critical infrastructure, including those related to gas, power, water, wastewater and communication systems; and damages to structures and other development.

Earthquakes can also cause failure of dams, levees, and reservoirs. Facilities and land downslope from dams or water reservoirs or behind levees might be subject to flooding, if the dams, reservoirs, or levees fail as a result of an earthquake. The County has locations with significant flood risk that include facilities downslope from dams or reservoirs or behind levees.

Impacts that are not quantified, but can be anticipated in large future events, include:

- Injury and loss of life;
- Commercial and residential structural and property damage;
- Disruption of and damage to public infrastructure, utilities, and services;
- Damage to roads/bridges resulting in loss of mobility;
- Significant economic impact (jobs, sales, tax revenue) to the community; and
- Negative impact on commercial and residential property values

Impacts to identified assets at risk to this hazard and the overall vulnerability of the County may be affected in the future by climate change (which was discussed in the hazard profile section above), changes in population patterns, and changes in land use and development. The influencing effects of these factors on this hazard are discussed further in the Future Conditions/Future Development discussion below.

Future Conditions/Future Development

Future hazard conditions may be affected by climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. Findings on this for Amador County include the following:

- Climate change is likely to have no effect on future earthquake conditions and associated impacts and vulnerability of the County.
- Population growth in Amador County has recently slowed, but is expected to continue slowly going forward. Any additional growth in the County would place additional populations at risk to earthquake. Additional population growth would likely bring continued diversity to the County. Vulnerable population groups could face disproportionate effects from an earthquake and should be planned for. Changes in population and population patterns may or may not increase the impacts and vulnerability of the County to this hazard depending on the location and nature of growth and continued planning for future hazard conditions.
- Land use planning should be proactive to address future hazard conditions. County building codes are in effect to reduce structure damage, including damage to critical facilities and infrastructure, and should be updated as necessary to continue to address future earthquake conditions. Depending on the location of new development and adherence to protective building codes, changes in land use and development may or may not increase the impacts and associated vulnerabilities of the County to this hazard.

Future development considerations should be ongoing and proactive. Ensuring that comprehensive land use planning is conducted, regulatory requirements, such as building codes, are followed, and varying needs for different demographic groups with intersecting identities that reside within the County are considered can help to make for a more resilient community. Although new growth and development corridors would

fall in the area affected by earthquake, given the small chance of major earthquake and the building codes in effect, development in the earthquake area will continue to occur.

4.3.12. Flood: 1%/0.2% Annual Chance (w/Levee Failure)

Hazard Profile

This hazard profile contains multiple sections that detail how this hazard can affect the Amador County Planning Area. These sections include a hazard/problem description; description of location and extent; past occurrences of this hazard; likelihood of future occurrence, and how climate change can affect or influence this hazard.

Hazard/Problem Description

Flooding is the rising and overflowing of a body of water onto normally dry land. Floods are among the costliest natural disasters in terms of human hardship and economic loss nationwide. Floods can cause substantial damage to structures, landscapes, and utilities and can cause life safety issues. Floods can be extremely dangerous. Six inches of moving water can knock over a person given a strong current. A car will float in less than two feet of moving water and can be swept downstream into deeper waters. Floods kill more people trapped in vehicles than anywhere else.

During a flood, people can also suffer heart attacks or electrocution due to electrical equipment short outs. Floodwaters can transport large objects downstream which can damage or remove stationary structures, such as dam spillways. Ground saturation can result in instability, collapse, or other damage. Objects can also be buried or destroyed through sediment deposition. Floodwaters can also break utility lines and interrupt services. Standing water can cause damage to crops, roads, foundations, and electrical circuits. Direct impacts, such as drowning, can be limited with adequate warning and public education about what to do during floods. Where flooding occurs in populated areas, warning and evacuation will be of critical importance to reduce life and safety impacts from any type of flooding.

There are three primary types of freshwater flood events in the Amador County Planning Area: riverine and lake, flash flooding, and urban stormwater. Regardless of the type of flood, the cause is often the result of severe weather and excessive rainfall, either in the flood area or upstream reaches.

- **Riverine flooding** – Riverine flooding, defined as when a watercourse exceeds its "bank-full" capacity, generally occurs as a result of prolonged rainfall, or rainfall that is combined with already saturated soils from previous rain events. This type of flood occurs in river systems whose tributaries may drain large geographic areas and include one or more independent river basins. The onset and duration of riverine floods may vary from a few hours to many days. Factors that directly affect the amount of flood runoff include precipitation amount, intensity and distribution, the amount of soil moisture, seasonal variation in vegetation, snow depth, and water-resistance of the surface due to urbanization. In the Amador County Planning Area, riverine flooding is largely caused by heavy and continued rains, sometimes combined with snowmelt, and heavy flow from tributary streams. These intense storms can overwhelm the local waterways as well as the integrity of flood control structures. The warning time associated with slow rise floods assists in life and property protection.

- The term "**flash flood**" describes localized floods of great volume and short duration. In contrast to riverine flooding, this type of flood usually results from heavy rainfall on a relatively small drainage area. Precipitation of this sort usually occurs in the winter and spring. Flash floods often require immediate evacuation within the hour.
- **Stormwater/Urban** flood events have increased as land has been converted from fields or woodlands to roads and parking lots and lost its ability to absorb rainfall. Urbanization increases runoff by two to six times that of natural terrain. This is discussed in the Section 4.3.13 below.

In addition to the three types of flood events, there are two other types of flooding in Amador County: levee failure flooding and dam failure flooding. Regardless of the type of flood, the cause is often the result of severe weather and excessive rainfall, either in the flood area or upstream reach. The potential for flooding can change and increase through various land use changes and changes to land surface, resulting in a change to the floodplain. Environmental changes can create localized flooding problems in and outside of natural floodplains by altering or confining natural drainage channels. These changes are most often created by human activity.

Levee Failure

Levee failure flooding – A type of riverine flooding in Amador County is levee failure flooding. Levees reinforce the banks and help prevent flooding by containing higher flow events to the main stream channel. By confining the flow to a narrower steam channel, levees can also increase the speed of the water. Levees can be natural or man-made. A natural levee is formed when sediment settles on the stream bank, raising the level of the land around the stream. Levees provide strong flood protection, but they are not failsafe. Levees are designed to protect against a specific flood level and could be overtopped during severe weather events or dam failure. Levees reduce, not eliminate, the risk to individuals and structures located behind them. In the 2016 Amador County Flood Insurance Study, FEMA determined that there are no certified levees (i.e., levees providing 1% annual chance level of protection) that exist within Amador County. The FIS did note that although flood protection levees were built by the USACE along Sutter Creek in the City of Ione, the levees were not certified as providing protection from the 1% percent annual chance flood. In addition, flood and erosion-control retaining walls are located along Sutter Creek near the intersection of Preston and Main Streets; however, these structures also do not provide protection from the 1-percent annual chance flood. More information can be found in Ione's annex to this LHMP Update.

Dam Failure

The Amador County Planning Area is also at risk to flooding resulting from dams. Dam failure flooding is discussed separately in Section 4.3.9 of this document.

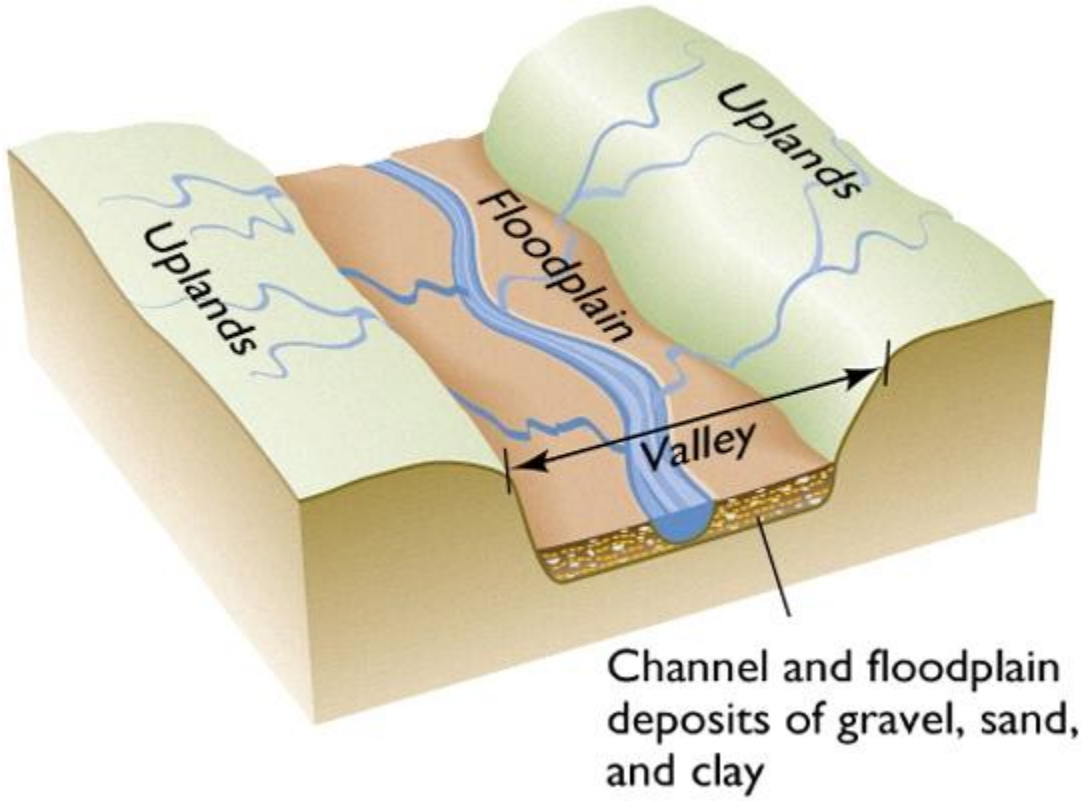
Location and Extent

Floodplains

The area adjacent to a channel is the floodplain (see Figure 4-92). Floodplains are illustrated on inundation maps, which show areas of potential flooding and water depths. In its common usage, the floodplain most often refers to that area that is inundated by the 1% annual chance (or 100-year) flood, the flood that has a one percent chance in any given year of being equaled or exceeded. The 1% annual chance flood is the

national minimum standard to which communities regulate their floodplains through the National Flood Insurance Program. The 500-year flood is the flood that has a 0.2% chance of being equaled or exceeded in any given year. The potential for flooding can change and increase through various land use changes and changes to land surface, which result in a change to the floodplain. A change in environment can create localized flooding problems inside and outside of natural floodplains by altering or confining natural drainage channels. These changes are most often created by human activity.

Figure 4-92 Floodplain Schematic



Source: FEMA

Hydrologic Regions

According to Cal DWR, California has 10 hydrologic regions. Amador County sits in the San Joaquin hydrologic region. This region encompasses the middle portion of the Central Valley bounded by the Sierra Nevada Mountains, the Coast Range, the divide between the American and Cosumnes river watersheds, and the divide between the San Joaquin and Kings River watersheds. The region also includes portions of the Sacramento-San Joaquin Delta. Although predominantly agricultural, this region has experienced increased urbanization in recent years and is subject to flooding from winter storm events and snowmelt.

A map of California's hydrological regions is provided in Figure 4-93.

Figure 4-93 California Hydrologic Regions



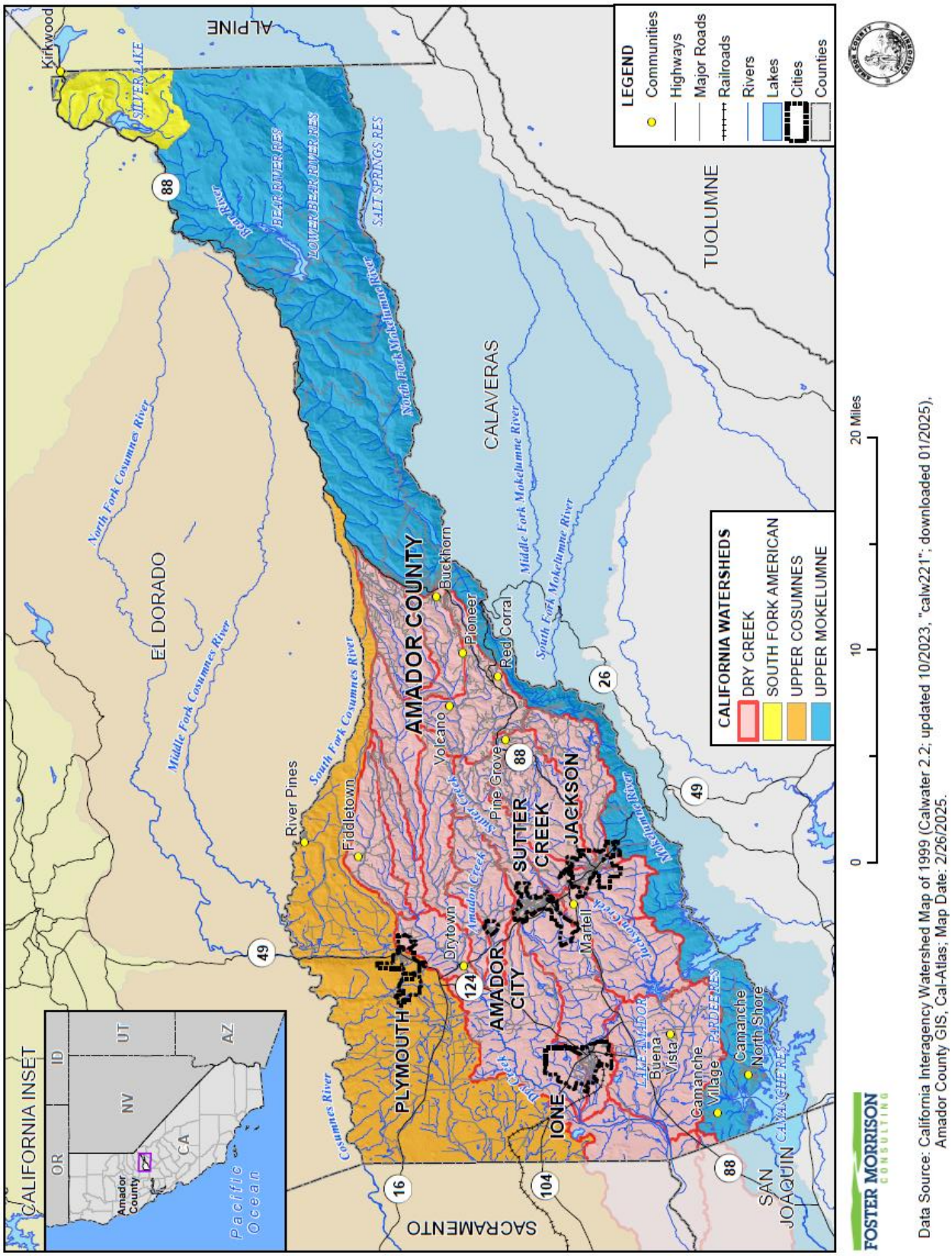
Source: California Department of Water Resources

The Amador County Waterway System

Amador County encompasses multiple rivers, streams, creeks, and associated watersheds. Amador County crosses three watersheds. Figure 4-94 illustrates the primary watersheds of Amador County, as well as the primary waterways in the County. These include the following watersheds:

- Dry Creek Watershed
- Mokelumne Creek
- Cosumnes Watershed

Figure 4-94 Primary Watersheds and Waterways of Amador County



Dry Creek Watershed

The Dry Creek watershed, an integral part of the Bay Delta System, covers more than 300 square miles, including 128 miles of streams, between the Upper Mokelumne River watershed and the Upper Cosumnes River, primarily in Amador County. The Creek flows west/southwest through the western slope of the foothills, joining with its two major tributaries, Sutter Creek and Jackson Creek along the way. It then flows to the floor of the Central Valley, just east of the town of Thornton (west of the City of Galt) where it empties into the Mokelumne River, while the Cosumnes River, enters the Mokelumne River approximately six miles downstream. The Mokelumne River then enters the complex network of tidally-influenced rivers and sloughs of the Sacramento-San Joaquin Delta. The delta waters eventually empty into the San Francisco Bay.

The majority of the Dry Creek Watershed is located in Amador County, but the lower elevation is split between Sacramento County on the north and San Joaquin County on the south. Incorporated cities within the watershed include Jackson, Sutter Creek, Amador City, and Ione in Amador County, and Galt in Sacramento County.

Streams in the Dry Creek Watershed are almost completely unregulated, except for several small dams and reservoirs on sub-watersheds. Lake Amador, located on the Jackson Creek south of the City of Ione, is the only significant dam and reservoir in the watershed with a capacity of 22,000 acre-feet. Lake Tabeaud (located on the South Fork of Jackson Creek), belongs to PG&E, and is the fore bay to the Electra Power House.

Most of the water served to Amador County's five cities flows through PG&E's Mokelumne River hydro-electric power facilities then passes through Lake Tabeaud and a piped conveyance and treatment system.

Another small dam and reservoir (50 acre-feet) New York Reservoir, is located on a tributary to Jackson Creek. It was part of the Amador Canal system.

Mokelumne Watershed

The Mokelumne River Watershed in Amador, Calaveras and Alpine Counties is a significant source of water for both consumption and energy production. The major land use in the upper watershed, owned both privately and publicly, is timber management. The cumulative effects of timber harvest on the beneficial downstream uses of water in this area have developed into an issue of growing importance. The East Bay Municipal Utility District (EBMUD) provides drinking water for 1.1 million customers in the San Francisco East Bay Area. The source of supply is the 585 square mile Mokelumne River watershed in the central Sierras. Runoff from the watershed is impounded in Pardee Reservoir, located in Amador and Calaveras counties, and is transported across the Central Valley by three aqueducts.

The Mokelumne River Basin is a relatively narrow and steep watershed. Elevations range from 570 feet at Pardee Dam to about 10,400 feet on the highest peaks within the basin. Annual precipitation and stream flow in the Mokelumne River Basin are extremely variable from month to month and from year to year. Most precipitation normally falls between November and May and very little falls between late spring and late fall. Peak flows in the Mokelumne River normally occur during winter storms or during the spring snowmelt season from March through June. Flows taper off to a minimum in late summer or fall. Snowmelt

from parts of Alpine, Amador, and Calaveras counties contribute to the Mokelumne River. The primary tributaries are the North, Middle and South Forks of the Mokelumne River, with the North Fork tributary draining over 80 percent of the Mokelumne watershed. Lesser tributaries include Summit Creek, Bear Creek, Cole Creek, Moore Creek, Blue Creek, Tiger Creek, Panther Creek, Forest Creek and Licking Fork.

The majority of the Mokelumne River watershed consists of open space and forest land with small concentrations of residential development and large tracts of designated wilderness. There are small agriculture areas, mainly orchards and vineyards, and several areas of recreational developments (including winter sports facilities). The watershed contains little area devoted to industrial or commercial use.

Historic impacts to the watershed include gold mining, deforestation, and livestock grazing. Current impacts include logging, grazing, deliberate and incidental toxic substance dumping, loss of wildlife habitat, low flow water quality, recreation, roadways, residential development, domestic wastes, and more. Efforts have been taken by the Upper Mokelumne River Watershed Authority (UMRWA) to better manage the watershed, including improving overall water quality.

Cosumnes Watershed

The Cosumnes River Watershed includes Amador, El Dorado and Sacramento Counties and drains a total of 936 square miles. The Cosumnes River, at a length of 80 miles, is considered the last untamed, free flowing river system west of the Sierra Nevada Mountains. The river has a natural flow regime, drying up in drought years and flooding in wet years. In the Upper Cosumnes River Watershed, beginning at approximately 7,600 feet msl in the Sierra Nevada Range, the river flows through bedrock formations, confining the river to basically a permanent channel. In the Lower Watershed, the river has meandered over time leaving behind deposits of fertile soil resulting in the creation of wetlands and streamside riparian habitat. The South Fork of the Cosumnes River runs through northern Amador County. The watershed empties into the Mokelumne River and is an integral part of the Sacramento Bay/Delta ecosystem.

In the early 1900's, agriculturists began intensively farming and ranching the land throughout the lower watershed. Levees were established along the river to help contain the occasional high flow event, allowing the land to be farmed year-round. This pattern of land use remained relatively constant through the last decade; however, flooding has become a more significant issue with the increased cost and value of agricultural operations. In addition to agriculture, a significant number of homes, communities, business, roads, and other infrastructure exist within the watershed. Privately owned levees, originally built to control flooding, have over time become aged and less stable. A break in a levee along the Cosumnes today not only impacts agricultural lands but results in flooded homes and businesses as well as damage to public roads, utilities, transportation, and emergency services. Impacts to the Southern California water supply may also occur. The USACE conducted a Reconnaissance Study of the lower watershed in 1999 and identified several issues including levee failure and flooding; erosion and channel incision; excessive sediment transport and degradation of the riverbed; constriction of the floodplain; isolation of the floodplain from the river channel; reduction of flows in summer and fall; and loss of aquatic and riparian habitat.

River flows are almost entirely a result of rainfall. Only 16 percent of the watershed lies above 5,000 feet; therefore, snowmelt contributes very little to stream flows. The river flows year-round in the upper watershed; however, in the lower watershed, flows are intermittent during the summer. Flooding on the

Cosumnes usually occurs November through April, generally as a result of heavy rains. According to the Cosumnes River Task Force Plan, peak flow years include: 1907, 1950 (27,600 cfs), 1955 (42,000 cfs), 1958 (29,300 cfs), 1963 (39,400 cfs), 1964 (37,500 cfs), 1980 (34,200), 1982 (37,000 cfs), 1986 (45,000 cfs), and 1997 (93,000 cfs). According to the 1999 study, the levees can hold a 5-year storm event of approximately 20,000 cfs. Flooding frequency is the greatest near the confluence with the Mokelumne; although most of the areas surrounding the river experience occasional or rare flooding frequency.

In 1997, the Cosumnes River Watershed experienced the largest flood event on record. Peak discharge was 93,000 cfs, 47,900 cfs more than the previously recorded high flow event of 1986. Approximately 34,000 acres of primarily farmland was inundated. Almost $7 million dollars in business losses occurred to orchards, vineyards, row and field crops and dairies. Agricultural losses to private property were estimated at $13 million. Most of the 1997 flood damage was associated with levee breaks. 82 homes or structures valued at $1.7 million were also damaged during the 1997 flood. Many bridges and roads were impassible and many incurred varying degrees of damage.

Amador County Flood Mapping

As part of the County's ongoing efforts to identify and manage their flood prone areas, Amador County relies on a variety of different mapping and related efforts. What follows is a brief description of FEMA and DWR mapping efforts covering the Amador County Planning Area.

FEMA Floodplain Mapping

FEMA established standards for floodplain mapping studies as part of the National Flood Insurance Program (NFIP). The NFIP makes flood insurance available to property owners in participating communities adopting FEMA-approved local floodplain studies, maps, and regulations. Floodplain studies that may be approved by FEMA include federally funded studies; studies developed by state, city, and regional public agencies; and technical studies generated by private interests as part of property annexation and land development efforts. Such studies may include entire stream reaches or limited stream sections depending on the nature and scope of a study. A general overview of floodplain mapping is provided in the following paragraphs. Details on the NFIP and mapping specific to the County is detailed in the Vulnerability Assessment below.

Flood Insurance Study (FIS)

The FIS develops flood-risk data for various areas of the community that will be used to establish flood insurance rates and to assist the community in its efforts to promote sound floodplain management. The current Amador County FIS is dated 1/20/2016. This study covers both the unincorporated and incorporated areas of the County.

Flood Insurance Rate Map (FIRM)

The FIRM is designed for flood insurance and floodplain management applications. For flood insurance, the FIRM designates flood insurance rate zones to assign premium rates for flood insurance policies. For floodplain management, the FIRM delineates 1% and 0.2% annual chancer floodplains, floodways, and the locations of selected cross sections used in the hydraulic analysis and local floodplain regulation. The

County FIRMs have been replaced by digital flood insurance rate maps (DFIRMs) as part of FEMA's Map Modernization program, which is discussed further below.

Letter of Map Revision (LOMR) and Map Amendment (LOMA)

LOMRs and LOMAs represent separate floodplain studies dealing with individual properties or limited stream segments that update the FIS and FIRM data between periodic FEMA publications of the FIS and FIRM.

Levee Considerations in Floodplain Mapping

Also, as part of FEMA's Map Modernization program, FEMA is mapping levees within communities, with a primary focus on maps determined to provide a 1% annual chance level of flood protection.

In August of 2005, FEMA Headquarters' issued Memo 34 Interim Guidance for Studies Including Levees. This memo recognizes the risk and vulnerability of communities with levees. The memo mandates the inclusion of levee evaluations for those communities that are undergoing map changes such as the conversion to DFIRMs. No maps can become effective without an evaluation of all levees within a community against the criteria set forth in 44 CFR 65.10 Mapping of Areas Protected by Levee Systems. Generally, these levee certification requirements include evaluations of freeboard, geotechnical stability and seepage, bank erosion potential due to currents and waves, closure structures, operations and maintenance, and wind wet and wave run-up. In short, these guidelines require certification of levees before crediting any levee with providing protection from the 1 percent annual event (e.g., the 100-year flood).

In Amador County, similar to other locations in California, levees and flood control facilities have been built and are maintained variously by public and private entities, including reclamation, irrigation and flood control districts, other state and local agencies, and private interests. Many of these facilities were constructed with flood control as secondary or incidental to their primary purpose, so are not considered as providing protection from the 1% annual chance or greater flood.

Digital Flood Insurance Rate Maps (DFIRM)

As part of its Map Modernization program, FEMA is converting paper FIRMS to digital FIRMs, DFIRMS. These digital maps:

- Incorporate the latest updates (LOMRs and LOMAs);
- Utilize community supplied data;
- Verify the currency of the floodplains and refit them to community supplied basemaps;
- Upgrade the FIRMs to a GIS database format to set the stage for future updates and to enable support for GIS analyses and other digital applications; and
- Solicit community participation.

DFIRMs for Amador County have been developed and most current Effective DFIRMs for Amador County are dated January 20, 2016, and are being used for the flood analysis for this LHMP Update. The DFIRM is shown in Figure 4-95, and DFIRM flood zones are shown on Table 4-99.

Figure 4-95 Amador County - DFIRM

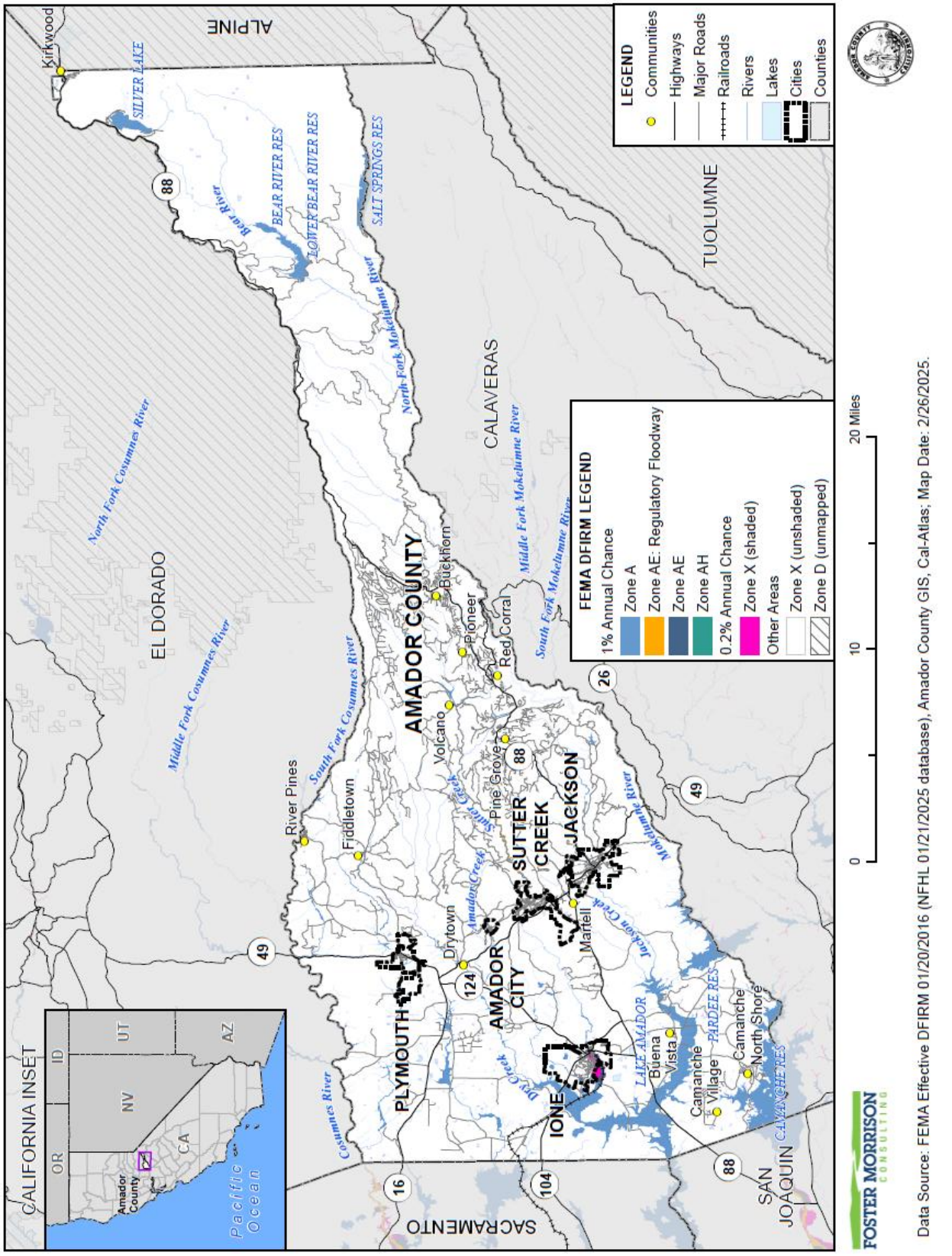


Table 4-99 Amador County – FEMA DFIRM Flood Zones by Jurisdiction

Flood Zone	Description	Present in City of Amador City	Present in City of Ione	Present in City of Jackson	Present in City of Plymouth	Present in City of Sutter Creek	Present in Unincorporated County
A	1% annual chance flooding: No base flood elevations provided		X	X	X	X	X
AE	1% annual chance flooding: Base flood elevations provided		X	X		X	X
AE Regulatory Floodway	1% annual chance flood: Regulatory floodway; Base flood elevations provided			X		X	X
AH	1% annual chance flood areas of shallow flooding between one to three feet deep. Regulatory floodway; Base flood elevations provided			X			X
Shaded X	0.2% annual chance flooding: The areas between the limits of the 1% annual chance flood and the 0.2-percent-annual-chance (or 500-year) flood		X	X		X	X
X (unshaded)	No flood hazard	X	X	X	X	X	X

Source: FEMA DFIRM 01/20/2016

California Floodplain Mapping

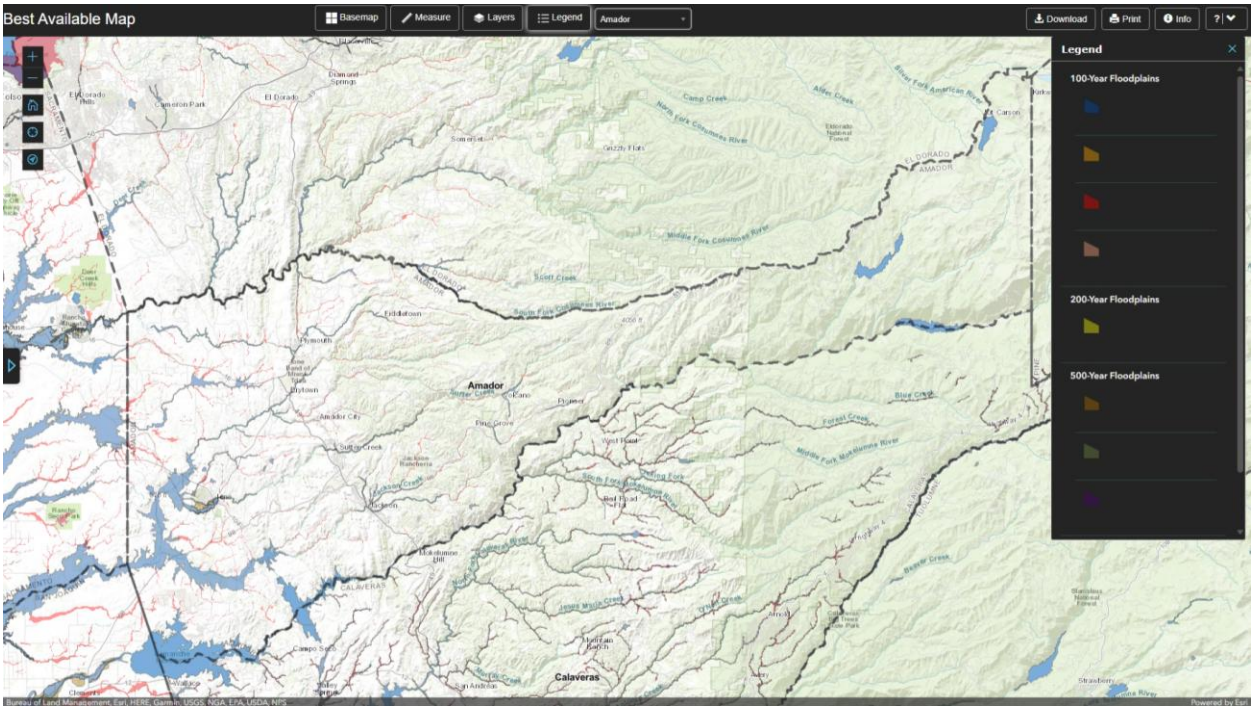
Also to be considered when evaluating the flood risks in Amador County are various floodplain maps developed by the California DWR for various areas throughout California, and in the Sacramento-San Joaquin Valley cities and counties. The FEMA regulatory maps provide just one perspective on flood risks in Amador County. Senate Bill 5 (SB 5), enacted in 2007, authorized Cal-DWR to develop the Best Available Maps (BAM) displaying 1% and 0.5% (200-year) annual chance floodplains for areas located within the Sacramento-San Joaquin (SAC-SJ) Valley watershed. This effort was completed by DWR in 2008. DWR has expanded the BAM to cover all counties in the State and to include 0.2% annual chance flood zones.

Different than the FEMA DFIRMs which have been prepared to support the NFIP and generally reflect only the 1% and 0.2% annual chance flood risks, the BAMs are provided for informational purposes and are intended to reflect current 1%, 0.5% (200-year) as applicable, and 0.2% annual chance flood risks using the best available data. The 100-year floodplain limits on the BAM are a composite of multiple 1% annual

chance floodplain mapping sources. It is intended to show all currently identified areas at risk for a 100-year flood event, including FEMA's 1% annual chance flood zones. The BAM are comprised of different engineering studies performed by FEMA, Corps, and DWR for assessment of potential 1%, 0.5%, and 0.2% annual chance floodplain areas. These studies are used for different planning and/or regulatory applications, and for each flood frequency may use varied analytical and quality control criteria depending on the study type requirements.

The value in the BAMs is that they provide a bigger picture view of potential flood risk to the County than that provided in the FEMA DFIRMs. This provides the community and residents with an additional tool for understanding potential flood hazards not currently mapped as a regulated floodplain. Improved awareness of flood risk can reduce exposure to flooding for new structures and promote increased protection for existing development. Informed land use planning will also assist in identifying levee maintenance needs and levels of protection. By including the FEMA 1% annual chance flood zone, it also supports identification of the need and requirement for flood insurance. Figure 4-96 shows the BAM for the Amador County Planning Area.

Figure 4-96 Amador County– Flood Awareness (Best Available) Map



Source: California DWR. Retrieved 3/5/2025

Legend explanation: **Blue** - FEMA 100-Year, Orange – Local 100-Year (developed from local agencies), **Red** – DWR 100-year (Awareness floodplains identify the 100-year flood hazard areas using approximate assessment procedures.), **Pink** – USACE 100-Year (2002 Sac and San Joaquin River Basins Comp Study), **Yellow** – USACE 200-Year (2002 Sac and San Joaquin River Basins Comp Study), **Tan** – FEMA 500-Year, **Grey** – Local 500-Year (developed from local agencies), **Purple** – USACE 500-Year (2002 Sac and San Joaquin River Basins Comp Study).

Flood extents are usually measured in depths of flooding and area flooded. Expected flood depths in the Amador County Planning Area vary. Flood durations in the County tend to be short to medium term, or until either the storm drainage system can catch up or flood waters move downstream. Geographical extents

of DFIRM flood zones for the unincorporated Amador County are detailed in Table 4-100. Details on each jurisdiction's DFIRM flood extents can be found in their respective annexes to this LHMP Update.

Table 4-100 Amador County Planning Area –Geographical DFIRM Flood Zone Extents

Jurisdiction / Flood Zone	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Amador City						
1% Annual Chance Flood Hazard	0	0.0%	0	0.0%	0	0.0%
0.2% Annual Chance Flood Hazard	0	0.0%	0	0.0%	0	0.0%
Other Areas	198	0.05%	61	0.04%	137	0.06%
Amador City Total	**198**	**0.05%**	**61**	**0.04%**	**137**	**0.06%**
Ione						
1% Annual Chance Flood Hazard	251	0.06%	68	0.04%	183	0.08%
0.2% Annual Chance Flood Hazard	108	0.03%	76	0.05%	32	0.01%
Other Areas	2,613	0.67%	546	0.32%	2,068	0.94%
Ione Total	**2,973**	**0.77%**	**690**	**0.41%**	**2,283**	**1.04%**
Jackson						
1% Annual Chance Flood Hazard	104	0.03%	41	0.02%	63	0.03%
0.2% Annual Chance Flood Hazard	4	0.001%	2	0.001%	2	0.001%
Other Areas	2,194	0.6%	740	0.4%	1,454	0.7%
Jackson Total	**2,302**	**0.6%**	**782**	**0.5%**	**1,520**	**0.7%**
Plymouth						
1% Annual Chance Flood Hazard	30	0.01%	5	0.003%	25	0.01%
0.2% Annual Chance Flood Hazard	0	0.0%	0	0.0%	0	0.0%
Other Areas	1,668	0.4%	595	0.4%	1,073	0.5%
Plymouth Total	**1,698**	**0.4%**	**600**	**0.4%**	**1,098**	**0.5%**

Jurisdiction / Flood Zone	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Sutter Creek						
1% Annual Chance Flood Hazard	28	0.01%	15	0.01%	13	0.01%
0.2% Annual Chance Flood Hazard	9	0.002%	5	0.003%	5	0.002%
Other Areas	1,671	0.4%	742	0.4%	929	0.4%
Sutter Creek Total	**1,709**	**0.4%**	**762**	**0.5%**	**947**	**0.4%**
Unincorporated Amador County						
1% Annual Chance Flood Hazard	16,510	4%	7,230	4%	9,280	4%
0.2% Annual Chance Flood Hazard	95	0.02%	32	0.02%	64	0.03%
Other Areas	363,006	93%	157,994	94%	205,012	93%
Unincorporated Amador County Total	**379,611**	**98%**	**165,256**	**98%**	**214,356**	**97%**
Grand Total	**388,490**	**100%**	**168,150**	**100%**	**220,340**	**100%**

Source: FEMA DFIRM 01/2016

Past Occurrences

Disaster Declaration History

A list of federal and state disaster declarations for Amador County from flooding, (including heavy rains and storms) is shown on Table 4-101.

Table 4-101 Amador County – Federal and State Disaster Declaration from Flood 1950-2025

Disaster Type	State Declarations		Federal Declarations	
	Count	Years	Count	Years
Flood (including heavy rains and storms)	22	1950, 1955, 1958 (twice), 1959, 1963, 1964, 1969, 1980, 1982, 1986, 1995 (twice*), 1997, 2006 (twice*), 2017 (twice*), 2019*, 2021, 2023 (twice)	20	1950, 1955, 1958, 1962, 1963, 1964, 1969, 1986, 1995 (twice*), 1997, 1998, 2006 (twice*), 2017 (twice*), 2019*, 2023 (three*)

Source: Cal OES, FEMA

*included a landslide component.

NCDC Events

The NCDC tracks flooding events for the County. Events have been tracked for flooding since 1993. Table 4-102 shows events in Amador County since 1993.

*Table 4-102 NCDC Flood Events in Amador County 1993 to 7/31/2024**

Event Type	Number of Events	Deaths	Deaths (indirect)	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Flash Flood	3	0	0	0	0	$0	$0
Flood	40	3	0	0	0	$4,450,000	$7,800,000
Total	**43**	**3**	**0**	**0**	**0**	**$4,450,000**	**$7,800,000**

Source: NCDC

*Note: Losses reflect totals for all impacted areas, much of which fell outside of Amador County

FIS Events

The 2016 FIS noted that documented flooding from Sutter Creek occurred in January 1980 and January 1995.

1980 Event

An article in the Amador Dispatch indicated that during the 1980 flood event there was overflow of the channel near the Marlette Street mobile home park, approximately 0.5 mile upstream of the Five Mile Drive crossing of Sutter Creek. It was reported that the area was sandbagged, and that evacuation of the mobile home park was considered; however, the flow receded, and no major damage was reported. No flooding was documented in any of the restudy area upstream of the mobile home park. During this event, the maximum recorded peak discharge was 6,950 cubic feet per second (cfs), which is the maximum recorded peak discharge for the 40 years of record at the gage. Based on the hydrologic analyses, the peak discharge would be approximately 9,000 cfs at the study area.

1995 Event

The downstream portion of the restudy area was again subjected to shallow flooding on January 2, 1995. Overtopping occurred at several locations between the new Five Mile Drive Bridge of Sutter Creek and the right-angle bend in the channel alignment located approximately 400 feet downstream of the intersection of Spring Creek Drive and Marlette Street. Flooding was experienced by several properties located between the south bank of the creek and Marlette Street. South of Marlette Street, shallow flooding was experienced by some properties immediately west of the channel bend located west of Spring Creek Drive.

Farther to the west, flooding was primarily contained in the streets south of Marlette Street. A portion of the overflow flowed west, down Marlette Street, and returned to Sutter Creek immediately upstream of the Five Mile Drive Bridge. Flow to the south also occurred over the undeveloped area immediately east of the most easterly treatment-plant pond.

Street flooding, resulting from backwater from drainage outfall, was experienced at Spring Creek Drive at the bend approximately 1,000 feet north of Marlette Street and at the intersection with Marlette Street. Ponding of flood waters was also experienced on the golf course located on the north side of the creek, approximately 500 feet upstream of Five Mile Drive.

The abandoned Five Mile Drive Bridge experienced erosion damage and has been permanently removed. The new Five Mile Drive Bridge was not damaged. There are available estimates of discharges for the 1995 event. Based on the overtopping in the downstream area near the Marlette Street mobile home park, the discharge would probably have been equal to or greater than the 1980 event. There was no flooding in the upstream portion of the restudy area near the Preston Avenue (Highway 104) crossing of Sutter Creek. The flow was contained by the existing channel and levees. The measured high-water mark was approximately 1.2 feet below the Highway 104 bridge soffit. There has been no documented flooding in the area immediately upstream and downstream of Highway 104.

Hazard Mitigation Planning Committee Events

The following flood event summaries are taken verbatim from information on file with the County Archives and provided by the Amador County OES.

1849/50 – No specific data available. See references below.

1852 – The great flood of 1852. On March 4 or 5, unceasingly through March 8, torrents fell. By March 10, the Sacramento River was a half foot above its high water mark during the 1850 flood. Raging creeks and rivers roared down their channels and beds to sweep scores of bridges downstream to destruction. The Sacramento Daily Union carried clips from the Chronicle of March 13th which reported: "On the Mokelumne River the loss cannot fall short of $50,000. We hear of Palmer and Co.'s bridge (worth $10,000) at Oregon Bar was carried away. At Middle Bar, the massive bridge of McKinney and Co. (worth $12,000) was swept away with a large ferry boat worth $15,000. All the homes on the north bank of the river at this bar were torn from foundations and carried down the fierce torrent and smashed to pieces against the rocks. All the stores and tents along the south bank to Big Bar were overloaded, leaving them miserable wrecks. At least one minor drowned trying to cross the bridgeless torrent in a canoe. The Chronicle reported the Mokelumne had risen at least 18 feet during the flood, being 4 to 6 feet higher than the winter of 1849-50. It may have gone even higher. The Middle Bar Bridge was 20 feet above normal water level and it still did not survive.

1862 – January 10 thru 12 - Worst storm in memory, almost a biblical deluge. On January 10th, the water in the river rose a foot an hour and water poured through every gulch like thunder. The Mokelumne River rose 44 feet above low water or 5 to 18 feet higher than in 1852. The tempest swept the river clean of flumes, dams, bridges, ferries, hovels, and homes. Roads were impassable. Travel and communication between the mountains and valley ceased. Provisions could not be restocked. Prices zoomed. For the first time in history all of Stockton was under water and for the second time Sacramento was totally flooded. Big buildings in Jackson were lifted off foundations and floated into the rampaging middle fork; Ione valley was flooded.

1878 – Sudden deluge. That Sunday morning dense banks of clouds were noticed southeast and northwest, gorged with water and collision bent. At 3 pm the towering banks of cloud cleaved, and spawned for an hour and a half, the greatest torrent of rain this area has ever witnessed. While probably raining elsewhere, the rain burst nonetheless seemed confined to Jackson and the watershed of the three forks of Jackson Creek which converge near downtown. Within an hour the north fork topped its banks and swept away or damaged most of the creekside dwellings down to the fork's confluence with the other branches. Chinatown on the west side of Main and hugging the creek was struck worst. Most flimsy and frame Chinese stores floated off foundations and headed downstream, some with occupants inside or clinging to the remains. Despite the catastrophe that hit Chinatown the rest of the town was not apprehensive. It also had no time for fear about a half hour later when a wall of water appeared racing down the middle fork. It arrived later but proved more destructive for these reasons: The middle fork is much longer and has more tributaries and capacity than the north fork and the breaking of the New York Ranch reservoir released its storage into the middle forks surge. That water careened into New York gulch, struck the middle fork near French garden, severely damaging that vegetable basket, and merged madly with the high water coming from upstream. About 4:30 pm into Jackson rushed the wave or wall of water. If it was not high enough then to leap the creek's banks, it soon was. All the driftwood, flotsam, and debris it carried soon dammed up against the Broadway Bridge. Almost instantly the water engulfed the north bank and Water streets, flooding all yards on the south side of the street and wreaking much chaos. There was more long-lasting damage, particularly in Jackson Valley, where bodies, buildings, driftwood and all debarked including a plague of rattlesnakes from foothill pits.

1907 – The Great lone Flood: According to the March 22, 1907, Dispatch, a storm began that Monday early in the afternoon and beat down in copious sheets until dawn the next day. By 2:30 pm on Monday, Jackson creek was a raging torrent judged to be higher than any time in 25 years. The south fork washed the Zeile mine footbridge off and there was not a bridge left spanning the Mokelumne below Middle bar nor was there any bridge left between Lancha Plana and Lodi. The peak of the foothill runoff hit Stockton in the valley later on Tuesday and by midnight Stockton had its greatest flood since 1862.

From various sources (personal recollections, the FIS, the NCDC, and SHELDUS) the HMPC also provided information on the following flood events.

January 1980 – Lake Amador, located in the Jackson Valley Irrigation District (JVID), experienced a very large spill event, (i.e., 4-feet over spill). Damaged infrastructure included JVID Sacrificial road and structures. There was additional Levee and Jackson Creek damage to private parties. Request letters are on file asking assistance. Most letters do not specify dollar amount of damage. One estimated repair at $75,000. Assistance to these private parties was denied. An article in the Amador Dispatch indicated that during the 1980 flood event there was overflow of the channel near the Marlette Street mobile home park, approximately 0.5 mile upstream of the Five Mile Drive crossing of Sutter Creek. It was reported that the area was sandbagged, and that evacuation of the mobile home park was considered; however, the flow receded, and no major damage was reported. No flooding was documented in any of the restudy area upstream of the mobile home park. During this event, the maximum recorded peak discharge was 6,950 cubic feet per second, which is the maximum recorded peak discharge for the 40 years of record at the gage.

1986 – Heavy rains caused Sutter Creek to swell and exceed its banks causing low-level flooding to adjacent structures located on Main Street (Highway 49), Eureka Street, Badger Street, and Spanish Street. Damage to property occurred; amounts are unknown.

January 1995, DR1044 – Three days of record-setting rainfall culminated in widespread flooding of small rivers. Flooding occurred on JVID Jiminez property. Damages included eroded embankment/levee and damage to distribution pipeline. Total damages estimated at $1,999; relief funding estimated at $1,514. Heavy rains also caused Sutter Creek to swell and exceed its banks causing low-level flooding to adjacent structures located on Main Street (Highway 49), Eureka Street, Badger Street, and Spanish Street. Damage to property occurred; amounts are unknown.

March 1995, DR1046 – A rainstorm wreaked havoc from one end of the county to the other as gusty winds wiped out power lines, felled trees, and damaged property. Downed power lines left approximately 7,000 households without power. An uprooted cedar tree crashed into the roof of Amador High School and ripped up roof sheeting at Ione Elementary School. Highway 88 flooded with three feet of water at the Carson Spur west of Kirkwood. A tornado was spotted in western Amador County. There were no damages reported. Flooded basements and sewer backups were reported in Sutter Creek. Trees toppled throughout the county including one that crashed into a Pine Grove Home. Water went over the spillway at Pardee Reservoir for the first time since 1986. Damage estimates to roads and public buildings came in at approximately $240,140.00. According to the FIS:

Based on the overtopping in the downstream area near the Marlette Street mobile home park, the discharge would probably have been equal to or greater than the 1980 event. However, based on the hydraulic model developed for this restudy and the measured high-water mark, the estimated discharge would bring the order of 20 percent lower than indicated by the downstream overtopping. There was no flooding in the upstream portion of the restudy area near the Preston Avenue (Highway 104) crossing of Sutter Creek. The flow was contained by the existing channel and levees. The measured high-water mark was approximately 1.2 feet below the Highway 104 bridge soffit. There has been no documented flooding in the area immediately upstream and downstream of Highway 104.

January 1997, DR1155 –Amador County was seriously impacted by heavy rain, heavy snow, utility disruption and related storm damage that began on December 20, 1996. The County declared a local emergency on December 23, 1996. The storm caused flooding in the lower elevations and major damage due to 4-5 feet of heavy, wet snow in the higher elevations. Emergency fire and medical services could not be provided to the affected areas due to the magnitude of the storm, along with the hazardous conditions of downed power lines, power poles and trees. Power was out for over one week to many homes in the affected area and only medical evacuations were possible for much of that time. Emergency snow removal equipment and operators were brought in by both Amador County and PG&E in an attempt to restore emergency access for fire, law, and medical services as well as for PG&E to restore electrical service. In the City of Ione, Sutter Creek overflowed its banks causing evacuations in flooded areas. In Jackson, Jackson Creek flooded causing water to go over the Pit Street and Broadway Street bridges, propane tanks broke loose and floated down the creek, evacuations of homes and businesses along the creek were ordered. The parking garage in downtown Jackson was under water. In the City of Sutter Creek, the heavy rains caused Sutter Creek to swell and exceed its banks causing low level flooding to adjacent structures located on Main Street (Highway 49), Eureka Street, Badger Street, and Spanish Street. Mandatory water

conservation orders were issued upcountry due to turbidity issues at Tiger Creek Reservoir. In River Pines, the sewer and water treatment plant flooded. Evacuation centers were established throughout the county for county residents that were evacuated from their homes. In addition, evacuation centers were established for residents evacuated from neighboring Sacramento and El Dorado County. Damage estimates for private property exceeded $2 million dollars and damages to roadways and utilities exceeded $5.18 million dollars. The FIS reported that:

Overtopping occurred at several locations between the new Five Mile Drive Bridge of Sutter Creek and the right angle bend in the channel alignment located approximately 400 feet downstream of the intersection of Spring Creek Drive and Marlette Street. Flooding was experienced by several properties located between the south bank of the creek and Marlette Street. South of Marlette Street, shallow flooding was experienced by some properties immediately west of the channel bend located west of Spring Creek Drive. Farther to the west, flooding was primarily contained in the streets south of Marlette Street. A portion of the overflow flowed west, down Marlette Street, and returned to Sutter Creek immediately upstream of the Five Mile Drive Bridge. Flow to the south also occurred over the undeveloped area immediately east of the most easterly treatment-plant pond. Street flooding, resulting from backwater from drainage outfall, was experienced at Spring Creek Drive at the bend approximately 1,000 feet north of Marlette Street and at the intersection with Marlette Street. Ponding of flood waters was also experienced on the golf course located on the north side of the creek, approximately 500 feet upstream of Five Mile Drive. The abandoned Five Mile Drive Bridge experienced erosion damage and has been permanently removed. The new Five Mile Drive Bridge was not damaged.

January 1998 - Heavy rains from a strong Pacific storm caused widespread but minor flooding across the Sacramento and Northern San Joaquin Valleys and nearby foothills. Localized flooding affected areas of Amador County. Hundreds of traffic accidents also occurred on the highways and city streets throughout the region.

February 1998, DR1203 – (El Nino year) Major flooding occurred below Dam on JVID property and on the JVID creek towards the western end of District. Damage to infrastructure included the following: Oxidation Basin Levee - $7,274; Lake Amador Sacrificial road - $13,551; Jackson Creek Pumping Station Dam - $42,691; and Dry Creek repair - $13,156. Total damages and disaster relief funding to JVID estimated at $76,672. Heavy rains also caused Sutter Creek to swell and exceed its banks causing low-level flooding to adjacent structures located on Main Street (Highway 49), Eureka Street, Badger Street, and Spanish Street. Damage to property occurred; amounts are unknown. Damages were also reported throughout the county, in Amador city, the City of Ione, and to the Amador County Unified School District.

February 9, 1999 – Flash flooding affected areas of Amador County. The NCDC reported that Jackson Creek left its banks and flooded areas of downtown Jackson. The California Department of Forestry aided in sandbagging and saved downtown businesses from damage. Sutter Creek left its banks and flooded isolated areas of the City of Sutter Creek. Sandbagging was not necessary. An unnamed tributary off of Gopher Gulch in the town of Sutter Creek rose quickly and topped the Badger Street Bridge.

January 22, 2000 - Rainfall totaling 6.32 inches accumulated in just over 48 hours near Pine Grove.

December 2005/January 2006, Winter Storms of 2005/2006, DR1628 – Amador County sustained extensive damages to the public road system due to severe storms, flooding, mudslides, and landslides from the period December 17, 2005 to January 3, 2006. Damages were estimated at approximately $1.5 million dollars. There were some minor damages to private property reported. In addition, the Amador Regional Sanitation Authority sustained some damages to their pipeline. The most severe problem associated with this storm was the high winds and downed trees and power lines. A tree fell on a house causing moderate damage and another tree fell on a vehicle causing major damage.

March 2006, Spring Storms of 2006, DR1646 – The spring of 2006 was an unusually wet spring. There were constant reports of mudslides throughout the county. On April 8, 2006, the Amador Water Agency sustained major damages to an earthen canal that transports water from Lake Tabeaud to the Tanner Water Treatment Facility in Sutter Creek. A 200-foot section of the canal slid down the hillside cutting off the water supply to the Tanner facility. This outage affected approximately 10,000 raw and treated water customers in Jackson, Sutter Creek, Amador City, Drytown and Ione. Estimates for emergency work and repairs exceed $1.5 million dollars. The county road system sustained major damages and estimates for repairs exceed $1 million dollars. The Amador Region Sanitation Authority, the cities of Plymouth, Ione and Jackson sustained minor damages. There was little damage to private property reported.

January and February 2017 DR-4308, DR-4301 – Flood occurred in the County. AWA almost lost water pump station in Ione. Sutter Creek was at flood stage. A pump station along the creek was damaged due to flooding and soil erosion. A disaster declaration was issued for this flood. In addition to damages to roads, landslides in Pioneer Creek Road occurred as a result. Repair costs were $375,961. Shake Ridge Road also suffered erosion and landslides that is being dealt with as of the writing of this Plan. Multiple locations had damages. This can be seen in Table 4-103.

Table 4-103 2017 Amador County Winter Storm Damages

Address	City	Problem	Cause	Damages
Freemont Mine Road	Sutter Creek	Debris Removal/road clean-up	Winter Storm	$9,000
Lower Jackson Valley Road	Ione	Debris Removal/road clean-up	Winter Storm	$6,437
Stony Creek Road	Jackson	Debris Removal/road clean-up	Winter Storm	$7,000
Buena Vista Road	Ione	Debris Removal/road clean-up	Winter Storm	$4,466
Defender Grade	Pioneer	Debris Removal/road clean-up	Winter Storm	$5,292
Lower Tonzi Road	Plymouth	Debris Removal/road clean-up	Winter Storm	$2,376
Sutter Creek Road	Ione	Debris Removal/road clean-up	Winter Storm	$5,755
Old Sacramento Road	Plymouth	Debris Removal/road clean-up	Winter Storm	$4,822
Silver Drive South	Pioneer	Debris Removal/road clean-up	Winter Storm	$1,026
Sugar Pine Drive	Pioneer	Debris Removal/road clean-up	Winter Storm	$2,250
Alpine Drive	Pioneer	Debris Removal/road clean-up	Winter Storm	$6,084
6500 Buena Vista Road	Ione	Emergency Pumping and Hauling for line leachate pond	Winter Storm	$85,800

Address	City	Problem	Cause	Damages
New Chicago Road	Sutter Creek	Shoulder Danage/Gravel Road Damage	Winter Storm	$31,000
Freemont Mine Road	Sutter Creek	Road construction	Winter Storm	$5,000
Defender Grade	Pioneer	Slope Failure	Winter Storm	$10,000
Lower Tonzi Road	Plymouth	Culvert Failure	Winter Storm	$8,000
Shake Ridge Road	Pioneer	Road Failure	Winter Storm	$3,000,000
Pioneer Creek Road	Pioneer	Culvert Failure/Riprap Damage	Winter Storm	$7,500

Source: Amador County

Figure 4-97 Amador County 2017 Flooding



Source: Jackson Valley Irrigation District

Figure 4-98 Amador County 2017 Flooding



Source: Jackson Valley Irrigation District

2019 – Flooding occurred in the County. Sutter Creek was at flood stage. $20,000 in FEMA disaster money was received to repair debris locations.

December 2021 – After multiple atmospheric river storms starting in October of 2021 (which received a state emergency proclamation), an extreme winter storm (with rain in the lower elevations and snow in the upper elevations of the County) occurred. A local emergency proclamation (Resolution 22-048) was tendered. The Pioneer Park area saw heavy rains down multiple trees. Debris was generated, and the woody debris was removed by a local contractor.

December 2022 to March 2023 – Atmospheric river storm events affected the County multiple times in the winter of 2022/2023. Two state emergency proclamations were issued for these events. Amador County also issued an emergency proclamation (Resolution 23-001) for these events. In the lower elevations, heavy rains caused flooding. In the upper elevations, heavy snows were seen.

Figure 4-99 Damages in Amador County from 2022/2023 Storms



Source: Amador County

Likelihood of Future Occurrence

1% Annual Chance Flood

Occasional— The 1% annual chance flood (100-year) is the flood that has a 1 percent chance of being equaled or exceeded in any given year. This, by definition, makes the likelihood of future occurrence occasional. However, the 100-year flood could occur more than once in a relatively short period of time.

0.2% Annual Chance Flood

Unlikely—The 0.2% annual chance flood (500-year) is the flood that has a 0.2 percent chance of being equaled or exceeded in any given year. This, by definition, makes the likelihood of future occurrence unlikely.

It is likely that climate change will increase the chance of future occurrence as well as future impacts. More information on climate change and flood can be found in the next section. More information on future impacts can be found in the Future Conditions/Future Development section of the Vulnerability Assessment below.

Climate Change and Flood

Climate change and its effect on flooding is discussed using three sources:

- 2021 CAS (as well as the 2024 Draft CAS)
- Cal-Adapt
- National Center for Atmospheric Research

California Climate Adaptation Strategy

According to the 2021 CAS (as well as the 2024 Draft CAS), climate change may affect flooding in California and the Planning Area. While average annual rainfall may increase or decrease slightly, the

intensity of individual rainfall events is likely to increase during the 21st century. It is possible that average soil moisture and runoff could decline, however, due to increasing temperatures, evapotranspiration rates, and spacing between rainfall events. Reduced snowpack and increased number of intense rainfall events are likely to put additional pressure on water infrastructure which could increase the chance of flooding associated with breaches or failures of flood control structures such as levees and dams.

Cal Adapt

Cal Adapt future precipitation projections were shown in Figure 4-56 in the Severe Weather Heavy Rains and Storms in Section 4.3.4. These could affect flooding in the Amador County Planning Area.

National Center for Atmospheric Research

Also, according to the National Center for Atmospheric Research in Boulder, Colorado, atmospheric rivers are likely to grow more intense in coming decades, as climate changes warms the atmosphere enabling it to hold more water.

Vulnerability Assessment

Vulnerability—High

Historically, the Amador County Planning Area has always been at risk to flooding during the rainy season from November through April. The Amador County FIS noted that floods result from prolonged heavy rainfall and are characterized by high peak flows of moderate duration and by a large volume of runoff. Flooding is more severe when antecedent rainfall has resulted in saturated ground conditions. Several areas of the Planning Area are subject to flooding by the overtopping of rivers and creeks, levee failures, and the failure of urban drainage systems that cannot accommodate large volumes of water during severe rainstorms. In addition to the major rivers, there are many streams, channels, canals, and creeks that serve the drainage needs of the Planning Area and communities surrounding it. There is significant threat of flooding in areas of the Planning Area from several of these streams. These streams can be prone to rapid flooding with little notice.

An assessment of a community's vulnerability to this hazard begins with an understanding of local exposure to unincorporated Amador County. This is included in the Local Concerns section below. After that, vulnerability is discussed in multiple sections that detail how this hazard can affect both the entire Amador County Planning Area as well as the unincorporated portions of Amador County. How the hazard affects the other participating jurisdictions can be found in their respective annexes to this LHMP Update. These sections below include assets at risk, impacts, and how future development may affect the vulnerability of the County to this hazard.

Local Concerns (unincorporated Amador County)

The unincorporated County has specific concerns regarding this hazard. These concerns form a portion of the basis for the mitigation strategy and mitigation actions that seek to reduce the risk and vulnerability to this hazard.

The County noted that some areas of the County are susceptible to flooding during heavy rains or rapid snowmelt. The rural infrastructure is sometimes not adequately prepared to handle these events. In some areas, homeless encampments have been established in low-lying, flood-prone areas. Amador County Public Works noted that Sutter Creek-Volcano Road runs parallel to Sutter Creek. A portion of the road and the Creek are nearly at the same elevation. In those areas, small, localized flooding is sometimes experienced.

The 2016 FIS for Amador County noted that, for the unincorporated County, there are no significant flood-protection measures in the study area. Bridges and culverts have been provided at all road crossings, both public and private. The 2016 Amador County General Plan Safety Element noted that Flood flows generally follow defined stream channels, drainages, and watersheds. Floods causing severe damage or risk have historically occurred primarily in developed portions of the county. Flooding events generally occur in areas near waterways, and have caused significant damage in the western portion of the county near population centers, such as Jackson, Ione, and Sutter Creek.

Local concerns for each of the jurisdictions can be found under the Local Concerns heading in each respective jurisdictional annex to this LHMP Update.

Assets at Risk

Assets at risk from 1% and 0.2% annual chance floods include people and populations; structures; critical facilities and infrastructure; and natural, historic, and cultural resources. These are discussed in the following sections for the Amador County Planning Area and unincorporated Amador County.

Additionally, for each hazard in the FEMA National Risk Index in Amador County, the relevant portions of the hazard analysis done by FEMA is presented below. This includes the Hazard Risk Index Rating, Expected Annual Loss Values, Exposure Values, and the Historic Loss Ratio Rating. These are presented for the Amador County Planning Area as a whole.

The Planning Area has mapped FEMA DFIRMs with flood hazard areas. GIS was used to determine the possible impacts of flooding within the Planning Area and how the risk varies across the Amador County Planning Area. The following methodology was utilized in determining assets at risk to the 1% annual chance flood event and 0.2% annual chance flood event.

Methodology (Parcel and Structures)

In order to analyze people and populations, structures, and critical facilities at risk in DFIRM flood zones, GIS was used to quantify those values. The 2024 Amador County Parcel/Assessor Data was provided by Amador County and was used as the basis for the inventory of assessed values for both improved and unimproved parcels within the Amador County Planning Area. Amador County has a FEMA effective DFIRM dated 1/20/2016, which was obtained from FEMA's National Flood Hazard Layer to perform the flood analysis. The DFIRM flood zones, were then overlaid on the parcel layer. In some cases, there are parcels in multiple flood zones, such as Zone A, Zone X, or Shaded X. For the purposes of this analysis, if multiple DFIRM flood zones intersected any portion of a parcel polygon, the entire parcel was assigned the highest annual chance flood zone category. The parcels were segregated and analyzed in this fashion for the entire Planning Area.

Once the DFIRM flood zones were intersected, land and improved (structure) values from the Assessor data were included for each parcel and estimated content replacement values were added to the analysis. Improved parcels include those with improved structure values identified in the Amador County Assessor's database.

Methodology (Loss Estimate)

The loss estimate for flood is based on the total of improved and contents value. Only improved parcels and the value of their structure improvements were included in the flood loss analysis. The value of land is not included in the loss estimates as generally the land is not at loss to floods, just the value of improvements and structure contents. The land value is represented in the detailed flood tables but is primarily present to show the value of the land associated with each flood zone.

Once the potential value of affected parcels was calculated, a damage factor was applied to obtain loss estimates by flood zone. When a flood occurs, seldom does the event cause total loss of an area or building. Potential losses from flooding are related to a variety of factors including flood depth, flood velocity, building type, and construction. The percentage of damage is primarily related to the flood depth. FEMA's flood benefit/cost module uses a simplified approach to model flood damage based on building type and flood depth. The values at risk in the flood analysis tables were refined by applying an average damage estimation of 20% of the total building value. The 20% damage estimate utilized FEMA's Flood Building Loss Table based on an assumed average flood depth of 2 feet. The end result of this more refined flood hazard loss estimate analysis is an inventory of the numbers, types, and values of parcels subject to the flood hazard.

People and Populations

All people and populations located in the 1% and 0.2% annual chance floodplains are at some risk to flooding. Certain vulnerable populations located within areas prone to flooding may be at increased risk to this hazard, especially during a large event with minimal advance notice. These vulnerable populations include: the unhoused, those with limited mobility, and those that lack the resources to leave the area.

Amador County Planning Area residents that live in the 1% and 0.2% annual chance floodplains are often the most vulnerable. Not only are the residents at risk, but their homes and contents are all at risk, compounding the impacts associated with significant hazard events. To further evaluate the impact to the Planning Area's residential population residing within these hazard areas, the DFIRM flood zones were overlayed on the parcel layer and linked to the Assessor Data. Those residential parcels that were assigned the highest annual chance flood zones as detailed in the above methodology, were counted and multiplied by the 2020 Census Bureau average household factors for each jurisdiction. This is shown in Table 4-104.

Table 4-104 Amador County Planning Area – Improved Residential Parcels and Populations in FEMA DFIRM Flood Zones by Jurisdiction

Jurisdiction	1% Annual Chance		0.2% Annual Chance	
	Improved Residential Parcels	Population at Risk	Improved Residential Parcels	Population at Risk
Amador City	0	0	0	0
Ione	322	737	155	355
Jackson	151	332	13	29
Plymouth	4	12	0	0
Sutter Creek	64	132	16	33
Unincorporated County	261	613	2	5

Source: FEMA DFIRM 1/20/2016, 2024 Amador County Parcel/Assessor Data, 2020 US Census Bureau Average Household Size – City of Amador City (2.07); City of Ione (2.29); City of Jackson (2.20); City of Plymouth (2.80); City of Sutter Creek (2.07): Unincorporated Amador County (2.35).

Structures

Results are presented here first for the Amador County Planning Area and secondly for unincorporated Amador County.

Amador County Planning Area

Certain structures in the Amador County Planning Area are at risk of DFIRM flooding and primarily include those structures located within the 1% and 0.2% annual chance floodplains. GIS was used to determine the possible impacts of flooding on parcels and structures within the Planning Area. Table 4-105 shows parcel counts, land and improved values (i.e., those with a structure improvement on the parcel), estimated content replacement values, and total values in the Planning Area. This is shown for the 1% and 0.2% annual chance flood zones, as well as for those properties that fall outside of the mapped FEMA DFIRM flood zones.

Table 4-105 Amador County Planning Area – Count and Value of Parcels and Structures in FEMA DFIRM 1% and 0.2% Annual Chance Flood Zones by Jurisdiction

Jurisdiction / Flood Zone	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Amador City						
1% Annual Chance Flood Hazard	0	0	$0	$0	$0	$0
0.2% Annual Chance Flood Hazard	0	0	$0	$0	$0	$0
Other Areas	180	111	$19,124,377	$21,078,306	$12,365,357	$52,568,040

Jurisdiction / Flood Zone	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Amador City Total	**180**	**111**	**$19,124,377**	**$21,078,306**	**$12,365,357**	**$52,568,040**
Ione						
1% Annual Chance Flood Hazard	452	371	$40,923,840	$87,983,517	$51,122,765	$180,030,122
0.2% Annual Chance Flood Hazard	169	159	$15,370,985	$34,728,985	$20,000,009	$70,099,979
Other Areas	1,584	1,446	$167,447,004	$373,754,655	$186,962,206	$728,163,865
Ione Total	**2,205**	**1,976**	**$223,741,829**	**$496,467,157**	**$258,084,980**	**$978,293,966**
Jackson						
1% Annual Chance Flood Hazard	291	207	$38,297,775	$145,588,113	$122,294,239	$306,180,127
0.2% Annual Chance Flood Hazard	29	24	$3,525,241	$10,794,147	$9,553,139	$23,872,527
Other Areas	1,804	1,525	$160,028,972	$411,492,479	$248,465,038	$819,986,489
Jackson Total	**2,124**	**1,756**	**$201,851,988**	**$567,874,739**	**$380,312,415**	**$1,150,039,142**
Plymouth						
1% Annual Chance Flood Hazard	25	7	$8,477,615	$9,727,971	$9,582,027	$27,787,613
0.2% Annual Chance Flood Hazard	0	0	$0	$0	$0	$0
Other Areas	600	481	$76,665,748	$108,639,435	$59,680,115	$244,985,298
Plymouth Total	**625**	**488**	**$85,143,363**	**$118,367,406**	**$69,262,141**	**$272,772,910**
Sutter Creek						
1% Annual Chance Flood Hazard	102	73	$9,234,981	$19,000,793	$11,174,927	$39,410,701
0.2% Annual Chance Flood Hazard	24	19	$2,546,520	$8,018,401	$5,844,780	$16,409,701
Other Areas	1,308	1,068	$121,893,704	$304,320,667	$180,599,958	$606,814,329
Sutter Creek Total	**1,434**	**1,160**	**$133,675,205**	**$331,339,861**	**$197,619,665**	**$662,634,731**

Jurisdiction / Flood Zone	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Unincorporated Amador County						
1% Annual Chance Flood Hazard	956	534	$145,444,914	$225,859,512	$189,924,665	$561,229,091
0.2% Annual Chance Flood Hazard	3	2	$517,124	$951,800	$475,900	$1,944,824
Other Areas	16,869	11,898	$1,541,444,469	$2,799,942,229	$1,574,323,556	$5,915,710,254
Unincorporated Amador County Total	**17,828**	**12,434**	**$1,687,406,507**	**$3,026,753,541**	**$1,764,724,121**	**$6,478,884,169**
Grand Total	**24,396**	**17,925**	**$2,350,943,269**	**$4,561,881,010**	**$2,682,368,677**	**$9,595,192,956**

Source: FEMA DFIRM 1/20/2016 2024 Amador County Parcel/Assessor Data

*With respect to improve parcels within the floodplain, the actual structures on the parcels may not be located within the actual floodplain, may be elevated and or otherwise outside of the identified flood zone

**This parcel count only includes those parcels in the 0.2% annual chance flood zone, exclusive of the 1% annual chance flood zone. The 0.2% annual chance flood, in actuality, also includes all parcels in the 1% annual chance flood zone.

Table 4-106 shows Planning Area loss estimates and improved values at risk by FEMA 1% and 0.2% annual chance flood zones. More detailed tables and discussions can be found in each jurisdiction's respective annex to this Base Plan.

Table 4-106 Amador County Planning Area – FEMA DFIRM Flood Loss Estimates

Flood Zone	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value	Loss Estimate	Loss Ratio
1% Annual Chance Flood Hazard	1,826	1,192	$242,379,125	$488,159,906	$384,098,622	$872,258,528	$174,451,706	2.52%
0.2% Annual Chance Flood Hazard	225	204	$21,959,870	$54,493,333	$35,873,827	$90,367,160	$18,073,432	0.26%
Total	**2,051**	**1,396**	**$264,338,995**	**$542,653,239**	**$419,972,449**	**$962,625,688**	**$192,525,138**	**2.78%**

Source: FEMA DFIRM 1/20/2016 2024 Amador County Parcel/Assessor Data

*With respect to improve parcels within the floodplain, the actual structures on the parcels may not be located within the actual floodplain, may be elevated and or otherwise outside of the identified flood zone

**This parcel count only includes those parcels in the 0.2% annual chance flood zone, exclusive of the 1% annual chance flood zone. The 0.2% annual chance flood, in actuality, also includes all parcels in the 1% annual chance flood zone.

According to the information in Table 4-105 and Table 4-106, the Amador County Planning Area has 1,826 improved parcels and roughly $872.3 million of structure and contents value in the 1% annual chance floodplain. There are an additional 225 improved parcels and roughly $18.1 million of structure and contents value in the 0.2% annual chance flood event. A loss ratio of 2.52% and 0.26% indicates that while the Amador County Planning Area does have structural assets at risk to flood, the County should be able to effectively recover from a major flood event.

Unincorporated Amador County

Numerous structures in unincorporated Amador County are at risk of DFIRM flooding and primarily include those structures located within the 1% and 0.2% annual chance floodplains. GIS was used to determine the possible impacts of flooding on parcels and structures within the unincorporated County. Table 4-107 shows parcel counts, land and improved values (i.e., those with a structure improvement on the parcel), estimated content replacement values, and total values in the unincorporated County. This is shown for the detailed flood zones by the 1% and 0.2% annual chance flood zones, as well as for those properties that fall outside of the mapped FEMA DFIRM flood zones.

Table 4-107 Unincorporated Amador County – Count and Value of Parcels and Structures in Detailed FEMA DFIRM 1% and 0.2% Annual Chance Flood Zones by Property Use

Flood Zone / Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
1% Annual Chance Flood Hazard						
Zone A						
Agricultural	292	214	$73,137,287	$42,882,073	$42,882,073	$158,901,433
Commercial	35	27	$6,005,532	$113,098,050	$113,098,050	$232,201,632
Industrial	9	8	$2,698,528	$2,066,396	$3,099,594	$7,864,518
Miscellaneous	158	5	$2,132,767	$5,626,324	$0	$7,759,091
Residential	355	218	$34,988,113	$46,836,792	$23,418,396	$105,243,301
Unknown	25	9	$17,692,072	$2,098,345	$0	$19,790,417
Zone A Total	**874**	**481**	**$136,654,299**	**$212,607,980**	**$182,498,113**	**$531,760,392**
Zone AE						
Agricultural	3	2	$1,279,416	$628,269	$628,269	$2,535,954
Commercial	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	1	1	$873,843	$5,381	$0	$879,224
Residential	8	4	$573,244	$1,255,746	$627,873	$2,456,863
Unknown	0	0	$0	$0	$0	$0
Zone AE Total	**12**	**7**	**$2,726,503**	**$1,889,396**	**$1,256,142**	**$5,872,041**
Zone AE: Regulatory Floodway						

Flood Zone / Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Agricultural	10	7	$759,370	$978,684	$978,684	$2,716,738
Commercial	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
Residential	59	39	$5,304,742	$10,383,452	$5,191,726	$20,879,920
Unknown	1	0	$0	$0	$0	$0
Zone AE: Regulatory Floodway Total	**70**	**46**	**$6,064,112**	**$11,362,136**	**$6,170,410**	**$23,596,658**
1% Annual Chance Flood Hazard Total	**956**	**534**	**$145,444,914**	**$225,859,512**	**$189,924,665**	**$561,229,091**
0.2% Annual Chance Flood Hazard						
Zone X (shaded)						
Agricultural	0	0	$0	$0	$0	$0
Commercial	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
Residential	3	2	$517,124	$951,800	$475,900	$1,944,824
Unknown	0	0	$0	$0	$0	$0
Zone X (shaded) Total	**3**	**2**	**$517,124**	**$951,800**	**$475,900**	**$1,944,824**
0.2% Annual Chance Flood Hazard Total	**3**	**2**	**$517,124**	**$951,800**	**$475,900**	**$1,944,824**
Other Areas						
Zone X (unshaded)						
Agricultural	1,484	938	$207,847,367	$172,573,057	$172,573,057	$552,993,481
Commercial	401	277	$90,796,324	$177,463,456	$177,463,456	$445,723,236
Industrial	43	22	$32,334,460	$11,409,198	$17,113,797	$60,857,455
Miscellaneous	662	69	$17,957,156	$8,181,313	$0	$26,138,469
Residential	14,130	10,515	$1,172,411,560	$2,414,346,492	$1,207,173,246	$4,793,931,298
Unknown	149	77	$20,097,602	$15,968,713	$0	$36,066,315
Zone X (unshaded) Total	**16,869**	**11,898**	**$1,541,444,469**	**$2,799,942,229**	**$1,574,323,556**	**$5,915,710,254**
Other Areas Total	**16,869**	**11,898**	**$1,541,444,469**	**$2,799,942,229**	**$1,574,323,556**	**$5,915,710,254**

Flood Zone / Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Unincorporated Amador County Total	**17,828**	**12,434**	**$1,687,406,507**	**$3,026,753,541**	**$1,764,724,121**	**$6,478,884,169**

Source: FEMA DFIRM 1/20/2016 2024 Amador County Parcel/Assessor Data

*With respect to improve parcels within the floodplain, the actual structures on the parcels may not be located within the actual floodplain, may be elevated and or otherwise outside of the identified flood zone

**This parcel count only includes those parcels in the 0.2% annual chance flood zone, exclusive of the 1% annual chance flood zone. The 0.2% annual chance flood, in actuality, also includes all parcels in the 1% annual chance flood zone.

Table 4-108 shows unincorporated Amador County loss estimates and improved values at risk by FEMA 1% and 0.2% annual chance flood zones.

Table 4-108 Unincorporated Amador County – FEMA DFIRM Flood Loss Estimates

Flood Zone	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value	Loss Estimate	Loss Ratio
1% Annual Chance Flood Hazard	956	534	$145,444,914	$225,859,512	$189,924,665	$415,784,177	$83,156,835	1.20%
0.2% Annual Chance Flood Hazard	3	2	$517,124	$951,800	$475,900	$1,427,700	$285,540	0.004%
Unincorporated Amador County Total	**959**	**536**	**$145,962,038**	**$226,811,312**	**$190,400,565**	**$417,211,877**	**$83,442,375**	**1.204%**

Source: FEMA DFIRM 1/20/2016 2024 Amador County Parcel/Assessor Data

*With respect to improve parcels within the floodplain, the actual structures on the parcels may not be located within the actual floodplain, may be elevated and or otherwise outside of the identified flood zone

**This parcel count only includes those parcels in the 0.2% annual chance flood zone, exclusive of the 1% annual chance flood zone. The 0.2% annual chance flood, in actuality, also includes all parcels in the 1% annual chance flood zone.

According to the information in Table 4-107 and Table 4-108, the unincorporated Amador County has 534 improved parcels and roughly $415.8 million of structure and contents value in the 1% annual chance floodplain. There are an additional 2 improved parcels and roughly $1.4 million of structure and contents value in the 0.2% annual chance flood event. A loss ratio of 1.204% and 0.004% indicates that while the County does have structural assets at risk to flood, the County should be able to effectively recover from a major flood event.

Insurance Coverage, Claims Paid, and Repetitive Losses

Standard property insurance does not include flood coverage because of the relatively high risk. The National Flood Insurance Program (NFIP) provides flood insurance to residents in those communities that participate in the NFIP. Federal financial assistance requires the purchase of flood for structures located within a 1% annual chance floodplain – a requirement that affects nearly all mortgages financed through

commercial lending institutions. Flood insurance is also recommended for all structures protected by levees, even if not mapped within a floodplain. However, there are no certified levees in the Planning Area. Flood insurance promotion and outreach will be important moving forward to ensure vulnerable structures are adequately insured and protected.

Unincorporated Amador County joined as an Emergency Entry on 10/29/1980, and then as a Regular NFIP Entry on 9/24/1984. The County does not participate in the CRS program. NFIP insurance data indicates that as of December 2, 2024, there were 23 policies in force in the unincorporated County, resulting in $4,709,000 of insurance in force and $23,560 in annual premiums paid. Of these, 19 are for residential properties and 4 are nonresidential. 14 of these are in A zones; and 9 policies are for parcels in the B, C, & X zones.

There have been 17 closed paid losses totaling $365,920.56. 16 of these were for residential properties and 1 was for nonresidential. Of these 17 paid losses, 10 were parcels in A zones, 5 parcels were in B, C, & X zones, and 2 had no zone data attached to them. Of the 17 claims, 12 claims were associated with pre-FIRM structures and 3 with post-FIRM structures, and 2 had no data attached to them. There have been 2 substantial damage claims since 1978. There have been 0 Increased Cost of Compliance (ICC) losses. According to FEMA's Community Information System data, there are 2 repetitive loss (RL) and 0 Post-FIRM Severe Repetitive Loss (SRL) buildings.

Based on the flood analysis, the Amador County Planning Area and unincorporated Amador County have significant values at risk to the 1% and 0.2% annual chance and greater floods. In many instances, the impact to the community from those structures falling within the special flood hazard zone (i.e., the 1% annual chance flood zone) can be lessened by those individuals that maintain flood insurance. Within the Planning Area, of the 1,468 improved parcels within the 1% annual chance flood zone, only 110 (or 7.5 percent) of those parcels maintain flood insurance. For the unincorporated County, of the 534 parcels within the 1% annual chance flood zone, only 23 (or 4.3 percent) of these parcels maintain flood insurance. his can be seen on Table 4-109, along with insurance information from the incorporated communities in the County.

Table 4-109 Amador County Planning Area – Percentage of Policy Holders to Improved Parcels in the 1% Annual Chance Floodplain by Jurisdiction

Jurisdiction	Improved Parcels in SFHA (1% Annual Chance) Floodplain*	Insurance Policies in the SFHA (1% Annual Chance) Floodplain	Percentage of 1% Annual Chance Floodplain Parcels Currently Insured
Amador City	0	0	–
Ione	371	51	13.7%
Jackson	207	24	11.6%
Plymouth	7	0	0.0%
Sutter Creek	73	7	9.6%
Unincorporated Amador County	534	23	4.3%

Source: FEMA DFIRM 1/20/2016, FEMA CIS 2024, 2024 Amador County Parcel/Assessor's Data

FEMA also supplied data from their PIVOT database, which provides property use information specific to the RL and SRL properties. However, according to FEMA, there is a discrepancy between CIS and the PIVOT databased on numbers of RL and SRL properties based on how information is transferred between systems. According to the PIVOT database, there are 0 RL properties and 0 SRL properties in the unincorporated County. This can be seen for all communities on Table 4-110. FEMA's CIS data does not include searchable information on property use for RL and SRL properties.

Table 4-110 Amador County Planning Area – RL and SRL Properties and their Status

Jurisdiction	RL Properties	SRL Properties
City of Amador City	0	0
City of Ione	0	0
City of Jackson		
Single-family dwelling	2	0
2-4 family dwelling	1	0
Non-residential building	1	0
Jackson Total	**4**	**0**
City of Plymouth	0	0
City of Sutter Creek		
Single-family dwelling	1	0
Sutter Creek Total	**1**	**0**
Unincorporated Amador County	0	0

Source: FEMA, PIVOT, 3/24/2025

Critical Facilities and Infrastructure

Flooding presents a threat to critical facilities and infrastructure, and community lifelines. Critical facilities and infrastructure plays an immensely important role in our communities. As previously noted, communities rely on roads, rail corridors, and related biking and pedestrian routes for transportation, and on critical infrastructure for drinking water, wastewater service, and draining streets of rainwater. Other utilities play an important role in providing critical services to area residents. Fire, police and other emergency response facilities and functions are also critical to the well being of the community and the ability to respond and recover from hazard events, such as floods. Damage to any one of these systems can threaten public safety, wreak havoc on daily life, impact properties far from flood zones, and result in economic impacts that cascade throughout California. The following GIS analysis identifies critical facilities and infrastructure at risk to 1% and 0.2% annual chance flooding, followed by a discussion on vulnerability of community lifelines.

A separate analysis was performed on the critical facility inventory in the Amador County Planning Area to determine critical facilities in the 1% and 0.2 annual chance flood zones. Using GIS, the DFIRM flood zones were overlayed on the critical facility GIS layer. Figure 4-100 shows critical facilities and the detailed DFIRM flood zones. Table 4-111 details critical facilities in detailed DFIRM flood zones by facility type

and count for the Amador County Planning Area broken out by jurisdiction. Details of critical facilities by type, name, and address by flood zone are listed in Appendix F.

Figure 4-100 Amador County Planning Area – Critical Facilities in DFIRM Flood Zones

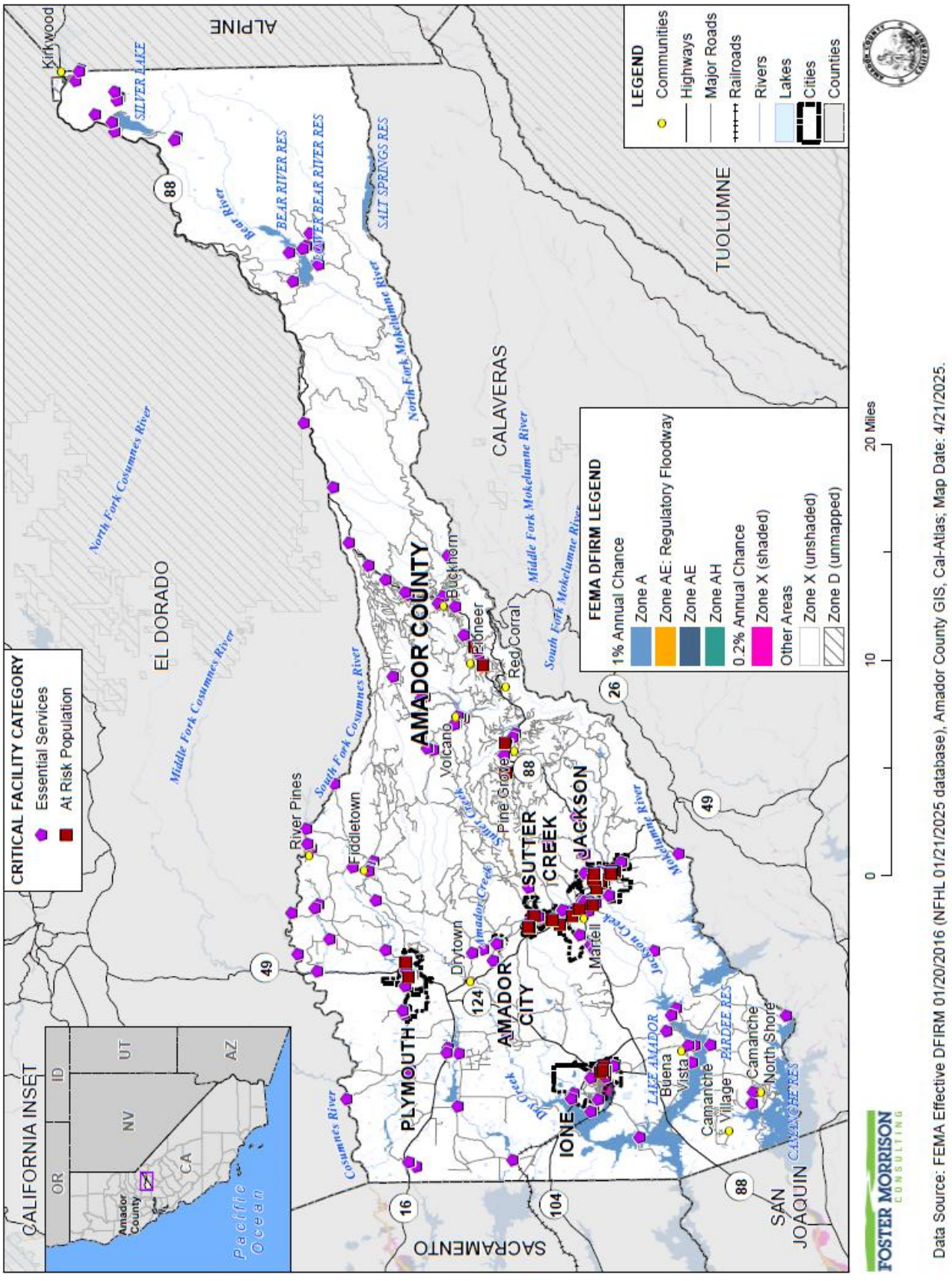


Table 4-111 Amador County Planning Area – Critical Facilities in Detailed DFIRM Flood Zones by Jurisdiction and Category

Jurisdiction / Critical Facility Category / Flood Zone	Facility Count
Amador City	
Essential Services	
1% Annual Chance Flood Hazard	0
0.2% Annual Chance Flood Hazard	0
Other Areas	3
Amador City Total	**3**
Ione	
Essential Services	
1% Annual Chance Flood Hazard	8
0.2% Annual Chance Flood Hazard	0
Other Areas	5
At Risk Population	
1% Annual Chance Flood Hazard	2
0.2% Annual Chance Flood Hazard	1
Other Areas	2
Ione Total	**18**
Jackson	
Essential Services	
1% Annual Chance Flood Hazard	4
0.2% Annual Chance Flood Hazard	1
Other Areas	30
At Risk Population	
1% Annual Chance Flood Hazard	0
0.2% Annual Chance Flood Hazard	0
Other Areas	13
Jackson Total	**48**
Plymouth	
Essential Services	
1% Annual Chance Flood Hazard	0
0.2% Annual Chance Flood Hazard	0
Other Areas	8
At Risk Population	
1% Annual Chance Flood Hazard	0
0.2% Annual Chance Flood Hazard	0
Other Areas	1

Jurisdiction / Critical Facility Category / Flood Zone	Facility Count
Plymouth Total	**9**
Sutter Creek	
Essential Services	
1% Annual Chance Flood Hazard	2
0.2% Annual Chance Flood Hazard	1
Other Areas	4
At Risk Population	
1% Annual Chance Flood Hazard	
0.2% Annual Chance Flood Hazard	
Other Areas	6
Sutter Creek Total	**13**
Unincorporated Amador County	
Essential Services	
1% Annual Chance Flood Hazard	28
0.2% Annual Chance Flood Hazard	0
Other Areas	110
At Risk Population	
1% Annual Chance Flood Hazard	0
0.2% Annual Chance Flood Hazard	0
Other Areas	7
Unincorporated Amador County Total	**145**
Unincorporated Alpine County	
Essential Services	
1% Annual Chance Flood Hazard	0
0.2% Annual Chance Flood Hazard	0
Other Areas	1
Unincorporated Alpine County Total	**1**
Grand Total	**237**

Source: FEMA 1/20/2016 DFIRM, Amador County GIS

Natural, Historic, and Cultural Resources

Large flood events can affect natural, historic, and cultural resources. There are a number of ways floodwaters can impact natural resources and the environment: Wildlife habitats can be destroyed by floodwaters. Contaminated floodwater can pollute rivers and habitats. Silt and sediment can destroy natural areas. Riverbanks and natural levees can be eliminated as rivers reach bankfull capacity. Rivers can be widened, and deposition can increase downstream. Trees can be uprooted by high-velocity water flow. Plants that survive the initial flood may die due to being inundated with water. Historic and cultural

resources may also be affected. Generally, the impacts are associated with damage to structures within the flooded areas, but other cultural resources such as those associated with Native Americans and old tribal areas can also be disturbed, damaged and lost during extreme flood events. Any of these resources that fall in the flood zones would be vulnerable.

FEMA NRI Hazard Vulnerability Assessment

The FEMA NRI was queried for additional specific data on Amador County's vulnerability to Flood: 1%/0.2% annual chance and Flood: Localized Flooding. The NRI contains data and analysis for 18 separate natural hazards. The NRI hazard related to Amador County's Flood: 1%/0.2% annual chance and Flood: Localized Flooding is riverine flooding. As shown in Table 4-112, riverine flooding could cause a total of $535,814 in expected annual losses, with a historic loss rating of relatively low. Riverine flooding has a relatively low rating for both social vulnerability and community resilience, with a risk index score of 54.1 out of 100. According to the NRI, there have been 16 riverine flooding events between the years 1996-2019 with an average of 0.7 events per year.

Table 4-112 Amador County Planning Area – Riverine Flooding Vulnerability Ratings from FEMA NRI

NRI Hazard	Hazard Risk Index Rating*	Expected Annual Loss Values (total)**	Exposure Value (total)***	Historic Loss Ratio Rating
Riverine Flooding	54.1	$535,814	$14,920,746,533	Relatively Low

Source: FEMA NRI Report, retrieved 4/1/2025.

*Hazard Risk Index is calculated using data for only a single hazard type, and reflect a communities expected annual loss value, community risk factors, and the adjustment factor used to calculate the risk value.

**Expected annual loss represents the average economic loss in dollars resulting from natural hazards each year.

***Exposure is a natural hazard consequence factor that is the representative value of buildings, populations, or agriculture potentially exposed to a natural hazard occurrence.

Additional information on the FEMA NRI can be found in Section 4.2 and Appendix G.

Impacts from Flood: 1% and 0.2% Annual Chance Flood

Floods are among the costliest natural disasters in terms of human hardship and economic loss nationwide. Large flood events, including those associated with 1% and 0.2% annual chance floods, can cause substantial damage to structures, landscapes, and utilities as well as life safety issues. People may be swept away in floodwaters, causing injuries or deaths. Floods can be extremely dangerous, and even six inches of moving water can knock over a person given a strong current. During a flood, people can also suffer heart attacks or electrocution due to electrical equipment short outs. Direct impacts, such as drowning, can be limited with adequate warning and public education about what to do during floods. Floodwaters can transport large objects downstream which can damage or remove stationary structures. Structures can be damaged directly from floodwaters and can also be damaged from trees falling as a result of water-saturated soils. Ground saturation can result in instability, collapse, or other damage. Objects can also be buried or destroyed through sediment deposition. Floodwaters can also break utility lines and interrupt services causing power outages. The interruption of power causes major problems and can result in the closure of governmental offices and community businesses. Public schools may also be required to

close or be placed on a delayed start schedule. Roads can be damaged and closed, causing safety and evacuation issues.

Standing water can cause damage to crops, roads, foundations, and electrical circuits. Other problems connected with flooding and stormwater runoff include erosion, sedimentation, degradation of water quality, loss of environmental resources, and economic impacts.

Impacts that are not quantified, but can be anticipated in large future events, include:

- Injury and loss of life;
- Commercial and residential structural and property damage;
- Disruption of and damage to public infrastructure, utilities, and services;
- Damage to roads/bridges resulting in loss of mobility;
- Significant economic impact (jobs, sales, tax revenue) to the community; and
- Negative impact on commercial and residential property values

Health Hazards from Flooding

Certain health hazards are also common to flood events. While such problems are often not reported, three general types of health hazards accompany floods. The first comes from the water itself. Floodwaters carry anything that was on the ground that the upstream runoff picked up, including dirt, oil, animal waste, and lawn, farm and industrial chemicals. Pastures and areas where cattle and hogs are kept or their wastes are stored can contribute polluted waters to the receiving streams.

Floodwaters also saturate the ground, which leads to infiltration into sanitary sewer lines. When wastewater treatment plants are flooded, there is nowhere for the sewage to flow. Infiltration and lack of treatment can lead to overloaded sewer lines that can back up into low-lying areas and homes. Even when it is diluted by flood waters, raw sewage can be a breeding ground for bacteria such as e. coli and other disease-causing agents.

The second type of health problems arise after most of the water has gone. Stagnant pools can become breeding grounds for mosquitoes, and wet areas of a building that have not been properly cleaned breed mold and mildew. A building that is not thoroughly cleaned becomes a health hazard, especially for small children and the elderly.

Another health hazard occurs when heating ducts in a forced air system are not properly cleaned after inundation. When the furnace or air conditioner is turned on, the sediments left in the ducts are circulated throughout the building and breathed in by the occupants. If a city or county water system loses pressure, a boil order may be issued to protect people and animals from contaminated water.

The third problem is the long-term psychological impact of having been through a flood and seeing one's home damaged and irreplaceable keepsakes destroyed. The cost and labor needed to repair a flood-damaged home puts a severe strain on people, especially the unprepared and uninsured. There is also a long-term problem for those who know that their homes can be flooded again. The resulting stress on floodplain residents takes its toll in the form of aggravated physical and mental health problems.

Impacts to identified assets at risk to this hazard and the overall vulnerability of the County may be affected in the future by climate change (which was discussed in the hazard profile section above), changes in population patterns, and changes in land use and development. The influencing effects of these factors on this hazard are discussed further in the Future Conditions/Future Development discussion below.

Future Conditions/Future Development

This section provides a discussion of how future conditions will influence or affect the hazard over time and also discusses future development relative to each hazard.

Future Conditions

Future hazard conditions may be affected by climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. Findings on this for Amador County include the following:

- Climate change is likely to exacerbate future flood conditions and associated impacts and vulnerability of the County to 1% and 0.2% annual chance flooding.
- Population growth in Amador County is expected to slowly continue. Additional growth within the DFIRM flood zones in the County would place additional populations at risk to flooding. Additional population growth would likely bring continued diversity to the County. Vulnerable population groups could face disproportionate effects from a flood and should be planned for. Changes in population and population patterns may or may not increase the impacts and vulnerability of the County to this hazard depending on the location and nature of growth and continued planning for future hazard conditions.
- Land use planning should be proactive to address future hazard conditions. Locating new development, structures and critical facilities and infrastructure within or near areas of flood risk may put additional development at risk. However, County building codes and the County's floodplain ordinance are in effect to reduce this risk and should be updated as necessary to continue to address future flood conditions. Depending on the location of new development and adherence to protective building codes and the floodplain ordinance, changes in land use and development may or may not increase the impacts and associated vulnerabilities of the County to this hazard.

Future Development

This section provides an analysis of the flood hazard and proposed future development within the County based on FEMA floodplains and also discusses considerations in evaluating future flooding conditions.

Future development considerations should be ongoing and proactive. Ensuring that comprehensive land use planning is conducted, regulatory requirements, such as building codes, are followed, and varying needs for different demographic groups with intersecting identities that reside within the County are considered can help to make for a more resilient community.

Future Development: General Considerations

Communities that participate in the NFIP adopt regulations and codes that govern development in special flood hazard areas (SFHAs) and enforce those requirements through their local floodplain management

ordinances through the issuance of permits. Amador County's floodplain management ordinance provides standards for development, subdivision of land, construction of buildings, and improvements and repairs to buildings that generally meet the minimum requirements of the NFIP.

The International Residential Code (IRC) and International Building Code (IBC), by reference to ASCE 24, include requirements that govern the design and construction of buildings and structures in flood hazard areas. FEMA has determined that the flood provisions of the I-Codes are consistent with the requirements of the NFIP (the I-Code requirements shown either meet or exceed NFIP requirements). ASCE 24, a design standard developed by the American Society of Civil Engineers, expands on the minimum NFIP requirements with more specificity, additional requirements, and some limitations.

With the adoption of the International Codes, communities will be moving towards a more stringent approach to regulatory floodplain management, beyond the minimum requirements of the NFIP. The adoption and enforcement of disaster-resistant building codes is a core community action to promote effective mitigation. When communities ensure that new buildings and infrastructure are designed and constructed in accordance with national building codes and construction standards, they significantly increase local resilience now and in the future. With continued advancements in building codes, local ordinances should be reviewed and updated to meet and exceed standards as practicable to protect new development from future flood events and to further promote disaster resiliency.

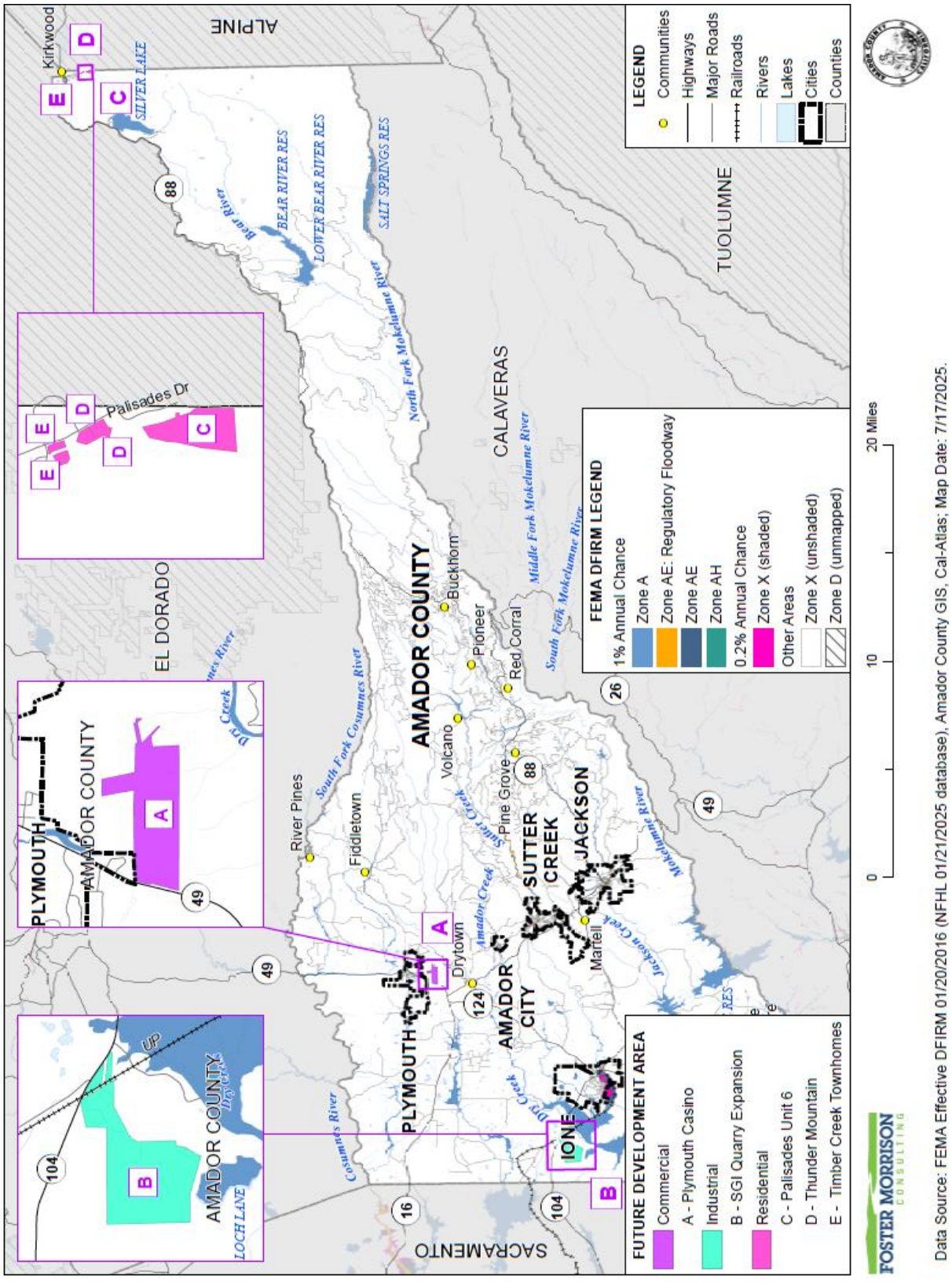
One of the most effective ways to reduce vulnerability to potential flood damage is through careful land use planning that fully considers applicable flood management information and practices. Master planning will also be necessary to assure that open channel flood flow conveyances serving the smaller internal streams and drainage areas are adequately prepared to accommodate the flows. Preservation and maintenance of natural and riparian areas should also be an ongoing priority to realize the flood control benefits of the natural and beneficial functions of these areas.

Future development in the County may be built in the floodplain, in conformance to the standards of the floodplain ordinance. The County enforces the floodplain ordinance on new development in unincorporated Amador County. Future development areas and their vulnerability to DFIRM flooding is discussed further in the below GIS analysis.

Future Development: GIS Analysis

Amador County provided five future development areas which were used as the basis for the inventory of future development for the unincorporated County. These were mapped in GIS. Where multiple parcels are listed, the parcels are merged to form one polygon, and the hazards are assigned to the highest annual chance flood zone category. Figure 4-101 show the locations of the future development areas and FEMA DFIRM flood zones. As shown, all of these areas fall outside of the 1% and 0.2% annual chance flood zones; as such, no tabular analysis is presented.

Figure 4-101 Unincorporated Amador County – Future Development in FEMA DFIRM Flood Zones



4.3.13. Flood: Localized Flooding

Hazard Profile

This hazard profile contains multiple sections that detail how this hazard can affect the Amador County Planning Area. These sections include a hazard/problem description; description of location and extent; past occurrences of this hazard; likelihood of future occurrence; and how climate change can affect or influence this hazard.

Hazard/Problem Description

Flooding occurs in areas other than the FEMA mapped floodplains. Flooding may be from drainages not studied by FEMA, lack of or inadequate drainage infrastructure, or inadequate maintenance. Localized, stormwater flooding occurs throughout the Amador County Planning Area during the rainy season from November through April. Prolonged heavy rainfall contributes to a large volume of runoff resulting in high peak flows of moderate duration. Flooding is more severe when previous rainfall has created saturated ground conditions. Urban storm drainpipes and pump stations have a finite capacity. When rainfall exceeds this capacity, or the system is clogged, water accumulates in the street until it reaches a level of overland release. This type of flooding may occur when intense storms occur over areas of development.

Location and Extent

There is no established scientific scale or measurement system for localized flooding. Localized flooding is generally measured by depth of flooding and the area affected. Localized flooding often happens quickly and has a short speed of onset. In the County this happens more often during the winter months, as was shown on Figure 4-47 above. Localized flooding often has a short duration. Specific locations in the County can be seen in the Local Concerns section below in Table 4-113.

Past Occurrences

Disaster Declarations

There are no identified state or federal disaster declarations for localized flooding, as shown in Table 4-4. However, localized flooding was likely an issue during previous declarations for severe storms, heavy rains and floods.

NCDC Events

The past occurrences of localized flooding are included in the 1% and 0.2% annual chance flood hazard profile in Section 4.3.12.

Hazard Mitigation Planning Committee Events

The HMPC noted the following events:

2017 – Heavy rains in 2017 caused flooding in many areas. Localized flooding occurred throughout the County. This was brought on by atmospheric rivers bringing heavy rains to large portions of the County. In addition to flooding, damage to these areas included pavement deterioration, washouts, and areas of erosion, The following areas have had localized flooding: Old Sacramento Road, Tonzi Road, Carbondale Road, Paine Road, Sutter Ione Road, Climax Road and others.

Figure 4-102 Old Sacramento Road



Source: Amador County

Figure 4-103 Tonzi Road



Source: Amador County

Figure 4-104 Carbondale Road



Source: Amador County

Figure 4-105 Paine Road



Source: Amador County

Figure 4-106 Sutter Ione Road #1



Source: Amador County

Figure 4-107 Sutter Ione Road #2



Source: Amador County

Figure 4-108 Climax Road



Source: Amador County

In 2023, Amador County Public Works noted that localized flooding occurred. It was contained to just a few low-lying areas, such as the Sutter Creek-Volcano Road and the creek crossing on Amador Road and Turner Road.

Likelihood of Future Occurrence

Highly Likely—Natural drainage systems located throughout the Amador County Planning Area have a finite capacity to convey water. Likewise, storm drainage systems have a finite capacity generally based on the design criteria. When rainfall exceeds the capacity of natural and storm drainage systems or systems clog, water accumulates until it reaches a level of overland release. Due to aging and often undersized infrastructure, this type of flooding will continue to occur annually during heavy rains.

It is likely that climate change will increase the chance of future occurrence as well as future impacts. More information on climate change and localized flood can be found in the next section. More information on future impacts can be found in the Future Conditions/Future Development section of the Vulnerability Assessment below.

Climate Change and Localized Flood

Even if average annual rainfall may decrease slightly, the intensity of individual rainfall events is likely to increase during the 21st century, increasing the likelihood of overwhelming stormwater systems built to historical rainfall averages. This makes localized flooding more likely.

Vulnerability Assessment

Vulnerability—Medium

Flood vulnerability and their impacts vary by location and severity of any given flood event and will likely only affect certain areas of the Amador County Planning Area during specific times. Based on the risk assessment, it is evident that floods will continue to have potentially significant economic impacts to certain areas of the Amador Planning Area. However, while flooding can cause significant impacts depending on the duration and volume of precipitation and the drainage in any given area, many of the floods in the Planning Area are minor, localized flood events that are more of a nuisance than a disaster.

Many areas of the Planning Area are at some measure of vulnerability to localized flooding. An assessment of a community's vulnerability to this hazard begins with an understanding of local exposure to unincorporated Amador County. This is included in the Local Concerns section below. After that, vulnerability is discussed in multiple sections that detail how this hazard can affect both the entire Amador County Planning Area as well as the unincorporated portions of Amador County. How the hazard affects the other participating jurisdictions can be found in their respective annexes to this LHMP Update. These sections below include assets at risk, impacts, and how future development may affect the vulnerability of the County to this hazard.

Local Concerns (unincorporated Amador County)

The unincorporated County has specific concerns regarding this hazard. These concerns form a portion of the basis for the mitigation strategy and mitigation actions that seek to reduce vulnerabilities to this hazard.

According to Amador County, numerous parcels and roads throughout the County not included in the FEMA 1% and 0.2% annual chance floodplains are subject to flooding in heavy rains. In addition to flooding, damage to these areas during heavy storms includes pavement deterioration, washouts, mudslides, debris areas, and downed trees. The frequency and type of damage or flooding that occurs varies from year to year, depending on the quantity of runoff.

The primary areas of localized flooding and the types of damage are shown on Figure 4-109 and presented in Table 4-113.

Figure 4-109 Amador County – Localized Flooding Areas

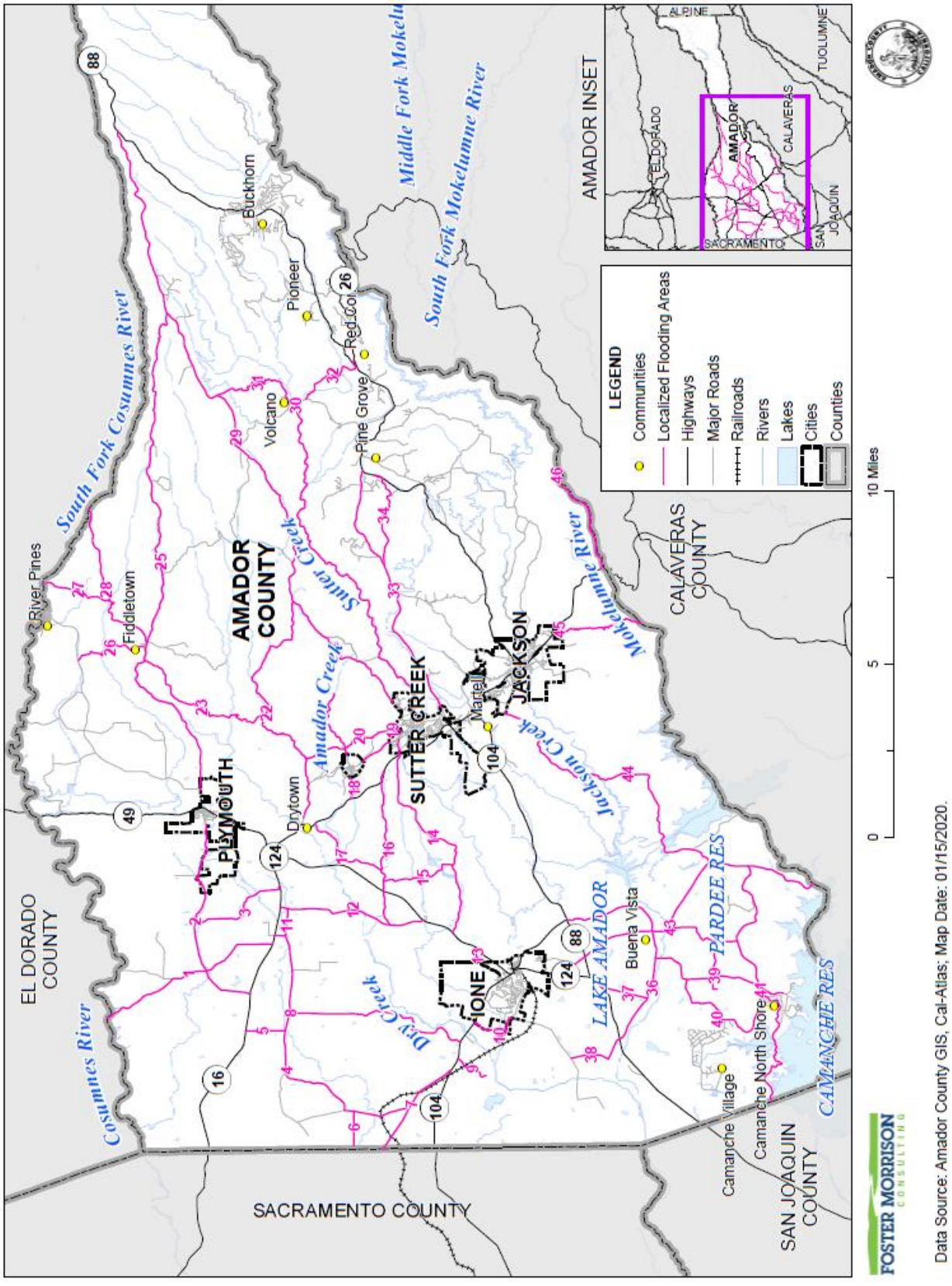


Table 4-113 Amador County Localized Flooding Areas

No.	Road Name	Flooding	Pavement Deterioration	Washouts	High Water/ Creek Crossing	Landslides/ Mudslides	Debris	Downed Trees
1	Labtrobe Rd	X				X		
2	Old Sacramento Rd	X	X				X	
3	Greilich Rd	X	X	X	X		X	
4	Carbondale Rd	X			X		X	
5	Forest Home Rd	X					X	
6	Maxwell Rd	X	X					
7	Michigan Bar Rd						X	
8	Irish Hill Rd	X	X					X
9	Dutschke Rd	X						
10	Five Mile Dr						X	
11	Huot Rd	X			X			
12	Willow Creek Rd	X						
13	Waterman Rd	X	X				X	
14	Sutter Ione Rd	X				X	X	X
15	Paine Rd	X	X		X	X	X	
16	Tonzi Rd	X	X		X	X	X	
17	Vaira Ranch Rd	X	X		X	X	X	
18	Old Hwy 49					X		
19	Amador Rd				X			
20	Turner Rd		X		X			
21	Amador Creek Rd	X	X	X	X			X
22	New Chicago Rd	X					X	
23	Quartz Mountain Rd N	X			X		X	
24	Quartz Mountain Rd E	X			X	X		
25	Fiddletown Rd	X	X				X	X
26	Ostrom Rd	X					X	
27	Lawrence Rd							X
28	Tyler Rd		X			X		X
29	Shakeridge Rd	X	X	X		X	X	
30	Sutter Creek Rd	X	X	X		X	X	X
31	Rams Horn Grade	X					X	
32	Pioneer Volcano Rd	X	X	X	X	X	X	X

No.	Road Name	Flooding	Pavement Deterioration	Washouts	High Water/ Creek Crossing	Landslides/ Mudslides	Debris	Downed Trees
33	Ridge Rd					X		X
34	Climax Rd					X	X	X
35	Buena Vista Rd	X	X			X	X	
36	Jackson Valley Rd	X	X				X	
37	Martin Ln	X	X				X	
38	Dave Brubeck Rd	X	X				X	
39	Camanche Rd	X	X			X	X	
40	Curran Rd	X	X				X	
41	Camanche Parkway N	X				X		
42	Reservation Rd	X						
43	Coal Mine Rd	X	X			X	X	
44	Stony Creek Rd	X	X	X		X	X	X
45	Middle Bar Rd		X			X	X	X
46	Electra Rd	X	X	X	X	X	X	X

Source: Amador County

Local concerns for each of the participating jurisdictions can be found under the Local Concerns heading in each respective jurisdictional annex to this LHMP Update.

Assets at Risk

Assets at risk from localized flood include people and populations; structures; critical facilities and infrastructure; and natural, historic, and cultural resources. These are discussed in the following sections for the Amador County Planning Area and unincorporated Amador County.

Additionally, for each hazard in the FEMA National Risk Index in Amador County, the relevant portions of the hazard analysis done by FEMA is presented below. This includes the Hazard Risk Index Rating, Expected Annual Loss Values, Exposure Values, and the Historic Loss Ratio Rating. These are presented for the Amador County Planning Area as a whole.

People and Populations

People and populations are traditionally not highly vulnerable to localized flooding, but their structures and contents can be at risk. Localized flooding may also cause transportation issues as roads and lanes are impacted or closed and affect the ability for people to travel throughout the Planning Area.

Structures

Structures in areas with localized flooding can be affected if floodwaters intrude into the structure. Structures in low lying areas, or those with basements can be at greater risk. Buildings with older

foundations that are prone to water intrusion are also at greater risk. Once water finds its way into a structure, it tends to continue to do so until the path that brings water into a structure is mitigated. Ground saturation can result in instability, collapse, or other damage to structures. Trees can also be compromised and uprooted falling on structures causing damage.

Critical Facilities and Infrastructure

Localized flooding, while often more of a nuisance, can cause damage to critical facilities and infrastructure during a heavy rain and storm event. Any facility that experiences localized flooding can be impacted. Utilities and other critical infrastructure can all be affected, causing interruptions in service until repairs can be made. For example, water and wastewater systems can be vulnerable to heavy rains and flood events. Rainfall creates a high water table, surging streams and creeks, and saturates soil. Infiltration of stormwater into water and wastewater systems may occur and presents a threat to public health and safety, when the infrastructure is no longer able to meet operational needs and local demands.

Natural, Historic, and Cultural Resources

Natural resource assets may have some vulnerabilities to localized flood during major storm events, but can benefit from floodwaters, often by design. Many parks and green spaces are designed to take overflow water and release it into the underlying soils and natural areas. Wetlands areas in the Planning Area actually help reduce the risk of flooding, as they can absorb excess rainfall that would have to be drained away from impervious surfaces. Flooding can provide many benefits to the natural environment, including recharging wetlands and groundwater, increasing fish production, creating wildlife habitat, and rejuvenating soil fertility. These smaller localized flooding events often provide more benefits to the environment in comparison to negative impacts associated with large flood events. Historic and cultural resources may be at some measure of vulnerability if they are located in areas subject to repeated localized flooding.

Impacts from Localized Flood

Primary concerns associated with stormwater flooding include impacts to infrastructure that provides a means of ingress and egress throughout the community. Ground saturation can result in instability, collapse, or other damage to trees, structures, roadways and other critical infrastructure. Objects can also be buried or destroyed through sediment deposition. Floodwaters can break utility lines and interrupt services. Standing water can cause damage to crops, roads, and foundations. Other problems connected with flooding and stormwater runoff include erosion, sedimentation, degradation of water quality, losses of environmental resources, and certain health hazards.

Life safety issues from localized flooding would be more limited. The amount and type of damage or flooding that occurs varies from year to year and from storm to storm, depending on the quantity of precipitation and runoff.

Impacts to identified assets at risk to this hazard and the overall vulnerability of the County may be affected in the future by climate change (which was discussed in the hazard profile section above), changes in population patterns, and changes in land use and development. The influencing effects of these factors on this hazard are discussed further in the Future Conditions/Future Development discussion below.

Future Conditions/Future Development

Future hazard conditions may be affected by climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. Findings on this for Amador County include the following:

- Climate change is likely to exacerbate future heavy rain conditions and associated impacts and vulnerability of the County to localized flood.
- Future population growth should be considered, as having more or less people in a community affects the overall hazard vulnerability to the County. Population growth in Amador County is expected to continue (though slowly). Additional population growth would likely bring continued diversity to the County. Vulnerable population groups such as low-income individuals and households living in floodprone areas could face disproportionate effects from localized flood and should be planned for. Changes in population and population patterns may or may not increase the impacts and vulnerability of the County to this hazard depending on the location and nature of growth and continued planning for future hazard conditions.
- Land use planning should be proactive to address future hazard conditions. While limited, much of the growth in Amador County is occurring through expansion of the more urbanized areas, causing an increase in peak flow and stormwater runoff. Such growth will consume previously undeveloped acres, and the impacts may overwhelm existing drainage and flood control facilities. Locating new development, structures and critical facilities and infrastructure within or near areas of localized flooding risk may put additional development at risk. County building codes are in effect to reduce this risk and should be updated as necessary to continue to address future localized flood conditions. Depending on the location of new development and adherence to protective building codes, changes in land use and development may or may not increase the impacts and associated vulnerabilities of the County to this hazard.

The potential for flooding may increase as stormwater is channeled due to land development. Such changes can create localized flooding problems inside and outside of natural floodplains by altering or confining natural drainage channels. Mitigating the root causes of the localized stormwater flooding or choosing not to develop in areas that often are subject to localized flooding will reduce future risks of losses due to stormwater/localized flooding. Floodplain modeling and master planning should be based on built out property conditions to ensure that all new development remains safe from future flooding.

Future development considerations should be ongoing and proactive. Ensuring that comprehensive land use planning is conducted, regulatory requirements, such as building codes, are followed, and varying needs for different demographic groups with intersecting identities that reside within the County are considered can help to make for a more resilient community.

4.3.14. Landslides, Mudslides, and Debris Flows

Hazard Profile

This hazard profile contains multiple sections that detail how this hazard can affect the Amador County Planning Area. These sections include a hazard/problem description; description of location and extent;

past occurrences of this hazard; the likelihood of future occurrence; and how climate change can affect or influence this hazard.

Hazard/Problem Description

Like its earthquake-generating faults, California's mountainous terrain is a consequence of dynamic geologic processes in operation as the North American Plate grinds past the Pacific Plate. According to the CGS, 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. Landslides are classified into many different types based on form and type of movement. They range from slow-moving rotational slumps and earth flows, which can slowly distress structures but are less threatening to personal safety, to fast-moving rock avalanches and debris flows that are a serious threat to structures and have been responsible for most fatalities during landslide events. For the purposes of this LHMP Update, the term landslide includes mudslides, debris flows, and rockfalls that tend to occur suddenly; as well as hillside erosion, which is a similar process that tends to occur on smaller scales and more gradually but can exacerbate landslide events.

Landslides, debris flows and mudslides are closely related to flooding, as both processes are related to precipitation, runoff, and the saturation of ground by water. In addition, landslides, mud flows, and debris flows can occur on small, steep stream channels and are often mistaken for floods. However, landslide events may be much more destructive than floods because of their higher densities, high debris loads, and high velocities.

Soil erosion is another common form of soil instability. Erosion is a function of soil type, slope, rainfall intensity, and groundcover. It accounts for a loss in many dollars of valuable soil, is aesthetically displeasing, and often induces even greater rates of erosion and sedimentation. Sedimentation is simply the accumulation of soil as a result of erosion. Construction activities often contribute greatly to erosion and sedimentation. Besides being a pollutant in its own right, sediment acts as a transport medium for other pollutants, especially nutrients, pesticides, and heavy metals, which adhere to the eroded soil particles. As the sediment drains into watercourses, the combination of these pollutants adversely affects water quality and can eventually impact stream flows and contribute to flooding potential. Conditions that contribute to landslide, mudslides, debris flows, hillside and streambank erosion include 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 (discussed in Section 4.3.15)
- Road building, excavation, and grading
- Earthquake

The 2023 State of California Hazard Mitigation Plan noted that more than one third of California is mountainous terrain that generally trends parallel to the coast, forming a barrier that captures moisture from offshore storms originating in the Gulf of Alaska and Mexico. Steep topography, weak rocks, heavy winter rains, and occasional earthquakes all lead to slope failures more frequently than would otherwise occur

under gravity alone. This is true in the mountainous, sloped areas within the Planning Area where the topography is characterized by rolling hills elevation changes.

Location and Extent

Landslides can be expected in areas with steep slopes and weak soils. It can also occur in areas where erosion has previously occurred. Both winter storms (precipitation-induced) and earthquake triggered landslides tend to occur in or near places that have experienced previous landslides. However, landslides may also occur in other locations over time.

Figure 4-110 shows the CGS areas at susceptible to deep seated landslides. The legend on Figure 4-110 shows the susceptibility scale (from 0-X with 0 being the least and X being the most susceptible) that the CGS uses to show the susceptibility of landslides. It is a primarily a combination of slope class and rock strength. Geographic extents of these classes for the unincorporated Amador County are shown on Table 4-114. Details on each participating jurisdiction's CGS deep-seated landslide extents can be found in their respective annexes to this LHMP Update.

According to the 2023 State Hazard Mitigation Plan, the susceptibility classes were further categorized into Very High (susceptibility class X) and High (susceptibility classes VII, VIII, & IX) for exposure analysis. The rest of the classes were not categorized. CGS mapping indicates that the eastern portions of the County Planning Area and surrounding area have areas at high to very high susceptibility areas for landslides. The western portion of the County, while much more limited, also includes some areas at high to very high landslide susceptibility. This can be seen in the darker orange and red colors. The speed of onset of landslide is often short, especially in post-wildfire burn scar areas, but it can also take years for a slope to fail. Landslide duration is usually short, though digging out and repairing landslide areas can take some time. In Amador County, landslides generally occur where there is very little population or infrastructure.

Figure 4-110 Amador County Planning Area – Susceptibility to Deep Seated Landslides

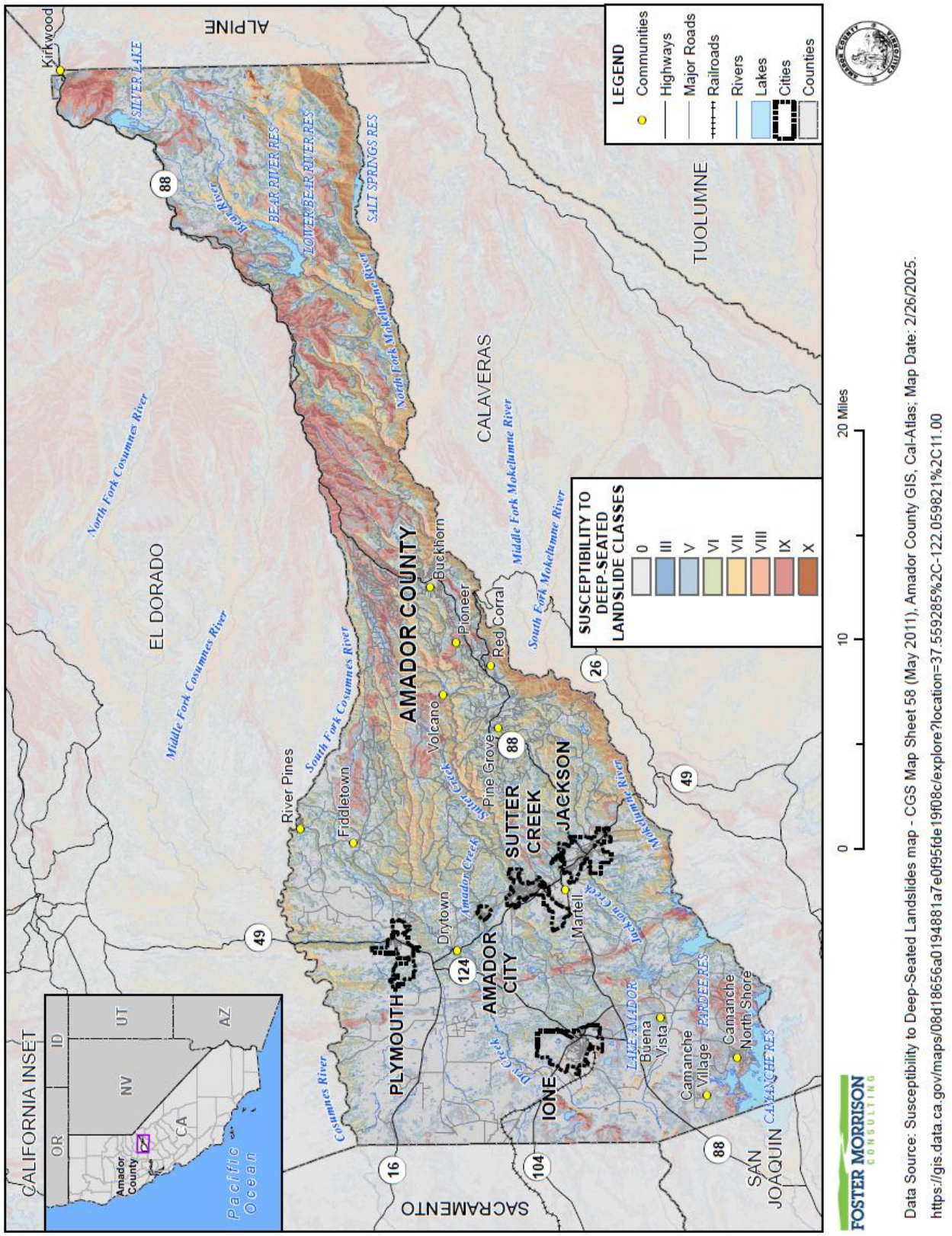


Table 4-114 Amador County Planning Area – Geographical Deep Seated Landslide Classes Extent

Jurisdiction / Susceptibility to Deep-Seated Landslide Class	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Amador City						
0	34	0.009%	13	0.008%	21	0.009%
III	57	0.01%	21	0.01%	36	0.02%
V	0	0.0%	0	0.0%	0	0.0%
VI	59	0.02%	16	0.009%	43	0.02%
VII	43	0.01%	9	0.005%	34	0.02%
VIII	5	0.001%	2	0.001%	3	0.001%
IX	0	0.0%	0	0.0%	0	0.0%
X	0	0.0%	0	0.0%	0	0.0%
Amador City Total	**198**	**0.05%**	**61**	**0.04%**	**137**	**0.06%**
Ione						
0	2,023	0.52%	507	0.30%	1,516	0.69%
III	134	0.03%	0	0.00002%	134	0.06%
V	570	0.15%	126	0.07%	444	0.20%
VI	60	0.02%	0	0.0%	60	0.03%
VII	102	0.03%	35	0.02%	68	0.03%
VIII	59	0.02%	16	0.009%	44	0.02%
IX	25	0.006%	6	0.004%	18	0.008%
X	0	0.0%	0	0.0%	0	0.0%
Ione Total	**2,973**	**0.77%**	**690**	**0.41%**	**2,283**	**1.04%**
Jackson						
0	1,569	0.40%	561	0.33%	1,009	0.46%
III	419	0.11%	132	0.08%	287	0.13%
V	61	0.02%	30	0.02%	31	0.01%
VI	145	0.04%	38	0.02%	107	0.05%
VII	70	0.02%	12	0.01%	57	0.03%
VIII	33	0.01%	8	0.00%	25	0.01%
IX	3	0.001%	1	0.0005%	3	0.00%
X	0	0.0%	0	0.0%	0	0.0%
Jackson Total	**2,302**	**0.59%**	**782**	**0.47%**	**1,520**	**0.69%**
Plymouth						
0	1,271	0.33%	572	0.34%	698	0.32%

Jurisdiction / Susceptibility to Deep-Seated Landslide Class	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
III	267	0.07%	26	0.02%	240	0.11%
V	0	0.0%	0	0.0%	0	0.0%
VI	124	0.03%	1	0.001%	124	0.06%
VII	34	0.009%	0	0.0%	34	0.02%
VIII	1	0.0004%	0	0.0%	1	0.001%
IX	0	0.0%	0	0.0%	0	0.0%
X	0	0.0%	0	0.0%	0	0.0%
Plymouth Total	**1,698**	**0.44%**	**600**	**0.36%**	**1,098**	**0.50%**
Sutter Creek						
0	1,164	0.30%	546	0.33%	618	0.28%
III	315	0.08%	134	0.08%	181	0.08%
V	33	0.008%	9	0.006%	23	0.01%
VI	137	0.04%	57	0.03%	80	0.04%
VII	48	0.01%	14	0.008%	34	0.02%
VIII	10	0.00%	2	0.001%	8	0.004%
IX	2	0.0005%	0	0.0001%	2	0.001%
X	0	0.0%	0	0.0%	0	0.0%
Sutter Creek Total	**1,709**	**0.44%**	**762**	**0.45%**	**947**	**0.43%**
Unincorporated Amador County						
0	140,569	36%	77,398	46%	63,170	29%
III	54,223	14%	25,575	15%	28,647	13%
V	35,424	9%	14,510	9%	20,914	10%
VI	42,155	11%	17,541	10%	24,614	11%
VII	47,138	12%	15,997	10%	31,141	14%
VIII	36,230	9%	8,611	5%	27,619	13%
IX	23,505	6%	5,578	3%	17,927	8%
X	137	0.04%	21	0.01%	116	0.1%
Unincorporated Amador County Total	**379,381**	**98%**	**165,231**	**98%**	**214,150**	**97%**
Grand Total	**388,260**	**100%**	**168,125**	**100%**	**220,134**	**100%**

Source: Susceptibility to Deep-Seated Landslides map – CSG Map Sheet 58 (05/2011)

Past Occurrences

Disaster Declaration History

There have been no disaster declarations associated with solely landslides in Amador County; however, as shown in Table 4-115, there have been 9 state and 10 federal disaster declarations for flood which included landslides as a component.

Table 4-115 Amador County – Federal and State Disaster Declarations Summary 1950-2025

Disaster Type	State Declarations		Federal Declarations	
	Count	Years	Count	Years
Flood (events that included landslide)	9	1995 (twice), 2006 (twice), 2017 (twice), 2019, 2023 (twice)	10	1995 (twice), 2006 (twice), 2017 (twice), 2019, 2023 (three)

Source: Cal OES, FEMA. Retrieved March 2025.

NCDC Events

The NCDC contains no records for landslides in Amador County. There has, however, been a damaging debris flow recorded in the County. This can be seen in Table 4-116.

*Table 4-116 NCDC Landslide and Debris Flow Events for Amador County 1950-7/31/2024**

Event Type	Number of Events	Deaths	Deaths (indirect)	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Debris Flows	1	0	0	0	0	$100,000	$0

Source: NCDC

Hazard Mitigation Planning Committee Events

There are certain areas within the County that are susceptible to slope failure resulting in localized landslides, mudslides, and debris flows. These areas are detailed in the Local Concern section below. Past occurrences of this hazard include the following:

In **2005 -** a landslide on the north side of Shake Ridge Road near Sutter Creek occurred. The hillside failed which, in turn, damaged 300 feet of water supply ditch. This ditch fed 6 cities/towns. The Amador Water Agency installed a pipeline to remove the risk of future issues in this area.

2023 - Amador County Public Works noted that there were small localized incidents that occurred in 2023 in some of the landslide areas Local Concerns section below. No damages were reported from these events.

Figure 4-111 Amador County Planning Area – Slip in Hillside from 2022/2023 Storm Events



Source: Amador County OES

It was also noted that Tiger Creek Road and Tiger Creek Afterbay Dam Road see ongoing issues due to severe winter weather and other issues. Erosion and slumping can occur in these areas.

Likelihood of Future Occurrence

Likely—Based on data provided by the HMPC, landslides are naturally occurring events that will inevitably happen as long as gravity itself is a controlling factor upon the landscape. Since Amador County's mountainous terrain in the eastern portion of the County challenges gravity as it rapidly rises to upper elevations, much of the high-relief topography in the County can be identified as land with the potential for

landslides. Much of that land though is in remote and undeveloped locales, which reduces the risk and vulnerability of this natural hazard. Given the nature of localized problems identified within the County, landslides will likely continue to impact the area when heavy precipitation occurs (especially in post wildfire burn areas) as they have in the past.

It is likely that climate change will increase the chance of future occurrence as well as future impacts. More information on climate change and landslide and debris flow can be found in the next section. More information on future impacts can be found in the Future Conditions/Future Development section of the Vulnerability Assessment below.

Climate Change and Landslide and Debris Flows

According to the 2021 CAS (as well as the 2024 Draft CAS), climate change may result in precipitation extremes (i.e., wetter wet periods and drier dry periods). More information on precipitation increases can be found in Section 4.3.3. While total average annual rainfall may decrease only slightly, rainfall is predicted to occur in fewer, more intense precipitation events. The combination of a generally drier climate in the future, which will increase the chance of drought and wildfires, and the occasional extreme downpour is likely to cause more mudslides, landslides, and debris flows.

Vulnerability Assessment

Vulnerability—Medium

According to historical hazard data and landslide hazard mapping, landslides can occur in the Amador County Planning Area. An assessment of a community's vulnerability to this hazard begins with an understanding of local exposure to unincorporated Amador County. This is included in the Local Concerns section below. After that, vulnerability is discussed in multiple sections that detail how this hazard can affect both the entire Amador County Planning Area as well as the unincorporated portions of Amador County. How the hazard affects the other participating jurisdictions can be found in their respective annexes to this LHMP Update. These sections below include assets at risk, impacts, and how future development may affect the vulnerability of the County to this hazard.

Local Concerns (unincorporated Amador County)

The unincorporated County has specific concerns regarding this hazard. These concerns form a portion of the basis for the mitigation strategy and mitigation actions that seek to reduce vulnerabilities to this hazard.

The 2016 Amador County General Plan Safety Element noted that although landslides are primarily associated with slopes greater than 15 percent, they can also occur in relatively flat areas and as cut-and-fill failures, river bluff failures, lateral spreading landslides, collapse of wine-waste piles, failures associated with quarries, and open-pit mines. Landslides in the County may be triggered by both natural- and human-caused activity.

The County noted that many areas in eastern Amador County are also rated high or very high in their susceptibility to landslide due to erosive soils, and from hydrophobic soils from past wildfire burn scars. There is very little population or improved parcels in this area.

Areas identified by the County with historic problems include those listed below.

- Landslides/Mudslides
  - ✓ Camanche Parkway No.
  - ✓ Carson Pass area
  - ✓ Charleston Road
  - ✓ Climax Road
  - ✓ Deer Trail
  - ✓ Electra Road
  - ✓ Fiddletown Road
  - ✓ Latrobe Road
  - ✓ Michigan Bar Road
  - ✓ Middle Bar Road
  - ✓ Old Highway 49
  - ✓ Pioneer – Volcano Road
  - ✓ Pioneer Creek Road
  - ✓ Rams Horn Grade
  - ✓ Shakeridge Road
  - ✓ Stony Creek Road (see Figure 4-112)
  - ✓ Sutter Creek Road
  - ✓ Trans Sierra Highway
  - ✓ Volcano Road

- Debris Flows
  - ✓ Comanche Road Bridge
  - ✓ Kit Carson Road
  - ✓ Little Bear Road (see Figure 4-113)
  - ✓ Old Sacramento Road
  - ✓ Sutter Creek Road
  - ✓ Pine Grove/Volcano Road

Figure 4-112 Stony Creek Road



Source: Amador County

Figure 4-113 Little Bear Road



Source: Amador County

Local concerns for each of the other participating jurisdictions can be found under the Local Concerns heading in each respective jurisdictional annex to this LHMP Update.

Assets at Risk

Assets at risk from landslide include people and populations; structures; critical facilities and infrastructure; and natural, historic, and cultural resources. These are discussed in the following sections for the Amador County Planning Area and unincorporated Amador County.

Additionally, for each hazard in the FEMA National Risk Index in Amador County, the relevant portions of the hazard analysis done by FEMA is presented below. This includes the Hazard Risk Index Rating, Expected Annual Loss Values, Exposure Values, and the Historic Loss Ratio Rating. These are presented for the Amador County Planning Area as a whole.

Methodology (Parcels and Structures)

In order to analyze people and populations, structures, and critical facilities at risk in DFIRM flood zones, GIS was used to quantify those values. The 2024 Amador County Parcel/Assessor Data was provided by Amador County and was used as the basis for the inventory of assessed values for both improved and unimproved parcels within the Amador County Planning Area. The 2011 California Geologic Survey Deep

Seated Landslide Susceptibility data was obtained for the Amador County Planning Area. The landslide hazard layer was then overlaid on the parcel layer. In some cases, there are parcels in multiple deep seated landslide classes. For the purposes of this analysis, if the deep seated landslide classes intersected any portion of a parcel polygon, the entire parcel was considered to be in the highest risk class. The parcels were segregated and analyzed in this fashion for the entire Planning Area.

Once the deep-seated landslide susceptibility classes were intersected, land and improved (structure) values from the Assessor data were included for each parcel and estimated content replacement values were added to the analysis. Improved parcels include those with improved structure values identified in the Amador County Assessor's database.

People and Populations

All populations located within areas of landslide susceptibility, especially in the High to Very High hazard areas (i.e., Classes VII to X) are at some vulnerability to landslide. This includes those people residing in these landslide potential areas as well as those that might reside or work within the landslide run out areas. People residing in these areas may also be cut off from transportation routes if roads and streets providing a means of ingress and egress are impacted. Certain vulnerable populations may be at greater risk due to the often sudden onset of a landslide event and include: the unsheltered, those with limited mobility, and those that lack the resources to leave the area.

Amador County Planning Area residents that live in the High and Very High landslide susceptibility areas are often the most vulnerable, but those who live in in the landslide run out areas (which are not mapped) are also vulnerable. Not only are the residents at risk, but their homes and contents are all at risk, compounding the impacts associated with significant hazard events. To further evaluate the impact to Planning Area's residential population residing within these hazard areas, an analysis was conducted of those who physically reside in the mapped landslide susceptibility areas. The CGS Susceptibility to Deep Seated Landslide maps were overlayed on the parcel layer and linked to the assessor data. Those residential parcel centroids that intersect the High or Very High risk areas (Class VII or higher) were counted and multiplied by the 2020 Census Bureau average household factors each jurisdiction in the Planning Area. Analysis results are shown in Table 4-117.

Table 4-117 Amador County Planning Area – Improved Residential Parcels and Population in Susceptibility to Deep Seated Landslides (Classes VII, VIII, IX, and X) by Jurisdiction

Deep Seated Landslide Class/Jurisdiction	Improved Residential Parcels	Population
VII		
Amador City	26	54
Ione	101	232
Jackson	49	108
Plymouth	0	0
Sutter Creek	62	128

Deep Seated Landslide Class/Jurisdiction	Improved Residential Parcels	Population
Unincorporated County	2,313	5,436
Total	**2,551**	**5,958**
VIII		
Amador City	4	8
Ione	72	165
Jackson	50	110
Plymouth	0	0
Sutter Creek	0	0
Unincorporated County	1,760	4,136
Total	**1,886**	**4,419**
IX		
Amador City	0	0
Ione	32	73
Jackson	17	37
Plymouth	0	0
Sutter Creek	1	2
Unincorporated County	1,412	3,318
Total	**1,463**	**3,431**
X		
Amador City	0	0
Ione	0	0
Jackson	0	0
Plymouth	0	0
Sutter Creek	0	0
Unincorporated County	4	9
Total	**4**	**9**

Source: Susceptibility to Deep-Seated Landslides map – CSG Map Sheet 58 (05/2011), 2024 Amador County Parcel/Assessor Data, 2020 US Census Bureau Average Household Size – City of Amador City (2.07); City of Ione (2.29); City of Jackson (2.20); City of Plymouth (2.80); City of Sutter Creek (2.07): Unincorporated Amador County (2.35).

Structures

Landslides can affect the built environment of the Amador County Planning Area and those structures located within the high to very high hazard areas (i.e., Classes VII to X) are especially vulnerable, as are the structures located within the landslide run out areas. The CGS Deep Seated Landslide Susceptibility layer was overlaid with the County parcel (structure) layer in GIS and linked to the assessor data. The mapped landslide areas are shown on Figure 4-110. Table 4-118 summarizes parcel counts, land and improved values (i.e., those with a structure improvement on the parcel), other values, estimated content replacement values, and total values in the Planning Area for deep seated landslide classes. Table 4-119

summarizes parcel counts, land and improved values (i.e., those with a structure improvement on the parcel), estimated content replacement values, and total values by property use for the unincorporated County for deep seated landslide classes. As shown, a limited number of improved parcels fall in Classes VII to X in the cities, while there are many improved parcels in Classes VII to X in the unincorporated County.

Table 4-118 Amador County Planning Area – Count and Value of Parcels and Structures Susceptible to Deep Seated Landslide by Class and Jurisdiction

Jurisdiction / Susceptibility to Deep-Seated Landslide Class	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Amador City						
0	17	11	$1,295,333	$1,857,930	$1,001,341	$4,154,604
III	37	25	$4,135,446	$4,500,610	$2,669,721	$11,305,777
VI	58	41	$6,930,312	$8,059,107	$4,806,698	$19,796,117
VII	52	29	$5,069,410	$6,045,394	$3,577,490	$14,692,294
VIII	16	5	$1,693,876	$615,265	$310,108	$2,619,249
Amador City Total	**180**	**111**	**$19,124,377**	**$21,078,306**	**$12,365,357**	**$52,568,040**
Ione						
0	1,317	1,230	$132,482,672	$318,679,739	$168,808,142	$619,970,553
V	585	531	$59,332,843	$125,847,002	$63,640,389	$248,820,234
VII	118	103	$11,085,532	$25,739,054	$13,201,312	$50,025,898
VIII	97	72	$8,803,927	$15,328,781	$7,664,391	$31,797,099
IX	88	40	$12,036,855	$10,872,581	$4,770,746	$27,680,182
Ione Total	**2,205**	**1,976**	**$223,741,829**	**$496,467,157**	**$258,084,980**	**$978,293,966**
Jackson						
0	1,037	922	$81,153,812	$205,409,492	$126,515,881	$413,079,185
III	540	440	$48,822,598	$138,243,500	$85,274,597	$272,340,695
V	115	100	$9,973,704	$30,412,696	$15,125,519	$55,511,919
VI	224	161	$27,645,839	$135,031,474	$110,107,041	$272,784,354
VII	99	59	$20,349,425	$32,993,251	$26,423,486	$79,766,162
VIII	79	57	$11,053,270	$20,588,206	$14,267,832	$45,909,308
IX	30	17	$2,853,340	$5,196,120	$2,598,060	$10,647,520
Jackson Total	**2,124**	**1,756**	**$201,851,988**	**$567,874,739**	**$380,312,415**	**$1,150,039,142**
Plymouth						
0	536	435	$69,207,310	$106,934,063	$62,161,134	$238,302,507
III	53	39	$9,668,168	$9,332,941	$6,048,755	$25,049,864
VI	22	14	$2,685,659	$2,100,402	$1,052,253	$5,838,314

Jurisdiction / Susceptibility to Deep-Seated Landslide Class	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
VII	12	0	$3,582,226	$0	$0	$3,582,226
Plymouth Total	**625**	**488**	**$85,143,363**	**$118,367,406**	**$69,262,141**	**$272,772,910**
Sutter Creek						
0	744	634	$72,757,839	$184,632,211	$120,864,415	$378,254,465
III	367	303	$29,373,095	$77,110,330	$39,376,477	$145,859,902
V	3	2	$575,072	$736,206	$700,166	$2,011,444
VI	199	155	$17,159,592	$47,724,542	$26,224,294	$91,108,428
VII	100	62	$10,397,559	$20,672,537	$10,336,269	$41,406,365
VIII	11	2	$1,262,463	$48,045	$48,045	$1,358,553
IX	10	2	$2,149,585	$415,990	$70,000	$2,635,575
Sutter Creek Total	**1,434**	**1,160**	**$133,675,205**	**$331,339,861**	**$197,619,665**	**$662,634,731**
Unincorporated Amador County						
0	2,052	1,575	$182,544,780	$386,612,887	$258,799,971	$827,957,638
III	1,723	1,333	$139,945,708	$306,413,278	$174,086,893	$620,445,879
V	2,267	1,537	$165,359,918	$338,599,501	$181,301,318	$685,260,737
VI	1,803	1,401	$159,986,869	$313,805,753	$171,368,366	$645,160,988
VII	3,702	2,659	$353,651,150	$677,494,509	$370,628,602	$1,401,774,261
VIII	3,486	2,175	$349,745,652	$481,480,648	$263,311,585	$1,094,537,885
IX	2,747	1,730	$296,033,771	$517,545,500	$341,495,575	$1,155,074,846
X	48	24	$40,138,659	$4,801,465	$3,731,813	$48,671,937
Unincorporated Amador County Total	**17,828**	**12,434**	**$1,687,406,507**	**$3,026,753,541**	**$1,764,724,121**	**$6,478,884,169**
Grand Total	**24,396**	**17,925**	**$2,350,943,269**	**$4,561,881,010**	**$2,682,368,677**	**$9,595,192,956**

Source: Susceptibility to Deep-Seated Landslides map – CSG Map Sheet 58 (05/2011), 2024 Amador County Parcel/Assessor Data

Table 4-119 Unincorporated Amador County – Count and Value of Parcels and Structures Susceptible to Deep Seated Landslide by Class and Property use

Susceptibility to Deep-Seated Landslide Class/Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Estimated Contents Value
0						
Agricultural	59	52	$9,331,710	$24,744,106	$24,744,106	$58,819,922
Commercial	206	141	$47,970,217	$107,004,646	$107,004,646	$261,979,509
Industrial	12	4	$1,128,162	$1,204,716	$1,807,074	$4,139,952

Susceptibility to Deep-Seated Landslide Class/Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Estimated Contents Value
Miscellaneous	89	8	$248,387	$612,121	$0	$860,508
Residential	1,671	1,360	$122,067,732	$250,488,289	$125,244,145	$497,800,166
Unknown	15	10	$1,798,572	$2,559,009	$0	$4,357,581
0 Total	**2,052**	**1,575**	**$182,544,780**	**$386,612,887**	**$258,799,971**	**$827,957,638**
III						
Agricultural	86	71	$9,525,739	$14,368,403	$14,368,403	$38,262,545
Commercial	51	37	$12,567,965	$24,663,155	$24,663,155	$61,894,275
Industrial	9	7	$3,101,167	$2,352,216	$3,528,324	$8,981,707
Miscellaneous	54	4	$390,002	$259,732	$0	$649,734
Residential	1,506	1,204	$113,520,998	$263,054,021	$131,527,011	$508,102,030
Unknown	17	10	$839,837	$1,715,751	$0	$2,555,588
III Total	**1,723**	**1,333**	**$139,945,708**	**$306,413,278**	**$174,086,893**	**$620,445,879**
V						
Agricultural	24	19	$3,391,498	$2,834,644	$2,834,644	$9,060,786
Commercial	43	32	$7,720,871	$15,343,765	$15,343,765	$38,408,401
Industrial	6	4	$2,252,733	$4,457,151	$6,685,727	$13,395,611
Miscellaneous	52	8	$575,342	$784,414	$0	$1,359,756
Residential	2,126	1,465	$150,366,452	$312,874,365	$156,437,183	$619,678,000
Unknown	16	9	$1,053,022	$2,305,162	$0	$3,358,184
V Total	**2,267**	**1,537**	**$165,359,918**	**$338,599,501**	**$181,301,318**	**$685,260,737**
VI						
Agricultural	121	96	$22,354,969	$14,485,416	$14,485,416	$51,325,801
Commercial	34	27	$11,986,585	$13,120,970	$13,120,970	$38,228,525
Industrial	6	5	$2,688,982	$1,499,248	$2,248,872	$6,437,102
Miscellaneous	46	9	$861,989	$423,103	$0	$1,285,092
Residential	1,585	1,260	$121,289,580	$283,026,215	$141,513,108	$545,828,903
Unknown	11	4	$804,764	$1,250,801	$0	$2,055,565
VI Total	**1,803**	**1,401**	**$159,986,869**	**$313,805,753**	**$171,368,366**	**$645,160,988**
VII						
Agricultural	397	285	$55,690,415	$59,178,152	$59,178,152	$174,046,719
Commercial	32	18	$4,692,847	$8,271,178	$8,271,178	$21,235,203
Industrial	2	2	$298,760	$2,302,323	$3,453,485	$6,054,568
Miscellaneous	110	16	$1,693,168	$2,507,382	$0	$4,200,550
Residential	3,114	2,313	$284,275,299	$599,451,575	$299,725,788	$1,183,452,662
Unknown	47	25	$7,000,661	$5,783,899	$0	$12,784,560
VII Total	**3,702**	**2,659**	**$353,651,150**	**$677,494,509**	**$370,628,602**	**$1,401,774,261**

Susceptibility to Deep-Seated Landslide Class/Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Estimated Contents Value
VIII						
Agricultural	598	356	$76,852,461	$46,501,816	$46,501,816	$169,856,093
Commercial	35	25	$4,344,234	$5,448,103	$5,448,103	$15,240,440
Industrial	7	3	$8,192,873	$345,125	$517,688	$9,055,686
Miscellaneous	241	11	$9,043,358	$4,350,738	$0	$13,394,096
Residential	2,562	1,760	$238,461,268	$421,687,957	$210,843,979	$870,993,204
Unknown	43	20	$12,851,458	$3,146,909	$0	$15,998,367
VIII Total	**3,486**	**2,175**	**$349,745,652**	**$481,480,648**	**$263,311,585**	**$1,094,537,885**
IX						
Agricultural	479	267	$75,607,422	$51,633,728	$51,633,728	$178,874,878
Commercial	34	23	$7,453,210	$116,691,220	$116,691,220	$240,835,650
Industrial	9	4	$17,010,083	$1,311,958	$1,967,937	$20,289,978
Miscellaneous	220	18	$7,277,677	$4,870,147	$0	$12,147,824
Residential	1,986	1,412	$183,030,550	$342,405,379	$171,202,690	$696,638,619
Unknown	19	6	$5,654,829	$633,068	$0	$6,287,897
IX Total	**2,747**	**1,730**	**$296,033,771**	**$517,545,500**	**$341,495,575**	**$1,155,074,846**
Unincorporated Amador County Total	**17,828**	**12,434**	**$1,687,406,507**	**$3,026,753,541**	**$1,764,724,121**	**$6,478,884,169**

Source: Susceptibility to Deep-Seated Landslides map – CSG Map Sheet 58 (05/2011), 2024 Amador County Parcel/Assessor Data

Critical Facilities and Infrastructure

Landslides present a threat to critical facilities and infrastructure. The following analysis discusses critical facilities and infrastructure. A separate analysis was performed on the critical facility inventory in the Amador County Planning Area to determine critical facilities by deep-seated landslide class. Using GIS, the landslide classes were overlayed on the critical facility GIS layer. Figure 4-114 shows critical facilities, as well as the deep-seated landslide classes. Table 4-120 details critical facilities by deep seated landslide class by facility type and count for the Planning Area. Details of critical facility category, type, name and address by deep-seated landslide classes are listed in Appendix F. As shown, 13 critical facilities fall in Classes VII to X all of which are in the unincorporated County.

Figure 4-114 Amador County Planning Area – Critical Facilities in Deep-Seated Landslide Class

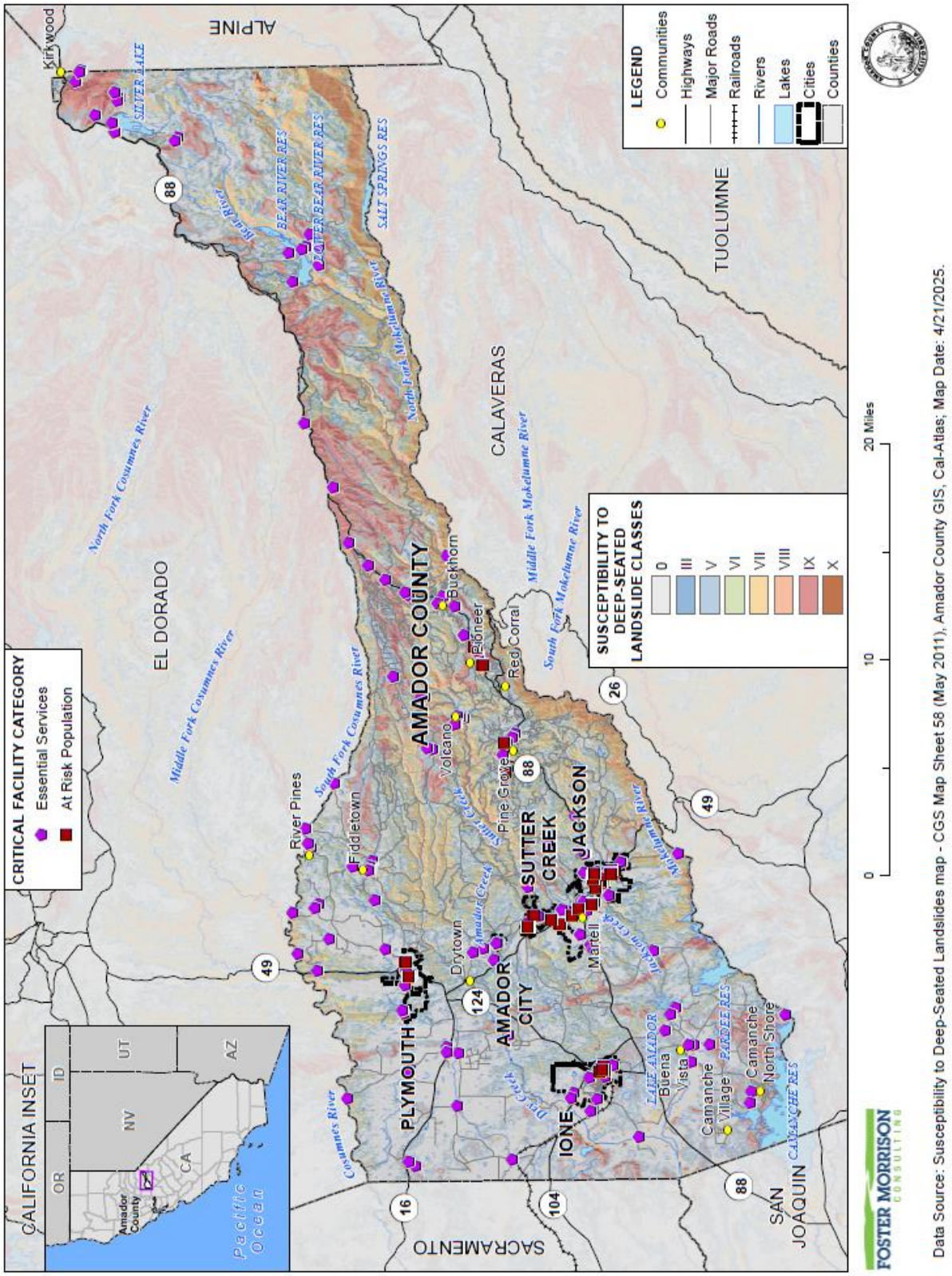


Table 4-120 Amador County Planning Area – Critical Facilities in Deep-Seated Landslide Class by Jurisdiction and Category

Jurisdiction / Susceptibility to Deep-Seated Landslide Class / Critical Facility Category	Facility Count
Amador City	
0	
Essential Services	2
At Risk Population	0
0 Total	**2**
III	
Essential Services	1
At Risk Population	0
III Total	**1**
Amador City Total	**3**
Ione	
0	
Essential Services	11
At Risk Population	5
0 Total	**16**
V	
Essential Services	2
At Risk Population	0
V Total	**2**
Ione Total	**18**
Jackson	
0	
Essential Services	30
At Risk Population	9
0 Total	**39**
III	
Essential Services	3
At Risk Population	2
III Total	**5**
VI	
Essential Services	2
At Risk Population	1
VI Total	**3**
VII	
Essential Services	0

Jurisdiction / Susceptibility to Deep-Seated Landslide Class / Critical Facility Category	Facility Count
At Risk Population	1
VII Total	**1**
Jackson Total	**48**
Plymouth	
0	
Essential Services	8
At Risk Population	1
0 Total	**9**
Plymouth Total	**9**
Sutter Creek	
0	
Essential Services	6
At Risk Population	6
0 Total	**12**
III	
Essential Services	1
At Risk Population	0
III Total	**1**
Sutter Creek Total	**13**
Unincorporated Amador County	
0	
Essential Services	91
At Risk Population	5
0 Total	**96**
III	
Essential Services	8
At Risk Population	1
III Total	**9**
V	
Essential Services	19
At Risk Population	1
V Total	**20**
VI	
Essential Services	7
At Risk Population	0
VI Total	**7**
VII	

Jurisdiction / Susceptibility to Deep-Seated Landslide Class / Critical Facility Category	Facility Count
Essential Services	3
At Risk Population	0
VII Total	**3**
VIII	
Essential Services	7
At Risk Population	0
VIII Total	**7**
IX	
Essential Services	3
At Risk Population	0
IX Total	**3**
Unincorporated Amador County Total	**145**
Unincorporated Alpine County	
VII	
Essential Services	1
At Risk Population	0
VIII Total	7
Unincorporated Amador County Total	**8**
Grand Total	**237**

Source: Susceptibility to Deep-Seated Landslides map – CSG Map Sheet 58 (05/2011), Amador County GIS

Natural, Historic, and Cultural Resources

Landslides can affect natural, historic, and cultural resources that lie in the landslide area, or the landslide run out area. Landslides can destroy large tracts of forest and open space areas, destroy wildlife habitat, and remove productive soils and vegetation from slopes. It can also fill in waterways, impact water quality, and potentially affect flooding potential. Natural resources that fall in the High or Very High susceptibility classes shown on Figure 4-110 would be most vulnerable, as well as those in the run out areas. As shown on the map, this would include a relatively small area of the developed area, since most of the higher risk areas occur in the undeveloped areas of the Planning Area.

FEMA NRI Hazard Vulnerability Assessment

The FEMA NRI was queried for additional specific data on Amador County's vulnerability to Landslides, Mudslides, and Debris Flow. The NRI contains data and analysis for 18 separate natural hazards. The NRI hazard related to Amador County's Landslides, Mudslides, and Debris Flow is only landslide. As shown in Table 4-121, landslides could cause a total of $21,900 in expected annual losses, with a historic loss rating of very low. Landslide has a relatively moderate rating for both social vulnerability and community resilience, with a risk index score of 44 out of 100. According to the NRI, there have been 0 landslide events between the years 2010-2021 with an average of 0 events per year.

Table 4-121 Amador County Planning Area – Landslide Vulnerability Ratings from FEMA NRI

NRI Hazard	Hazard Risk Index Rating*	Expected Annual Loss Values (total)**	Exposure Value (total)***	Historic Loss Ratio Rating
Landslide	44	$21,900	$181,116,409,942	Very Low

Source: FEMA NRI Report, retrieved 4/1/2025.

*Hazard Risk Index is calculated using data for only a single hazard type, and reflect a communities expected annual loss value, community risk factors, and the adjustment factor used to calculate the risk value.

**Expected annual loss represents the average economic loss in dollars resulting from natural hazards each year.

***Exposure is a natural hazard consequence factor that is the representative value of buildings, populations, or agriculture potentially exposed to a natural hazard occurrence.

Additional information on the FEMA NRI can be found in Section 4.2 and Appendix G.

Impacts from Landslide

Any type of landslide may result in damages or complete destruction of buildings in their path, as well as deaths and injuries. Landslides can cause road blockages by depositing debris on road surfaces or road damage if the road surface itself slides downhill. Utility lines and pipes are also prone to breakage in slide areas.

Landslides can collapse into water bodies, causing tsunamis or seiches. In 1958, a magnitude 8 earthquake collapsed a hillside into Lituya Bay, Alaska, causing a water splash wave that reached 1,720 feet up a mountain slope, stripping all vegetation. A massive landslide into the Vaoint Reservoir in Italy in 1963 caused a water splash wave that swept 800 feet over the top of a dam, causing a major flood that killed an estimated 2,600 people below. Landslides can relocate river channels, as occurred during the Oso mudslide in Washington State in March 2014. This occurred in an area not considered landslide prone on local maps. Landslides and debris flows can relocate river channels, impact water quality and the storage capacity of surface water reservoirs used to store potable water.

Landslides, debris flows, and mud flows impacts vary by location and severity of any given event and will likely only affect certain areas of the Planning Area susceptible to landslide. Based on the risk assessment, there is limited potential for significant landslides to occur in the Planning Area in the more developed areas. Most, but not all, of the historic landslides in the Amador County Planning Area have been minor, localized events that are more of a nuisance than a disaster. Impacts that are not quantified, but can be anticipated in large future events, include:

- Injury and loss of life;
- Commercial and residential structural and property damage;
- Disruption of and damage to public infrastructure, utilities, and services;
- Damage to roads/bridges resulting in loss of mobility;
- Significant economic impact (jobs, sales, tax revenue) to the community; and
- Negative impact on commercial and residential property values

Impacts to identified assets at risk to this hazard and the overall vulnerability of the County may be affected in the future by climate change (which was discussed in the hazard profile section above), changes in population patterns, and changes in land use and development. The influencing effects of these factors on this hazard are discussed further in the Future Conditions/Future Development discussion below.

Future Conditions/Future Development

Future hazard conditions may be affected by climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. Findings on this for Amador County include the following:

- Climate change is likely to exacerbate future landslide conditions and associated impacts and vulnerability of the County to landslides. This is especially true in burn scar areas that are at greater risk to landslides.
- Future population growth should be considered, as having more or less people in a community affects the overall hazard vulnerability to the County. Population growth in Amador County is expected to continue slowly. Additional population growth would likely bring continued diversity to the County. Vulnerable population groups could face disproportionate effects from a landslide, though it would be unlikely for these or any populations to build in the landslide risk areas. Changes in population and population patterns may or may not increase the impacts and vulnerability of the County to this hazard depending on the location and nature of growth and continued planning for future hazard conditions.
- Land use planning should be proactive to address future hazard conditions. Locating new development, structures and critical facilities and infrastructure within or near areas of landslide risk may put additional development at risk. However, County building codes are in effect to reduce this risk and should be updated as necessary to continue to address future landslide conditions. It should be noted that most of the growth in the County is occurring in areas outside the landslide risk areas. Thus, depending on the location of new development and adherence to protective building codes, changes in land use and development may or may not increase the impacts and associated vulnerabilities of the County to this hazard.

Future development considerations should be ongoing and proactive. Ensuring that comprehensive land use planning is conducted, regulatory requirements are followed, and varying needs for different demographic groups with intersecting identities that reside within the County are considered can help to make for a more resilient community. Although new growth and development corridors would fall in the area affected by moderate risk of landslide, given the small chance of a major landslide and the building codes and erosion ordinance in effect, development in the landslide areas will continue to occur.

GIS Analysis

Amador County provided five future development areas which were used as the basis for the inventory of future development for the unincorporated County. These were mapped in GIS. Figure 4-115 show the locations of the future development areas and deep-seated landslide classes. Table 4-122 shows the details of the future development areas that are located in each deep-seated landslide class.

Figure 4-115 Unincorporated Amador County – Future Development in Deep-Seated Landslide Classes

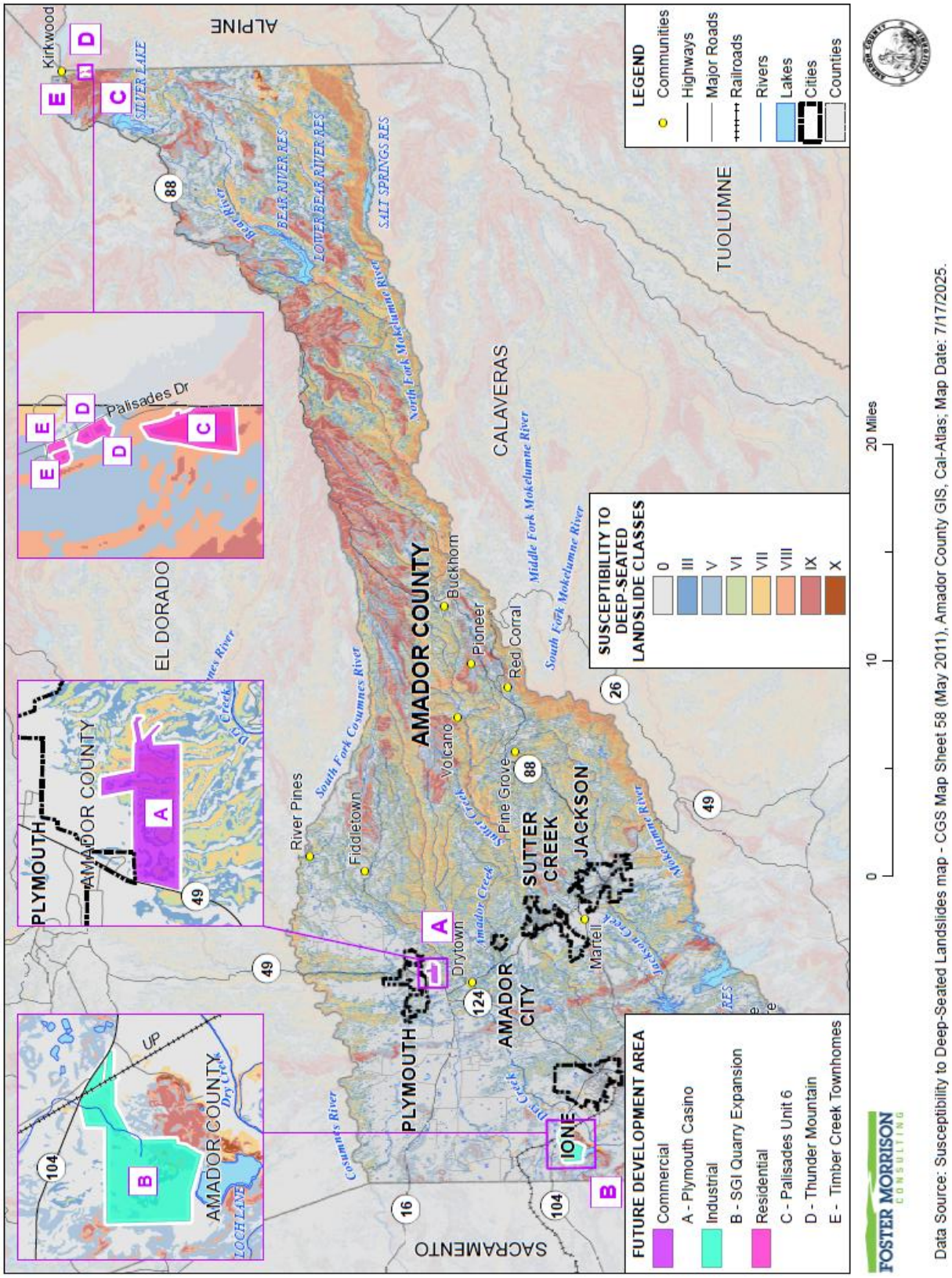


Table 4-122 Unincorporated Amador County – Future Development in Deep-Seated Landslide Classes with Parcel Counts and Acreages

Susceptibility to Deep-Seated Landslide Class /Site/Map ID - Future Development	Unimproved Parcel Count	Total Unimproved Acres
VI		
D - Thunder Mountain	2	2.5
E - Timber Creek Townhomes	2	2
VI Total	**4**	**4.5**
VIII		
A - Plymouth Casino	1	130
VIII Total	**1**	**130**
IX		
B - SGI Quarry Expansion	1	50
C - Palisades Unit 6	1	13
IX Total	**2**	**63**
Grand Total	**7**	**197.5**

Source: CGS Maps Sheet 58, Amador County GIS

4.3.15. Wildfire (w/Smoke and Air Quality)

Hazard Profile

This hazard profile contains multiple sections that detail how this hazard can affect the Amador County Planning Area. These sections include a hazard/problem description; description of location and extent; past occurrences of this hazard; likelihood of future occurrence; and how climate change can affect or influence this hazard.

Hazard/Problem Description

California is recognized as one of the most fire-prone and consequently fire-adapted landscapes in the world. The combination of complex terrain, Mediterranean climate, and productive natural plant communities, along with ample natural and aboriginal ignition sources, has created conditions for extensive wildfires. Wildland fire is an ongoing concern for the Amador County Planning Area. Historically, the fire season extends from early spring through late fall of each year during the hotter, dryer months. However, in recent years, wildfire season is more of a year around event. Fire conditions arise from a combination of high temperatures, low moisture content in the air and fuel, an accumulation of vegetation, and high winds.

Potential losses from wildfire include human life, structures and other improvements, natural and cultural resources, quality and quantity of water supplies, cropland, timber, and recreational opportunities. Economic losses could also result. Smoke and air pollution from wildfires can be a severe health hazard.

In addition, catastrophic wildfire can create favorable conditions for other hazards such as flooding, landslides and mudflows, and erosion during the rainy season. Additional losses could occur if PG&E initiates a power shutdown during extreme fire weather conditions. This is discussed in greater detail at the beginning of Section 4.3.

Wildfire Smoke and Air Quality

Smoke from wildfires is made up of gas and particulate matter, which can be easily observed in the air. Air quality standards have been established to protect human health with the pollutant referred to as PM2.5 which consists of particles 2.5 microns or less in diameter. These smaller sizes of particles are responsible for adverse health effects because of their ability to reach the lower regions of the respiratory tract.

Wildfire smoke can have negative effects to those who live in or near a fire burn area. Smoke and air pollution from wildfires can be a severe health hazard. Significant wildfires occurring in nearby northern California communities since the 2020 LHMP Update have created significant air pollution affecting area residents. County residents have been affected by wildfire smoke and poor air quality, from fires both within the Planning Area and from those much further away. The County has seen air quality impacts from smoke from wildfires since the 2020 LHMP. During these times, air sensors in the County showed periods of very poor air quality in Amador County. This was especially a concern during Covid. A document titled Smoke Impacts CA: 2020 Lessons – 2021 Actions that was published by the US Forest Service noted that wildfire smoke exposure could result in greater susceptibility to COVID-19 and other viruses/bacteria (decrease in local and systemic immune function).

The Amador Resource Conservation District noted that there is not much information pertaining to smoke and air quality concerns specific to Amador County but given information from various sources (CDC, EPA, and various clinical studies) it is known that prolonged exposure to wildfire smoke can have effects ranging from minor to extreme, especially for high-risk individuals (people with preexisting lung problems, elderly), leading to heart failure and premature death in the worst case scenario. An EPA database of Air Quality Index was queried for the last 5 years for AQI in Amador County. Results are shown in Table 4-123.

Table 4-123 Amador County Planning Area – Air Quality Index 2020-2025

Year	# Days with AQI	Good	Moderate	Unhealthy for Sensitive Groups	Unhealthy	Very Unhealthy	Hazardous	AQI Maximum	AQI 90th Percentile	AQI Median
2020	359	327	29	2	1	.	.	156	50	37
2021	365	307	54	4	.	.	.	133	67	37
2022	364	333	30	1	.	.	.	112	50	36
2023	360	341	19	.	.	.	.	80	48	36
2024	329	251	72	6	.	.	.	143	74	41

Source: Amador County Air Quality District
AQI from 0-50 is considered good and anything below 100 is Moderate.

According to FirstStreet.org, a climate risk data organization, elderly individuals are at an adversely high risk of experiencing negative health impacts from poor air quality, like worsening of heart disease and stroke, reduced lung capacity, and increase in lung disease.

The paper "Wildland fire management and air quality in the southern Sierra Nevada: Using the Lion Fire as a case study with a multi-year perspective on PM2.5 impacts and fire policy" by D. Schweizer and R. Cisneros explores the impacts of smoke from high-intensity, stand replacing fires versus lower intensity fires in the Sierra Nevada and explains that while smoke and fire mitigation is important with any fire, the extreme effects of smoke from large wildfires can be prevented by managing forests and allowing low intensity fires to burn.

Location and Extent

This section is broken down into two parts: a discussion on the wildland urban interface in Amador, and the Amador County wildfire setting.

Wildland Urban Interface

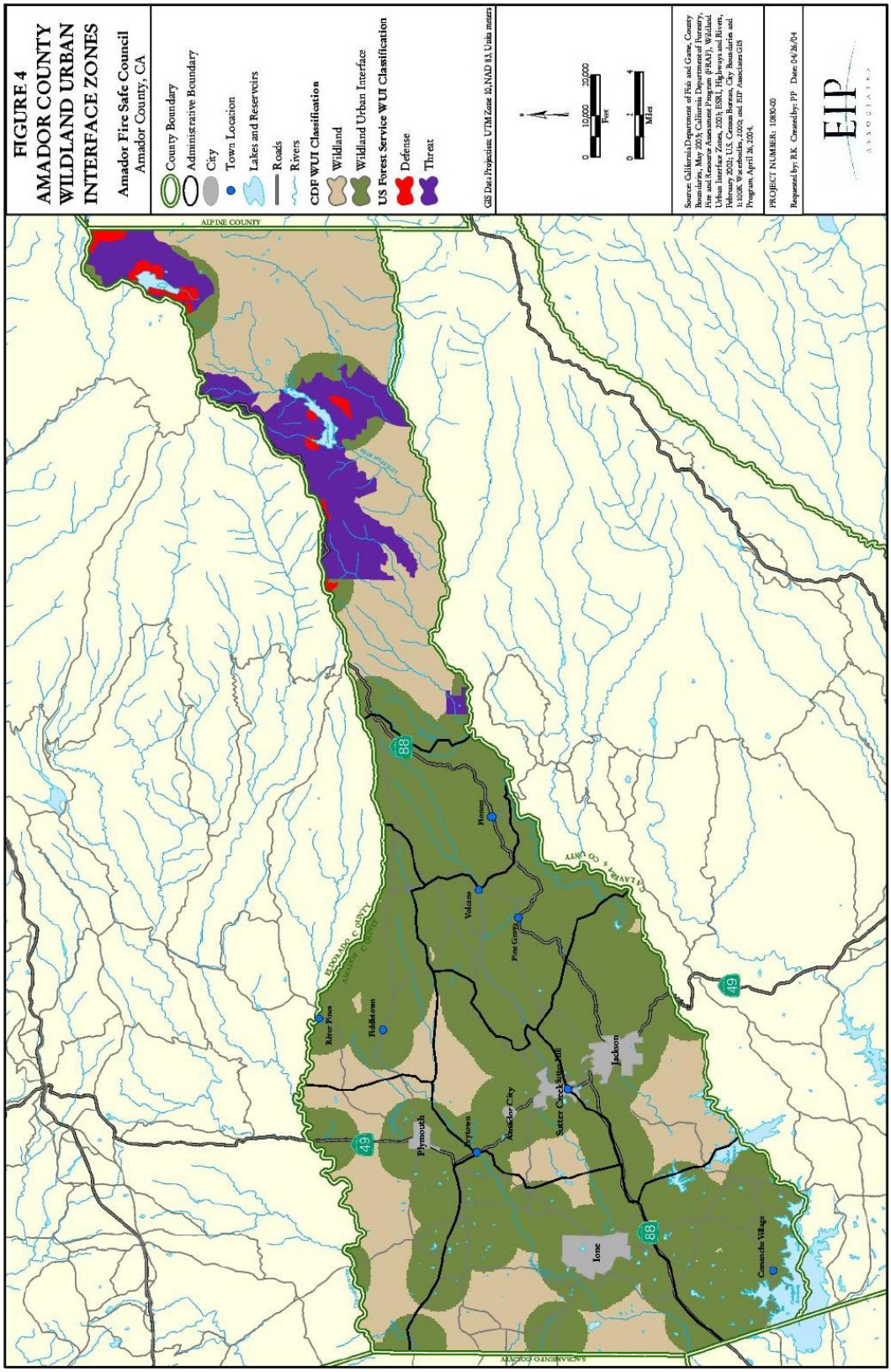
Throughout California, communities are increasingly concerned about wildfire safety as increased development in the foothills and mountain areas and subsequent fire control practices have affected the natural cycle of the ecosystem. While wildfire risk is predominantly associated with wildland urban interface (WUI) areas, significant wildfires can also occur in heavily populated areas. The wildland urban interface is a general term that applies to development adjacent to landscapes that support wildland fire. The WUI defines the community development into the foothills and mountainous areas of California. The WUI describes those communities that are mixed in with grass, brush and timbered covered lands (wildland). These are areas where wildland fire once burned only vegetation but now burns homes as well. The WUI for Amador County consists of communities at risk (shown in the Local Concerns section below) as well as the area around the communities that pose a fire threat.

There are two types of WUI environments. The first is the true urban interface where development abruptly meets wildland. The second WUI environment is referred to as the wildland urban intermix. Wildland urban intermix communities are rural, low density communities where homes are intermixed in wildland areas. Wildland urban intermix communities are difficult to defend because they are sprawling communities over a large geographical area with wild fuels throughout. This profile makes access, structure protection, and fire control difficult as fire can freely run through the community.

WUI fires are often the most damaging. WUI fires occur where the natural forested landscape and urban-built environment meet or intersect. Even relatively small acreage fires may result in disastrous damages. WUI fires occur where the natural forested landscape and urban-built environment meet or intermix. The damages are primarily reported as damage to infrastructure, built environment, loss of socio-economic values and injuries to people.

Figure 4-116 shows these WUI areas in red with Amador County in the center of the frame. This intermingling of wildland and manmade fuel has made the control of wildland fires more difficult and costly. It has also dramatically increased the danger and potential destruction caused by wildfire.

Figure 4-116 Amador County – WUI Areas



Source: Amador County Fire Hazard Protection Plan Addendum, 2010

Amador County Wildfire Setting

As previously stated, there are areas in the County that are prone to wildfire. Wildland fires affect grass, forest, and brushlands, as well as any structures located within them. Where there is human access to wildland areas, the risk of fire increases due to a greater chance for human carelessness and historical fire management practices. Generally, there are four major factors that contribute to and sustain wildfires and allow for predictions of a given area's potential to burn. These factors include fuel, topography, weather, and human actions.

- **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 man-made structures and other 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. The volume of available fuel is described in terms of Fuel Loading. Fuels are generally Sierra Mixed Conifer which is made up of heavy timber and significant loads of accumulated dead fuels. Certain areas in and surrounding Amador County are extremely vulnerable to fires as a result of overgrown fuels combined with a growing number of structures being built near and within rural lands. Fuel is the only factor that is under human control.
- **Topography** – An area's terrain and land slopes affect its susceptibility to wildfire spread. Fire intensities and rates of spread increase as slope increases due to the tendency of heat from a fire to rise via convection. The natural arrangement of vegetation throughout a hillside can also contribute to increased fire activity on slopes. Topography in Amador County is flat near the valley bottom and increasingly steep as the County reaches higher elevations. More importantly is the relationship of vegetation change with that of topography. Fuel loads tend to increase significantly as the topography becomes more rugged. The area near the Central Valley, which is characterized by rolling hills and flat valley bottoms, is generally dominated by grass lands or savannah. The fire behavior is generally wind driven short duration fires, typically lasting no more than one burning period. (A burn period comprises 10:00 a.m. of Day 1 to 10:00 a.m. of Day 2, a full 24-hour period). As the terrain approaches the upper foothills the vegetation changes dramatically to brush and tree dominated fuel types. These areas are generally steeper and longer sloped which will tend to cause more fuel and topography dominated fire behavior. Heavier fuels over steeper slopes cause marked increases in fire intensity and fire size; this combination makes firefighting efforts increasingly more difficult. This is primarily due to the demands that heavier fuels on steeper terrain can have on resources during active suppression and mop up operations. Higher elevation areas of the County are typically steeper than that of the upper foothill region. Fire spread is typically fuel and slope driven but winds can cause long range spotting. A major topographic feature that can lead to increased fire spread and intensity is the canyon alignment of the major river systems within the County. All of the major river systems are generally aligned in an east/west direction which coincides with the general prevailing westerly wind patterns over the County. This alignment can have the effect of "channeling" which can increase the wind speed and turbulence along these river systems. This alignment can often cause fire to spread farther and with greater intensity.
- **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 a wind, the faster a fire will spread, and the more intense

it will be. Winds can be significant at times in Amador County. The western portion of the County often experiences surface winds blowing from the north and west. The dryer north winds combined with light flashy fuels create conditions for large grass fires, which while menacing generally do little long-term damage. The resulting west winds are brisk and push fires in a west to east direction. The major canyons in Amador County are also orientated west to east, which tends to channel wind into canyons in a way that increases its upslope velocity. In addition to high winds, wind shifts can occur suddenly due to temperature changes or the interaction of wind with topographical features such as slopes or steep hillsides. Burn patterns of almost all historic large wildfires indicate they occurred during a relatively rare weather event called a foehn wind (discussed in the wind profile in Section 4.3.5). An example of a fire in Amador County affected by a foehn wind event was the Power Fire in 2004. This fire was started during the normal summer weather pattern and was declared contained two days later. Four days after the Power Fire started, a foehn wind event developed producing downslope winds in excess of 30 mile per hour, which spread the fire much more rapidly. Lightning also ignites wildfires, often in difficult-to reach terrain for firefighters. Related to weather is the issue of recent drought conditions contributing to concerns about wildfire vulnerability. During periods of drought, the threat of wildfire increases.

- **Human Actions** – Most wildfires are ignited by human action, the result of direct acts of arson, carelessness, or accidents. Many fires originate in populated areas along roads and around homes, and are often the result of arson or careless acts such as the disposal of cigarettes, use of equipment or debris burning. Recreation areas that are located in high fire hazard areas also result in increased human activity that can increase the potential for wildfires to occur.

Fires can have a quick speed of onset, especially during periods of drought. Fires can burn for a short period of time, or may have durations lasting for a week or more. Wildfire can affect any area of the Planning Area; however, CAL FIRE has mapped areas in California that are at risk to wildfire. Methodologies for this analysis and maps showing the various Fire Hazard Severity Zones, which range from Urban-Unzoned to Very High, can be found in the Vulnerability Assessment below. Cal Fire Fire Hazard Severity Zones have been developed based on Fire Responsibility Areas located in the County which details the responsible fire agency for each area of the County; specifically, federal, state, and local areas. Figure 4-117 shows the Fire Responsibility Area mapping for Amador County. Geographic extents of wildfire in the State Responsibility Area (SRA) and Federal Responsibility Area (FRA) for the unincorporated Amador County be seen on Figure 4-118 and is detailed in Table 4-124. Geographic extents of wildfire in the Local Responsibility Area (LRA) for the unincorporated Amador County be seen on Figure 4-119 and is detailed in Table 4-125. Details on each jurisdiction's Fire Hazard Severity Zone extents (for both SRA/FRA and LRA) can be found in their respective annexes to this LHMP Update.

Figure 4-117 Amador County Planning Area – Fire Responsibility Areas

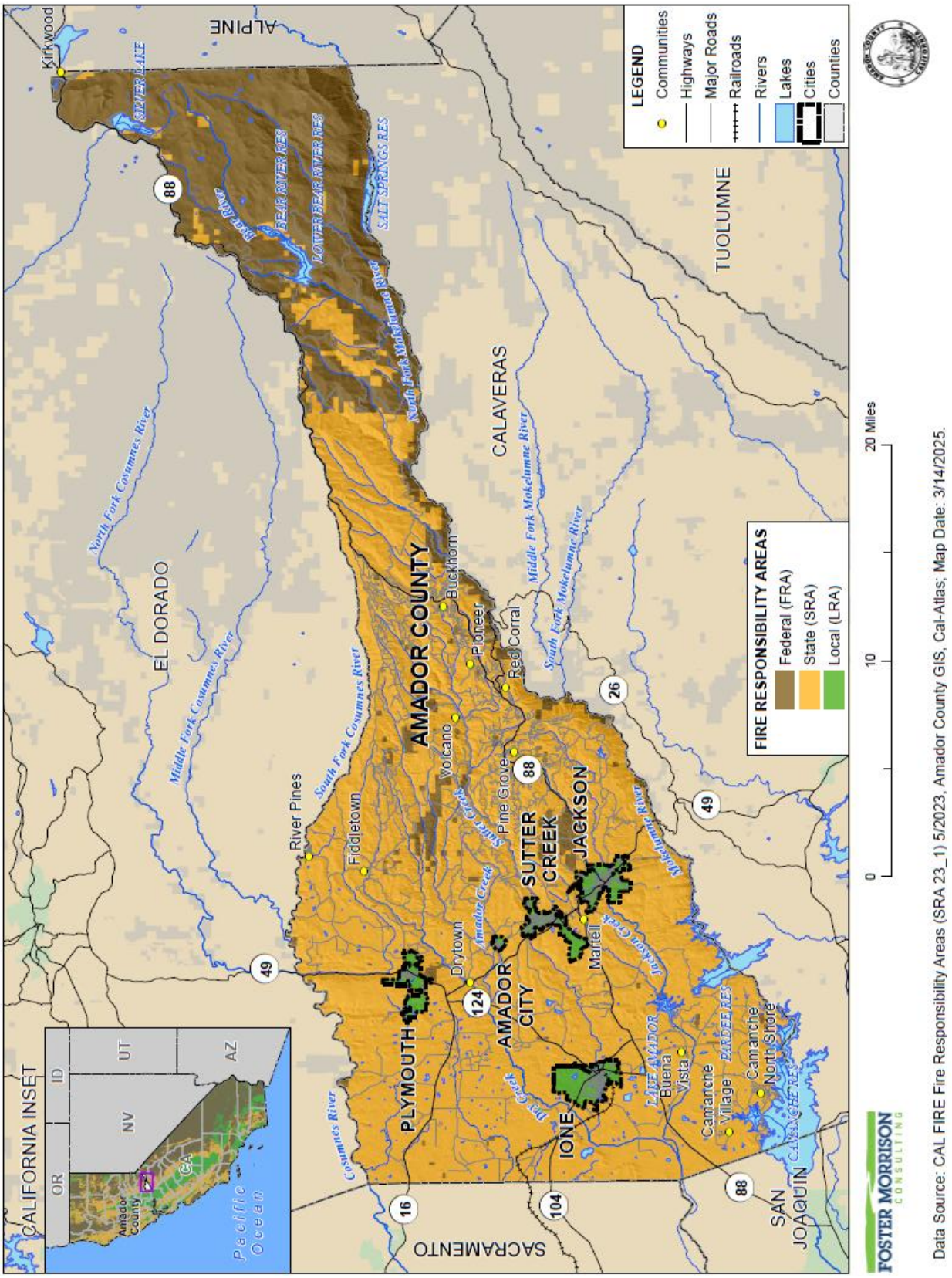


Figure 4-118 Amador County Planning Area – CAL FIRE SRA/FRA Fire Hazard Severity Zones

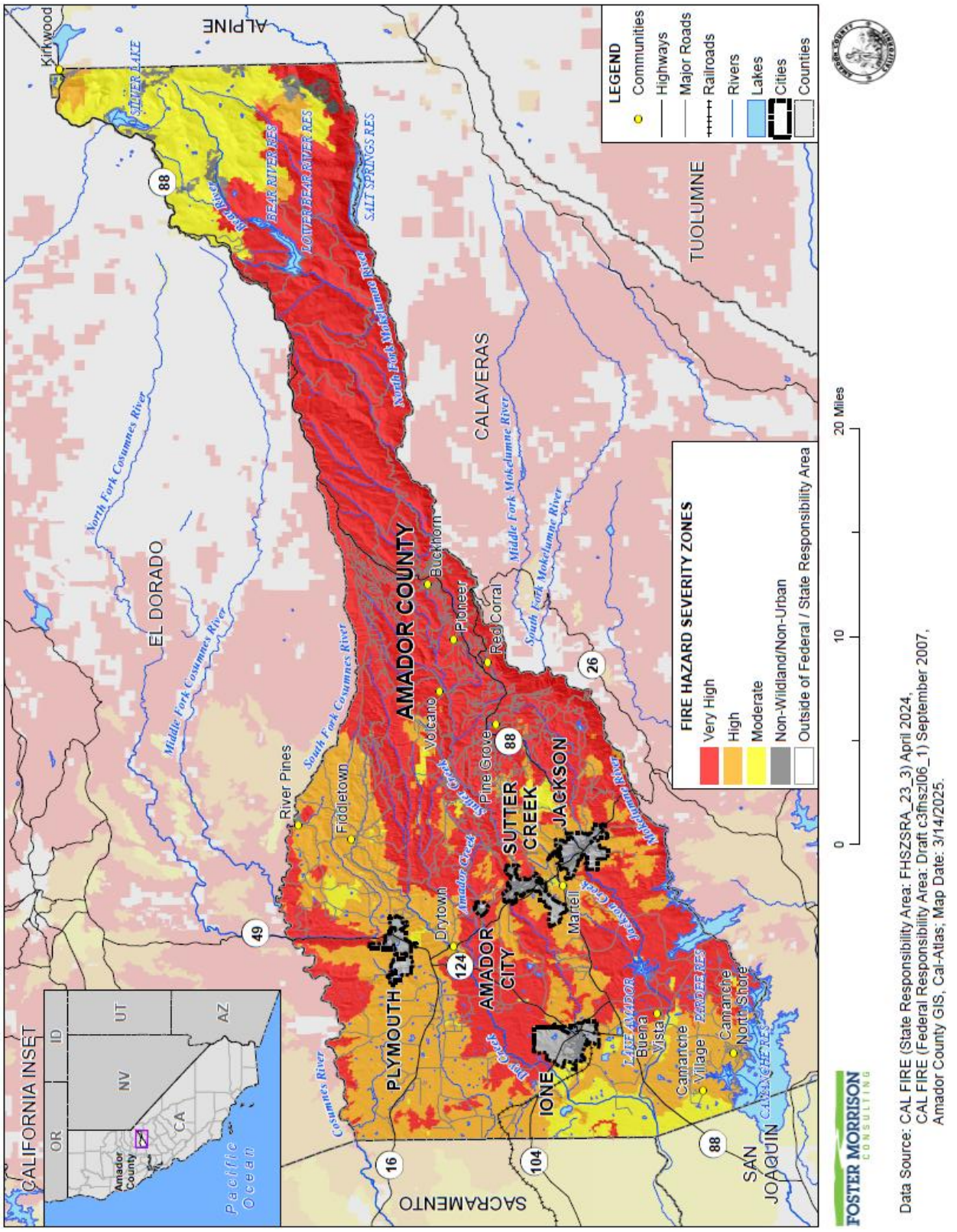


Table 4-124 Amador County Planning Area – CAL FIRE SRA/FRA Fire Hazard Severity Zones Geographical Extents

Jurisdiction / Fire Responsibility/ Fire Hazard Severity Zones	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Amador City						
FRA						
High	0.0003	0.0000001%	0.0003	0.0000002%	–	–
Moderate	0.002	0.000001%	0.002	0.000001%	–	–
FRA Total	**0.003**	**0.000001%**	**0.003**	**0.000002%**	**–**	**–**
SRA						
Very High	0.8	0.0002%	0.419	0.0003%	0.4	0.0002%
SRA Total	0.8	0.0002%	0.419	0.0003%	0.4	0.0002%
Amador City Total	**0.8**	**0.0002%**	**0.422**	**0.0003%**	**0.4**	**0.0002%**
Ione						
SRA						
Very High	0.8	0.0002%	0.003	0.000002%	0.8	0.0004%
High	2.8	0.001%	0.08	0.0001%	2.7	0.001%
Moderate	0.9	0.0002%	0.6	0.0004%	0.3	0.0001%
SRA Total	**4.5**	**0.001%**	**0.7**	**0.0004%**	**3.8**	**0.002%**
Ione Total	**4.5**	**0.001%**	**0.7**	**0.0004%**	**3.8**	**0.002%**
Jackson						
SRA						
Very High	0.6	0.0002%	0.1	0.0001%	0.5	0.0002%
High	12.2	0.003%	3.1	0.0019%	9.1	0.004%
SRA Total	12.8	0.003%	3.2	0.0020%	9.6	0.004%
Jackson Total	**12.8**	**0.003%**	**3.2**	**0.0020%**	**9.6**	**0.004%**
Plymouth						
SRA						
Very High	0.3	0.0001%	0.02	0.00001%	0.3	0.0001%
High	8.8	0.002%	1.7	0.0010%	7.1	0.003%
SRA Total	**9.1**	**0.002%**	**1.7**	**0.0010%**	**7.4**	**0.003%**
Plymouth Total	**9.1**	**0.002%**	**1.7**	**0.0010%**	**7.4**	**0.003%**
Sutter Creek						
SRA						
Very High	5.3	0.001%	1.8	0.0011%	3.5	0.002%

Jurisdiction / Fire Responsibility/ Fire Hazard Severity Zones	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
High	2.5	0.001%	0.6	0.0004%	1.9	0.001%
Moderate	0.4	0.0001%	0.3	0.0002%	0.1	0.0001%
SRA Total	**8.2**	**0.002%**	**2.7**	**0.0017%**	**5.5**	**0.003%**
Sutter Creek Total	**8.2**	**0.002%**	**2.7**	**0.0017%**	**5.5**	**0.003%**
Unincorporated Amador County						
FRA						
Very High	48,472	13%	60	0.04%	48,412	23%
High	5,010	1%	4	0.003%	5,006	2%
Moderate	32,604	9%	141	0.09%	32,463	15%
Non-Wildland/Non-Urban	5,003	1%	4	0.002%	4,999	2%
FRA Total	**91,089**	**24%**	**210**	**0.13%**	**90,879**	**42%**
SRA						
Very High	168,213	44%	86,479	52%	81,735	38%
High	103,688	27%	71,036	43%	32,653	15%
Moderate	16,337	4%	7,487	5%	8,851	4%
SRA Total	288,239	76%	165,001	100%	123,238	58%
Unincorporated Amador County Total	**379,328**	**100%**	**165,211**	**100%**	**214,117**	**100%**
Grand Total	**379,363**	**100%**	**165,219**	**100%**	**214,144**	**100%**

Source: CAL FIRE (FHSZ SRA 2024, FHSZ FRA 2007)

Figure 4-119 Amador County Planning Area – CAL FIRE LRA Fire Hazard Severity Zones

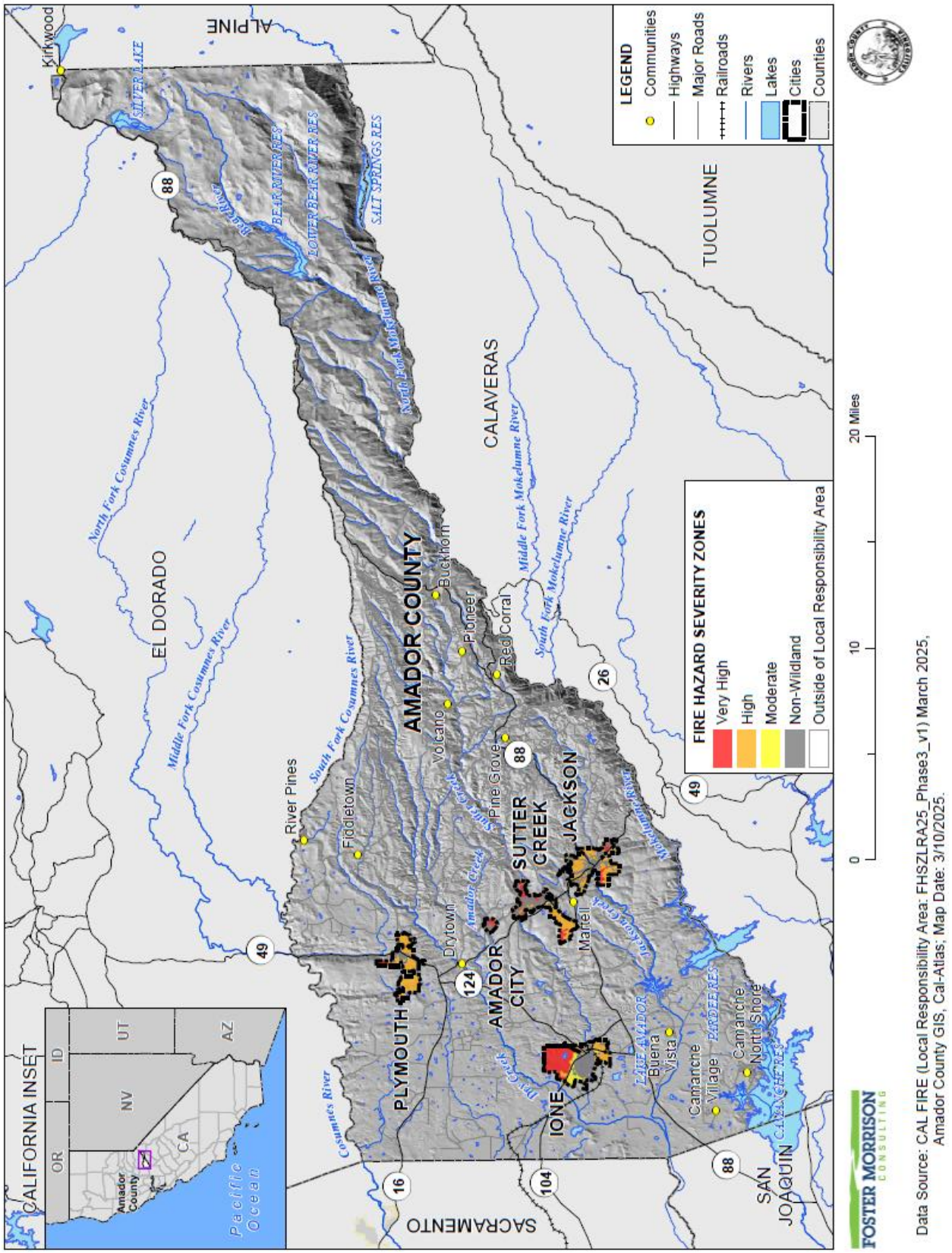


Table 4-125 Amador County Planning Area– CAL FIRE LRA Fire Hazard Severity Zones Geographical Extents

Jurisdiction / Fire Hazard Severity Zones	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Amador City						
Very High	197	0.1%	60	0.04%	137	0.1%
Outside of LRA Responsibility Area	0.4	0.0001%	0.1	0.0001%	0.2	0.0001%
Amador City Total	**198**	**0.1%**	**61**	**0.0%**	**137**	**0.1%**
Ione						
Very High	1,114	0.3%	3	0.002%	1,111	0.5%
High	918	0.2%	198	0.1%	720	0.3%
Moderate	398	0.1%	218	0.1%	181	0.1%
Non-Wildland	526	0.1%	271	0.2%	255	0.1%
Outside of LRA Responsibility Area	17	0.004%	1	0.0005%	16	0.01%
Ione Total	**2,973**	**0.8%**	**690**	**0.4%**	**2,283**	**1.0%**
Jackson						
Very High	253	0.1%	65	0.04%	188	0.1%
High	1,810	0.5%	590	0.4%	1,220	0.6%
Moderate	126	0.03%	73	0.04%	52	0.02%
Non-Wildland	109	0.03%	53	0.03%	56	0.03%
Outside of LRA Responsibility Area	6	0.001%	2	0.001%	3	0.002%
Jackson Total	**2,302**	**0.6%**	**782**	**0.5%**	**1,520**	**0.7%**
Plymouth						
Very High	105	0.03%	8	0.005%	98	0.04%
High	1,519	0.4%	558	0.3%	961	0.4%
Moderate	46	0.01%	24	0.01%	22	0.01%
Non-Wildland	22	0.01%	9	0.01%	13	0.01%
Outside of LRA Responsibility Area	6	0.001%	1	0.001%	5	0.002%
Plymouth Total	**1,698**	**0.4%**	**600**	**0.4%**	**1,098**	**0.5%**
Sutter Creek						
Very High	780	0.2%	357	0.2%	423	0.2%

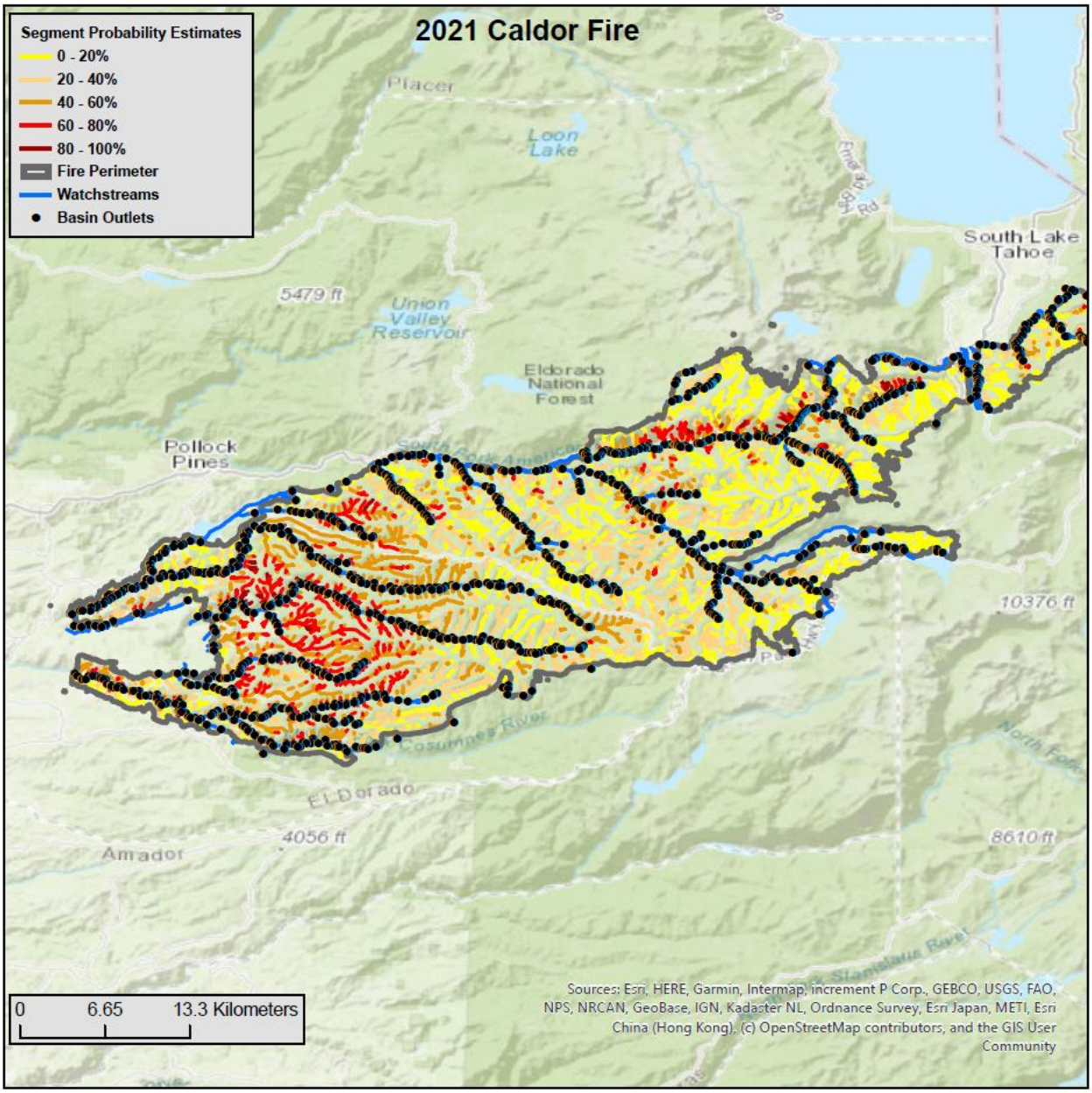
Jurisdiction / Fire Hazard Severity Zones	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
High	857	0.2%	368	0.2%	489	0.2%
Moderate	34	0.01%	15	0.01%	19	0.01%
Non-Wildland	34	0.01%	21	0.01%	13	0.01%
Outside of LRA Responsibility Area	4	0.001%	1	0.001%	3	0.001%
Sutter Creek Total	**1,709**	**0.4%**	**762**	**0.5%**	**947**	**0.4%**
Unincorporated Amador County						
Outside of LRA Responsibility Area	378,848	97.7%	165,178	98.3%	213,670	97.3%
Unincorporated Amador County Total	**378,848**	**97.7%**	**165,178**	**98.3%**	**213,670**	**97.3%**
Grand Total	**387,727**	**100.0%**	**168,072**	**100.0%**	**219,654**	**100.0%**

Source: CAL FIRE (LRA 2025)

Post-Wildfire Landslides and Debris Flows

Post-wildfire landslides and debris flows are a concern in Amador County, though the fires and associated post fire landslides often occur in areas that are less populated. Fires that burn in hilly areas, which comprise the eastern portion of Amador County, remove vegetation that holds hillsides together during rainstorms. Once that vegetation is removed, the hillside may be compromised, resulting in landslides and debris flows. Mapping of these areas has been ongoing on a case-by-case basis since 2012. A search of the USGS Emergency Assessment of Post-Fire Debris Flow Hazards showed only one event in Amador County – the 2021 Caldor Fire. This can be seen on Figure 4-120. The orange, red, and dark red colors on the map indicate areas where risk is greater.

Figure 4-120 Amador County – Post-Wildfire Debris Flow Areas



Source: USGS. Retrieved 3/20/2025

Past Occurrences

Disaster Declaration History

A search of FEMA and Cal OES disaster declarations shows three state and two federal disaster declarations. These are shown in Table 4-126.

Table 4-126 Amador County – Federal and State Disaster Declaration from Wildfire 1950-2025

Disaster Type	State Declarations		Federal Declarations	
	Count	Years	Count	Years
Fire	3	1961 (Rancheria Creek Fire), 2015 (Summer 2015 Fires), 2021 (Caldor Fire)	2	2016 (Butte Fire), 2021 (Caldor Fire)

Source: Cal OES, FEMA

NCDC Events

The NCDC has tracked wildfire events in the County dating back to 1993. The 50 events in Amador County in the database are shown in Table 4-127.

*Table 4-127 NCDC Wildfire Events in Amador County 1993 to 7/31/2024**

Event Type	Number of Events	Deaths	Deaths (indirect)	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Dense Smoke	2	0	0	0	0	$0	$0
Wildfire	48	5	0	32	32	$1,225,000	$0
Total	**50**	**5**	**0**	**32**	**32**	**$1,225,000**	**$ 0**

Source: NCDC

*Deaths, injuries, and damages are for the entire event, and may not be exclusive to the County.

CAL FIRE Events

CAL FIRE, USDA Forest Service Region 5, Bureau of Land Management (BLM), the National Park Service (NPS), Contract Counties and other agencies jointly maintain a comprehensive fire perimeter GIS layer for public and private lands throughout the state. The data covers fires back to 1878 (though the first recorded incident for the County was in 1917). For the National Park Service, Bureau of Land Management, and US Forest Service, fires of 10 acres and greater are reported. For CAL FIRE, timber fires greater than 10 acres, brush fires greater than 50 acres, grass fires greater than 300 acres, and fires that destroy three or more residential dwellings or commercial structures are reported. CAL FIRE recognizes the various federal, state, and local agencies that have contributed to this dataset, including USDA Forest Service Region 5, BLM, National Park Service, and numerous local agencies.

Fires may be missing altogether or have missing or incorrect attribute data. Some fires may be missing because historical records were lost or damaged, fires were too small for the minimum cutoffs, documentation was inadequate, or fire perimeters have not yet been incorporated into the database. Also, agencies are at different stages of participation. For these reasons, the data should not be used for statistical or analytical purposes.

The data provides a reasonable view of the spatial distribution of past large fires in California. Using GIS, fire perimeters that intersect Amador County were extracted and are listed in Table 4-128. There are 111 fires recorded in this database for Amador County. Each of them was tracked by CAL FIRE. Many more small fires likely have occurred, but were not included in the analysis.

Figure 4-121 shows fire history for the Amador County Planning Area, colored by the size of the acreage burned. This map contains fires from 1950 to 2024, while the detailed tables of wildfire shown in Table 4-128 contain fires from 1910 to 2024, with the first recorded wildfire in this database in Amador County is from 1917.

Figure 4-121 Amador County Wildfire History – CAL FIRE 1910 to 2024

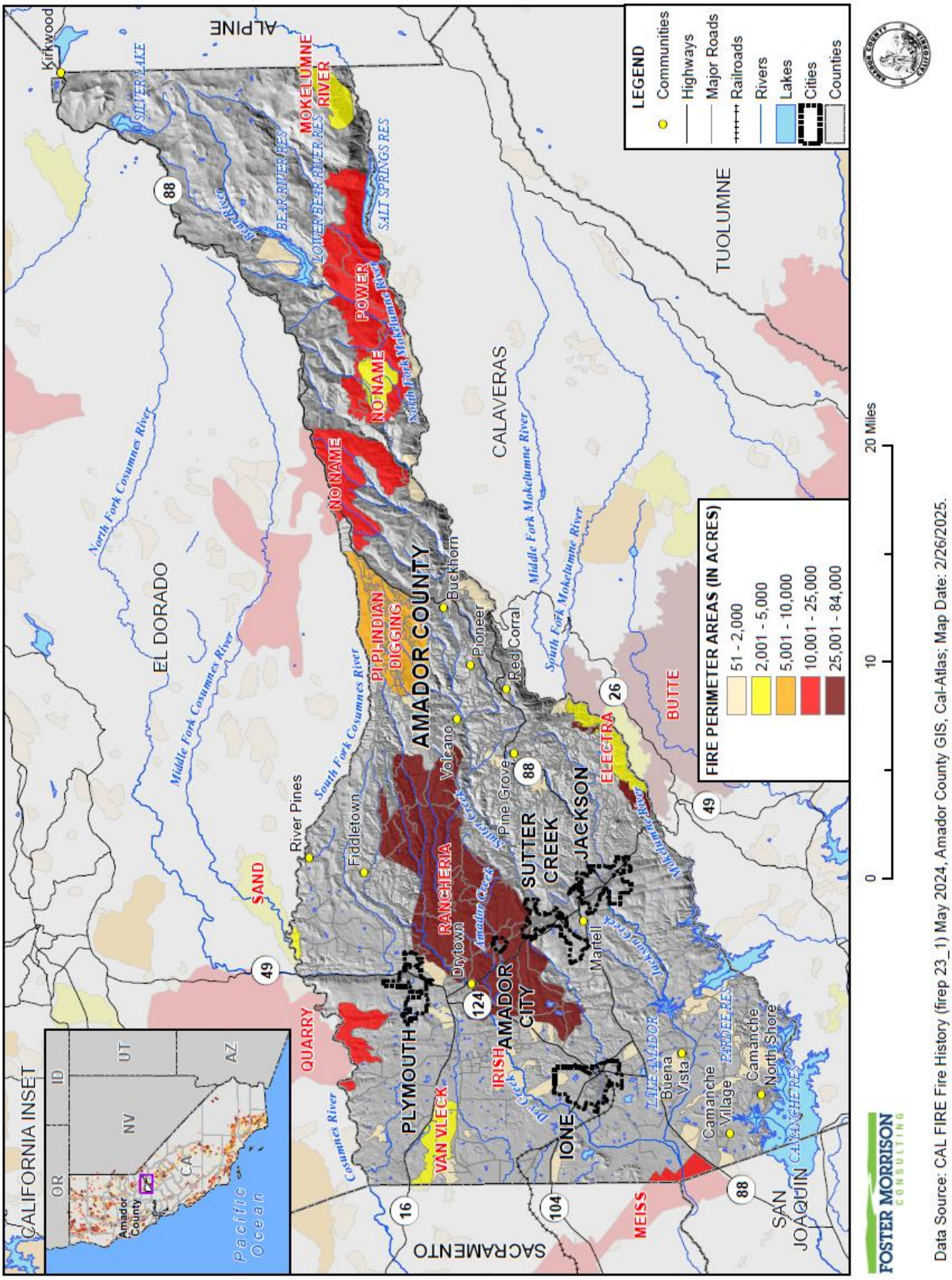


Table 4-128 Amador County – CAL FIRE Wildfire History Summary 1910-2024 by Acres Burned

Wildfire Name	Year	Date	Cause Description	Total Wildfire Acres	Wildfire Acres Within County
RANCHERIA	1961	9/2/1961	Unknown/Unidentified	34,104	34,103
POWER	2004	10/6/2004	Equipment Use	16,983	16,981
PI PI-INDIAN DIGGING	1924	8/18/1924	Miscellaneous	8,948	8,886
(blank)			Unknown/Unidentified	10,058	7,152
BUTTE	2015	9/10/2015	Unknown/Unidentified	70,847	3,559
QUARRY	1976	6/23/1976	Unknown/Unidentified	20,870	2,620
ELECTRA	2022	7/4/2022	Unknown/Unidentified	4,466	2,577
VAN VLECK	1968	6/22/1968	Unknown/Unidentified	2,665	2,520
MOKELUMNE RIVER	1924	8/1/1924	Miscellaneous	2,449	2,244
(blank)	1917	(blank)	Lightning	2,051	2,051
BEAR RIVER FIRE	1918	6/12/1918	Lightning	1,748	1,747
JACKSON	2001	6/13/2001	Equipment Use	1,671	1,671
(blank)	1959	(blank)	Unknown/Unidentified	1,378	1,377
P.G. & E.CO MOKELUME	1927	4/30/1927	Miscellaneous	1,131	1,131
MEISS	1981	6/14/1981	Miscellaneous	14,126	1,130
CALDOR	2021	8/15/2021	Unknown/Unidentified	221,786	1,115
(blank)	1919	(blank)	Unknown/Unidentified	1,107	1,107
SUTTER CREEK	1961	9/2/1961	Unknown/Unidentified	966	966
P.G. & E. #3	1965	9/17/1965	Unknown/Unidentified	1,570	916
PACIFIC MINE	1951	7/18/1951	Unknown/Unidentified	902	902
IRISH	2018	7/6/2018	Equipment Use	825	825
HIGHWAY 88 SERIES	1980	10/5/1980	Unknown/Unidentified	1,080	744
IRISH HILL	1961	10/8/1961	Unknown/Unidentified	732	732
DUFRENE ESCAPE	1954	7/29/1954	Unknown/Unidentified	726	726
BUTTE PG&E #24	1990	6/11/1990	Unknown/Unidentified	692	692
MICHIGAN BAR	1980	7/29/1980	Unknown/Unidentified	848	691
WEST SHERMAN CK	1919	9/15/1919	Unknown/Unidentified	681	681
JOSES SERIES	1964	7/5/1964	Unknown/Unidentified	680	680

Wildfire Name	Year	Date	Cause Description	Total Wildfire Acres	Wildfire Acres Within County
CLINTON TRAIL	1957	8/15/1957	Unknown/Unidentified	666	662
PONY	2002	6/12/2002	Powerline	702	644
AMADOR	1985	7/9/1985	Equipment Use	588	588
HIGHWAY-16	2001	7/6/2001	Equipment Use	547	547
COLD CK FIRE	1917	8/24/1917	Lightning	992	468
ARROYO SECO NO. 6	1958	7/29/1958	Unknown/Unidentified	436	436
SCULLY ROAD	1950	7/3/1950	Unknown/Unidentified	416	416
DAFFODIL HILL	1959	8/11/1959	Unknown/Unidentified	408	408
GOLD BUG	1923	3/22/1923	Unknown/Unidentified	510	386
SAND	2014	7/26/2014	Vehicle	4,239	386
DELL ORTO ESCAPE	1954	8/17/1954	Unknown/Unidentified	380	373
MOKE	2004	6/17/2004	Campfire	354	354
RANCHO	2016	6/28/2016	Vehicle	372	353
SALT	2011	12/1/2011	Miscellaneous	343	343
HIGHWAY 88 NO.1	1961	7/22/1961	Unknown/Unidentified	336	336
AMADOR	1988	7/18/1988	Arson	329	329
KLOTZ	1962	9/27/1962	Unknown/Unidentified	326	326
PETERSON	1951	8/19/1951	Unknown/Unidentified	312	312
(blank)			Unknown/Unidentified	308	308
(blank)	1922	(blank)	Miscellaneous	274	274
ELECTRA	2008	6/13/2008	Powerline	251	251
SUNNYBROOK	1994	6/26/1994	Unknown/Unidentified	230	230
SALT	2003	7/18/2003	Campfire	216	216
CAMANCHE	2016	6/17/2016	Unknown/Unidentified	210	210
DEADMAN'S FLAT	1925	7/18/1925	Lightning	189	189
(blank)	1956	(blank)	Unknown/Unidentified	160	160
(blank)	1991	4/19/1991	Lightning	154	154
(blank)	1978	3/27/1978	Debris	130	130
ROAD	1993	5/10/1993	Debris	127	127
ELLIS 2	2002	11/15/2002	Debris	113	113
POWERHOUSE	2004	9/5/2004	Powerline	113	113
JACKSON	2006	7/20/2006	Unknown/Unidentified	104	104
TONZI	2003	8/18/2003	Vehicle	99	99

Wildfire Name	Year	Date	Cause Description	Total Wildfire Acres	Wildfire Acres Within County
CABLE #2	1924	5/19/1924	Miscellaneous	89	89
BUSI	1961	1/14/1961	Unknown/Unidentified	84	84
CAMANCHE	2006	7/10/2006	Structure	79	79
SALT	2016	10/3/2016	Lightning	78	78
LIBERTY	2023	7/11/2023	Unknown/Unidentified	71	71
STONY	2002	7/3/2002	Equipment Use	68	68
GOOSE	2021	6/13/2021	Equipment Use	66	66
CARBON	2023	7/11/2023	Miscellaneous	59	59
SALT	1992	2/3/1992	Miscellaneous	53	53
BULL CK	1918	6/12/1918	Lightning	51	51
BEAR 2	2002	11/24/2002	Debris	49	49
COPPER FIRE	2020	9/30/2020	Smoking	47	47
BELL	2016	(blank)	Unknown/Unidentified	46	46
LAWRENCE	2021	9/5/2021	Unknown/Unidentified	46	46
UPPER	1996	8/12/1996	Miscellaneous	40	40
DOAK'S RIDGE FIRE	1937	5/16/1937	Miscellaneous	38	38
(blank)	1918	(blank)	Unknown/Unidentified	37	37
JACKSON	2023	7/1/2023	Equipment Use	28	28
HOYA	2016	8/15/2016	Equipment Use	23	23
(blank)	1927	(blank)	Miscellaneous	23	23
LAMBERT FIRE	2020	10/4/2020	Miscellaneous	22	22
TONZI	2017	6/17/2017	Unknown/Unidentified	22	22
BUENA	2002	8/15/2002	Unknown/Unidentified	21	21
JACKSON	2005	7/26/2005	Vehicle	21	21
CEDAR	1994	1/2/1994	Miscellaneous	20	20
DAVIS	1925	5/3/1925	Lightning	20	20
BELL	2021	5/20/2021	Equipment Use	19	19
MUD SPRINGS	1929	5/21/1929	Unknown/Unidentified	19	19
(blank)	1994	1/1/1994	Debris	19	19
VOLCANO	1993	8/16/1993	Powerline	18	18
WILLOW	2016	8/30/2016	Vehicle	18	18
(blank)	1989	11/20/1989	Debris	18	18
COAL	2022	8/7/2022	Arson	17	17
TIGER	2013	8/18/2013	Lightning	16	16
HIGHWAY-88	2001	8/24/2001	Arson	15	15

Wildfire Name	Year	Date	Cause Description	Total Wildfire Acres	Wildfire Acres Within County
STONY	2016	7/2/2016	Miscellaneous	15	15
MIDDLE	2016	7/11/2016	Unknown/Unidentified	13	13
(blank)	1931	(blank)	Unknown/Unidentified	261	13
PLYMOUTH	2023	11/2/2023	Debris	11	11
STONY	2017	6/24/2017	Powerline	11	11
(blank)	1938	(blank)	Lightning	11	11
(blank)	1934	(blank)	Lightning	11	11
ELECTRA	2019	9/25/2019	Arson	10	10
SALT	1969	9/9/1969	Lightning	10	10
(blank)	1937	(blank)	Miscellaneous	10	10
(blank)		9/3/1989	Smoking	8	8
DRESSLER	1952	8/8/1952	Unknown/Unidentified	1,555	4
STEVENS	1950	8/27/1950	Unknown/Unidentified	313	2
WINTON	2017	8/28/2017	Arson	0	0
(blank)	(blank)	(blank)	(blank)	-	-

Source: CAL FIRE (May 2024)

Hazard Mitigation Planning Committee Events

It is important to note that in addition to the Amador County fire history detailed above, there are numerous smaller fires that occur in the area year after year. These smaller fires have the ability to quickly get out of hand and become significant fires. Also, depending on the area, small fires in acreage can result in large losses. The HMPC provided the following details on fire history in Amador County.

1855 – City of Jackson: Although not considered a wildland fire, a fire destroyed a portion of the town.

1862 – City of Jackson: A fire (i.e., also not a wildland fire) destroyed most of Jackson, which was later rebuilt.

1920 – The Amador County Fire Safe Council indicated a fire known as the Indian Diggings fire affected the County.

August 5, 1926 – A fire which started between Ione and Buena Vista burned an area of between 30–40,000 acres. The fire was stopped short of entering the City of Jackson.

1961 – Rancheria Creek Fire: This was the worst fire in the County in over 50 years. In September of 1961, a fire started a mile and half west of Sutter Creek. Twenty-five minutes later, a second fire broke out on Dry Creek north of the Old Rancheria store. Whipped by a fierce wind, the latter fire moved past Plymouth, swept through the New Chicago and Fremont Mine country, moved to Bunker Hill, and by dusk, Amador City was surrounded by flames. The fire left one house remaining in historic "Stringbean Alley" and in Sutter Creek destroyed the Amador High School gym. Overall, the fire burned over 30,000 acres,

destroyed over 30 buildings, and did about $1,243,400 worth of damage. (See Figure 4-122 and Figure 4-123)

Figure 4-122 Rancheria Creek Fire Damages



Source: Amador County Archives

Figure 4-123 Rancheria Creek Fire Damages



Source: Amador County Archives

1964 – City of Sutter Creek: Wildland fire with structures involved occurred during the summer in the northwestern area of Sutter Creek from the City limits up to Amador High School area.

1992 – Farnum Ridge Fire burned over 800 acres near River Pines. It was caused by faulty equipment.

Summer 2003 – A forest fire near Panther Creek burned 250 acres of land.

July 2003 – A wildfire between Ione and Martell closed a section of Highway 88 for about five hours. The fire began as five smaller roadside fires that merged into three larger fires. Approximately 45 acres were scorched in the blaze.

October 2004 – The Power Fire: The Power Fire burned a total of just under 17,000 acres near the Salt Springs and Bear River reservoir areas. 13,611 acres were on USFS land within the Amador District of the Eldorado National Forest and about 3,000 acres were on private land. The exact cause is unknown; although it is confirmed to be human caused. Foehn wind gusts of up to 50 mph caused the fire to escape original containment. No structures were lost, and no injuries or fatalities were reported. Firefighting costs were

estimated at $6.8 million. Known damages include over $80,000 to repair fences and $33,707,115 in potential damages to crops, if not harvested. Other impacts included loss of grazing, hunting, and fishing lands.

2013 Roadrunner Fire – A fire broke out near Roadrunner Drive south of Ione in Amador County. The fire was started on June 12 and was extinguished the same day. 96 acres were burned.

2014 Sand Fire – The Sand Fire broke out east of Highway 49 5 miles north of Plymouth in Amador County. The fire broke out on the afternoon of July 25th. 4,240 acres were consumed by the fire. The fire was extinguished on August 2nd. Officials reported the fire had burned ten homes, seven outbuildings, and threatened 515 homes.

2015 Butte Fire – The Butte Fire broke out to the east of Jackson in Amador County on September 9 in the early afternoon. The fire burned 70,868 acres in total. The fire was not extinguished until October 15th. 44 structures were damaged, and 877 were destroyed. One injury was sustained, and two fatalities occurred due to the fire. On June 22, 2017, Sacramento Judge Allen Sumner ruled that because "...the Butte Fire was caused by a public improvement as deliberately designed and constructed by Pacific Gas and Electric Company," the company is liable for all property damages caused by the fire. On December 7, 2019, PG&E proposed to settle all the claims for a total of $13.5 billion, which would cover liability for its responsibility originating from the Camp Fire, Tubbs Fire, Butte Fire and Ghost Ship warehouse fire, combined. The offer was tendered as a method of avoiding bankruptcy.

2018 Irish Fire – A fire broke out off Irish Ridge Road and Carbondale road south of Plymouth in Amador County. The fire broke out on the afternoon of July 6. The fire consumed 825 acres and was extinguished on January 4 of 2019.

In **2020**, The Copper Fire was a vegetation fire that started September 30th and burned 48 acres at Copper Hill Rd. off Hwy 16, east of Rancho Murieta. Impacts include evacuations and road closures; no deaths and no property destroyed

Also in **2020**, the Lambert Fire, started October 4th, was a 21-acre vegetation fire at Lambert Road and Carbondale Road, North of Carbondale. Impacts include evacuations and road closures; no death nor properties destroyed.

In **2021**, the Goose Fire began on June 13th and burned 67 acres near Red Valley Road and Jackson Valley Road; this fire resulted in evacuations and road closures though no property was destroyed, and no injuries were reported.

Also in **2021**, the Caldor Fire began on August 14th and burned 221,835 acres, primarily in El Dorado County, though parts of the fire dropped into upcountry Amador County. This fire was absolutely devasting, destroying 1,005 structures, damaging 81 others, and injuring a total of 21 people, though luckily no deaths are reported.

The final larger wildfire of **2021** was the Lawrence Fire began on September 5th and burned 46 acres just North of Fiddletown; It threatened homes and a school and resulted in evacuations and road closures but was extinguished before any buildings were destroyed.

In **2022**, the Electra Fire broke out on July 4th and burned 4,470 acres in the scar of the Butte Fire (2015), northeast of Mokelumne Hill in Amador and Calaveras counties. An emergency declaration was proclaimed (Resolution 22-179). It did not become a state or federal proclamation. This fire threatened the lives of people celebrating the holiday at the river as well as the lives and homes of those nearby, this fire resulted in evacuation and shelter in place orders, road closures, and the injury of 1 firefighter.

In **2023**, the Liberty Fire started on July 11th, near Lake Camanche, on the boarder of San Joaquin and Amador counties and burned 71 acres. No structures were destroyed and no injuries or fatalities.

Also in **2023**, the Carbon Fire started on July 11th off Carbondale Road near Ione burned 58 acres. No loss of life or destruction of structures resulted.

In **2024**, the Wicklow Fire ignited September 9th and burned 63 acres in Martell. No loss of life or destruction of structures was reported.

Later in **2024**, the Tiger Fire began on September 30th and burned 4 acres near Pioneer. This fire resulted in evacuation orders but there are no reports of destroyed structures or deaths/injuries. The EOC was stood up during this event for approximately 6 hours. It was noted in and After Action Report that the early and well-coordinated evacuation efforts resulted in zero casualties. Transportation assistance for those without the means to evacuate was made available. The human shelter was fully operational within about an hour and provided essential services to evacuees and their pets. Animal rescue groups were quick to respond and set up shelters.

The last large fire in **2024** was the Michigan Fire. It ignited on November 21st near Ione and burned 24 acres, no reports of destruction of structures or death/injuries.

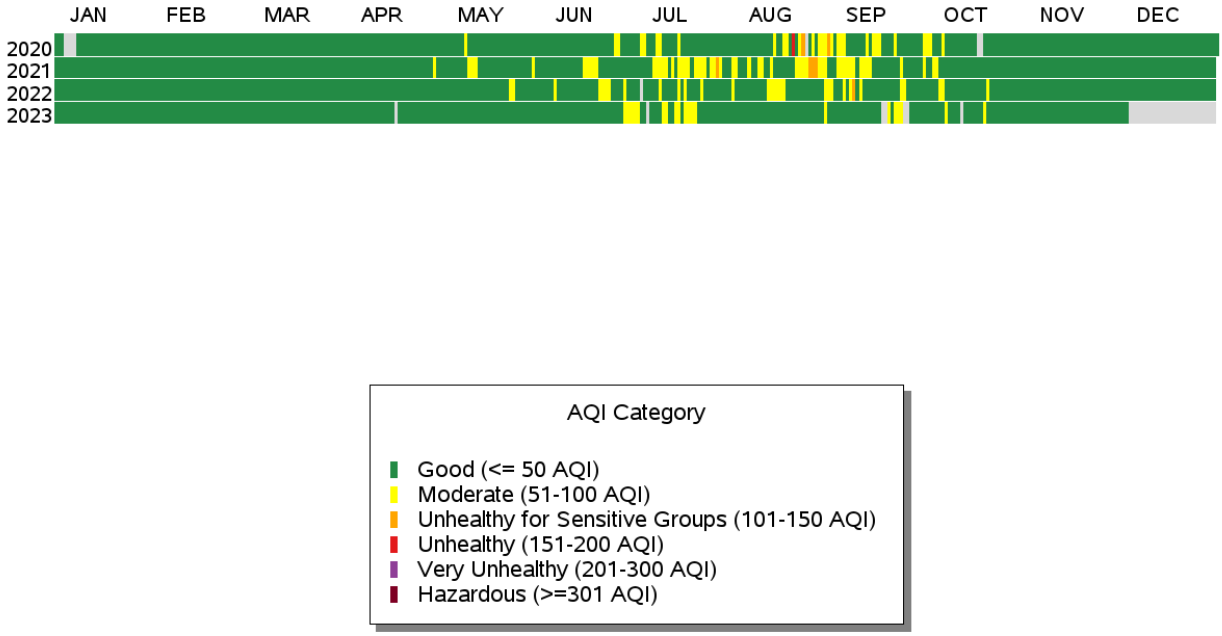
Figure 4-124 Michigan Fire Burn Area



Source: Amador County

For those wildfire events from 2020 to 2023, air quality data for smoke was reviewed and presented. This coincides with some of the wildfire events above. This can be seen in Figure 4-125.

Figure 4-125 Amador County Planning Area – Daily Air Quality from 2020-2023



Source: U.S. EPA AirData <https://www.epa.gov/air-data>
Generated: December 5, 2023

Likelihood of Future Occurrence

Highly Likely —Amador County faces a serious wildland fire threat every year. While generally limited to the sparsely populated, forested areas in the western portion of the County, fires will continue to occur on an annual basis throughout the Amador County Planning Area. The threat of wildfire and potential losses are constantly increasing as human development and population increase and the wildland urban interface areas expand. Due to its high fuel load and long, dry summers, portions of Amador County continue to be at risk from wildfire.

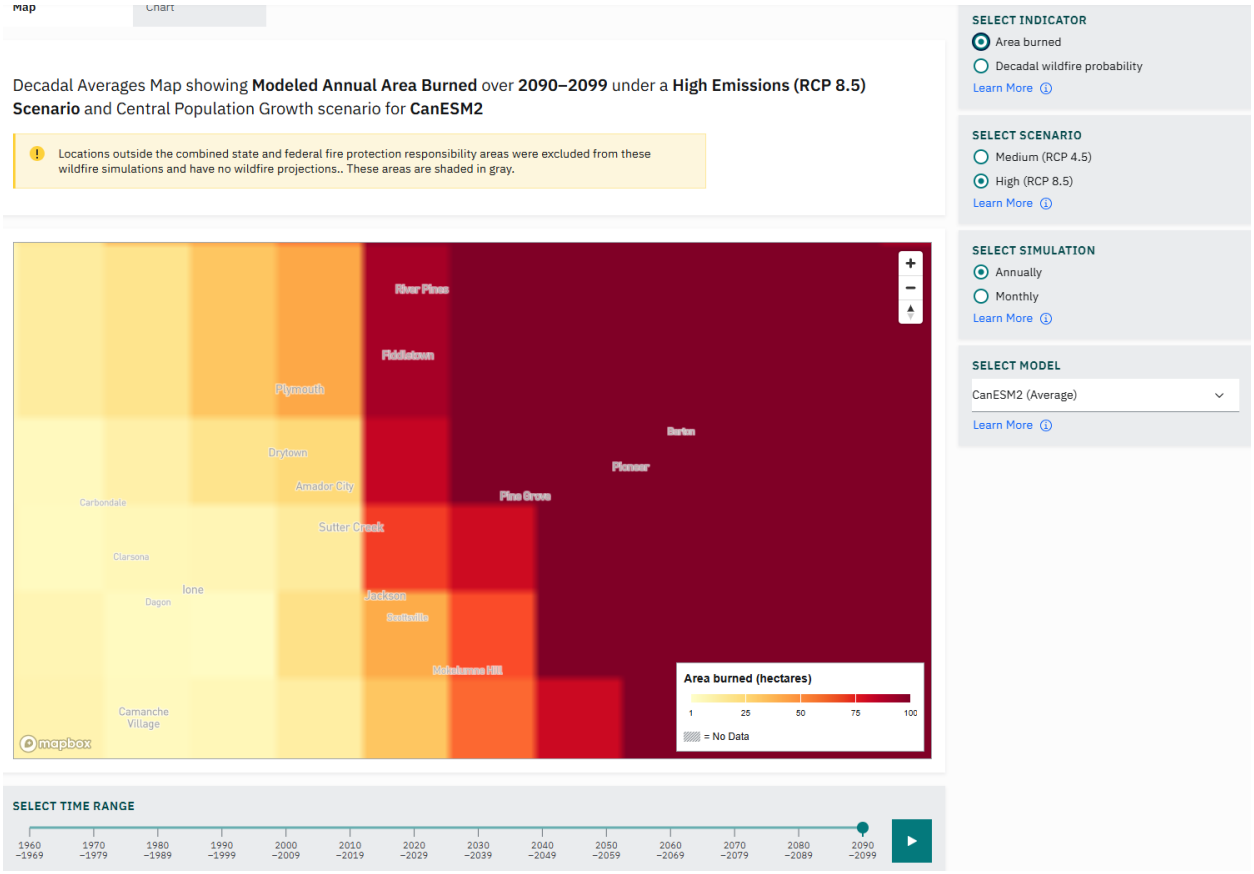
It is likely that climate change will increase the chance of future occurrence as well as future impacts. More information on climate change and wildfire can be found in the next section. More information on future impacts can be found in the Future Conditions/Future Development section of the Vulnerability Assessment below.

Climate Change and Wildfire

Warmer temperatures can exacerbate drought conditions. Drought often kills plants and trees, which serve as fuel for wildfires. Warmer temperatures could increase the number of wildfires and pest outbreaks, such as the western pine beetle. Cal-Adapt's wildfire tool predicts the potential increase in the amount of burned areas for the year 2090-2099, as compared to recent (2010) conditions. This is shown in Figure 4-126. Based on this model, Cal-Adapt predicts that wildfire risk in Amador County will increase moderately by the end of the century. However, wildfire models can vary depending on the parameters used. Cal-Adapt does not take landscape and fuel sources into account in their model. In all likelihood, in the Amador

County Planning Area, precipitation patterns, high levels of heat, topography, and fuel load will determine the frequency and intensity of future wildfire.

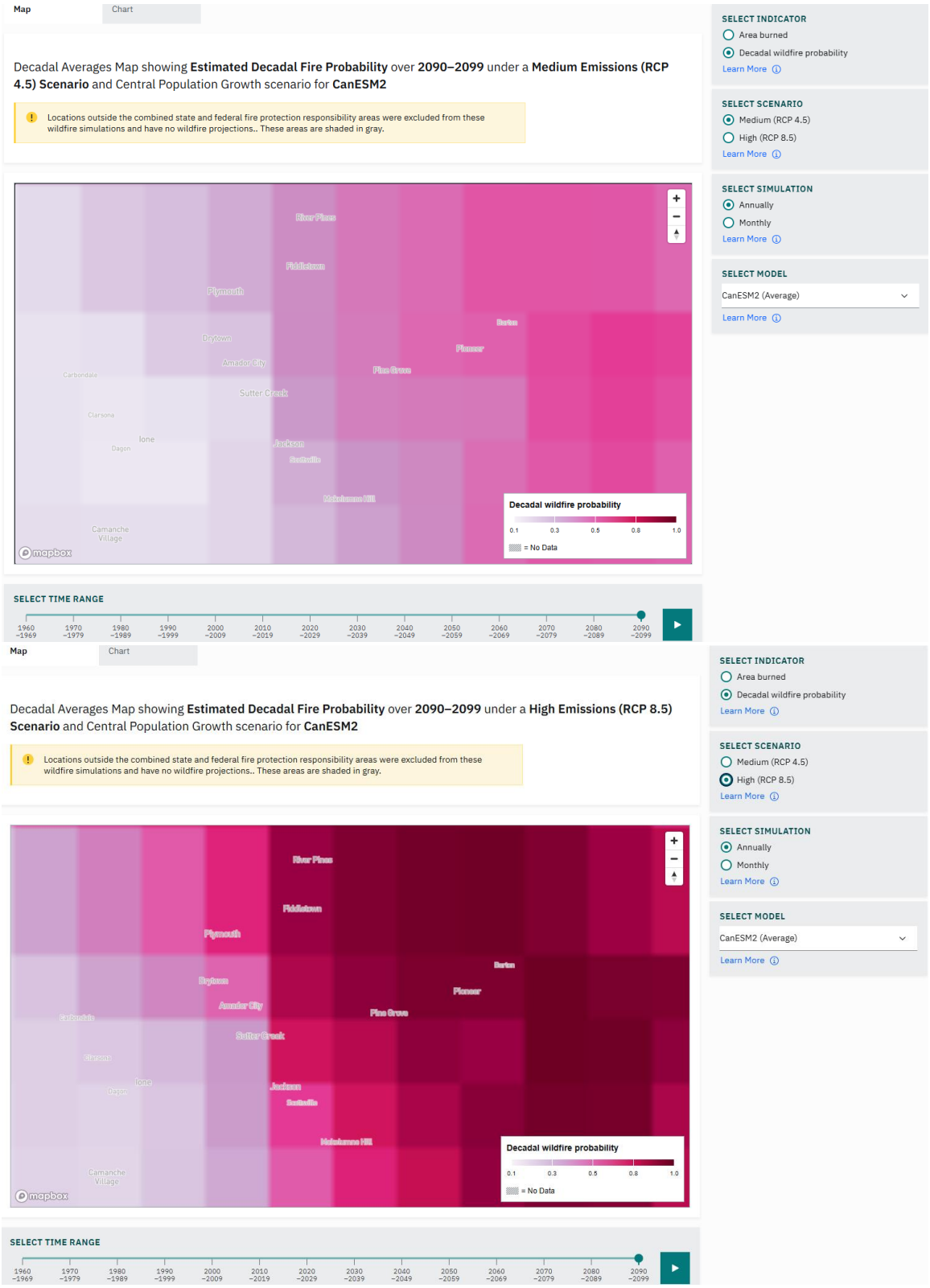
Figure 4-126 Amador County Planning Area – Projected Increase in Wildfire Burn Areas



Source: Cal-Adapt. Retrieved 2/6/2025.

Wildfire scenario projections were done by Cal-Adapt, based on statistical modeling from historical data of climate, vegetation, population density, and fire history. The fire modeling ran simulations on five variables on a monthly time step - Large fire presence/absence, Number of fires given presence, Area burned in a grid cell given a fire, High severity burned area given a fire and emissions. These are shown on Figure 4-127. The upper chart shows modeled annual averages of area burned for the Planning Area under the RCP 4.5 scenario, while the lower chart shows modeled annual averages of area burned for the Planning Area under the RCP 8.5 scenario.

Figure 4-127 Amador County Planning area – Future Annual Averages of Acres Burned under RCP 4.5 and 8.5 Scenarios



Source: Cal-Adapt. Retrieved 2/6/2025.

Vulnerability Assessment

Vulnerability—Extremely High

Risk and vulnerability to the County from wildfire is of significant concern. Wildfires that occur in the County occur from a variety of both natural and manmade causes. The County can be affected both by fires that start on or near County lands as well as those that start elsewhere and move into the County. In addition to burning large areas of land, air quality can be affected in the County by fires occurring inside the County as well as those from many miles away. As growth continues and populations increase in the County, the potential for catastrophic wildfires will also increase.

An assessment of a community's vulnerability to this hazard begins with an understanding of local exposure to unincorporated Amador County. This is included in the Local Concerns section below. After that, vulnerability is discussed in multiple sections that detail how this hazard can affect both the entire Amador County Planning Area as well as the unincorporated portions of Amador County. How the hazard affects the other participating jurisdictions can be found in their respective annexes to this LHMP Update. These sections below include assets at risk, impacts, and how future development may affect the vulnerability of the County to this hazard.

Local Concerns (unincorporated Amador County)

The unincorporated County has specific concerns regarding this hazard. These concerns form a portion of the basis for the mitigation strategy and mitigation actions that seek to reduce the risk and vulnerability to this hazard.

County Concerns

The County noted that increasingly frequent and severe wildfires throughout California pose a major threat. Limited road networks and dispersed rural communities mean that the vulnerable populations mentioned below may struggle to evacuate quickly and safely. Wildland fires that burn in natural settings with little or no development are part of a natural ecological cycle and may actually be beneficial to the landscape. Century old policies of fire exclusion and aggressive suppression have given way to better understanding of the importance fire plays in the natural cycle of certain forest types.

Communities at Risk

The National Fire Plan is a cooperative, long-term effort between various government agency partners with the intent of actively responding to severe wildland fires and their impacts to communities while ensuring sufficient firefighting capacity for the future. For purposes of the National Fire Plan, CAL FIRE generated a list of California communities at risk for wildfire. The intent of this assessment was to evaluate the risk to a given area from fire escaping off federal lands. Thus, there may be many more communities that are considered at risk to wildfire within the Amador County Planning Area, but might not meet these specific requirements for determining communities at risk from wildfire escaping off federal lands. Three main factors were used to determine the wildfire threat in the wildland-urban interface areas of California: fuel hazards, probability of fire, and areas of suitable housing density that could create wildland urban interface fire protection strategy situations. The preliminary criteria and methodology for evaluating wildfire risk to

communities is published in the Federal Register, January 4, 2001. The National Fire Plan identifies 10 "Communities at Risk" in Amador County.

- Amador City
- Fiddletown
- Ione
- Jackson
- Pine Grove
- Pioneer
- Plymouth
- River Pines
- Sutter Creek
- Volcano

Concerns from CAL FIRE

CAL FIRE noted that wildfires pose several significant public health concerns. Here are some of the chief local concerns:

- Respiratory Issues: Wildfire smoke contains fine particulate matter (PM2.5) that can penetrate deep into the lungs and even enter the bloodstream, exacerbating conditions like asthma, bronchitis, and chronic obstructive pulmonary disease (COPD).
- Cardiovascular Problems: Exposure to wildfire smoke can increase the risk of heart attacks, arrhythmias, and other cardiovascular issues.
- Vulnerable Populations: Certain groups, such as children, the unhoused, the elderly, pregnant women, and those with pre-existing health conditions, are more susceptible to the health impacts of wildfire smoke.
- Mental Health: The stress and trauma from experiencing wildfires and displacement can lead to mental health issues like anxiety, depression, and post-traumatic stress disorder (PTSD).
- Long-term Health Effects: Prolonged exposure to wildfire smoke can have lasting health impacts, including increased rates of respiratory infections and other chronic conditions.
- Emergency Room Visits and Hospitalizations: Increased air pollution from wildfires can lead to a rise in emergency room visits and hospitalizations for respiratory and cardiovascular issues which could overcome our small rural hospital's ability to care for patients.

Wildfire risk in Amador County varies by location. Factors contributing to the wildfire risk in Amador County include:

- Overstocked forests, severely overgrown vegetation, and lack of defensible space around structures;
- Large percentage of high hazard fuels;
- Conditions such as drought and overstocked forests contribute to increased beetle kill in weakened and stressed trees. In Amador County beetle kill is most established in the true firs within the upper elevations of the Eldorado National Forest (i.e., in the 5,000 to 7,000 elevation range). While the infestation is not exceptionally heavy, the mortality is noticeable along the Highway 88 corridor and is more prevalent in the heavily stocked stands of the Foster Meadow to Mormon Emigrant Trail area;
- The County contains steep rugged river canyons that limit accessibility except on foot;
- Increasing population density and increasing development within the WUI areas; and

- The area east of Highway 49 which contains the largest population also contains the most hazardous fuels and most difficult terrain.

Land Ownership Concerns

Sierra Pacific Industries (SPI) currently owns approximately 26,000 acres in Amador County. This land is defined as industrial timberland and is zoned as Timber Production Zone. Much of this land lies between the forest/urban interface within the Eldorado National Forest, and is critical to effective fire management activities. SPI and predecessor companies have been aggressive in planning and implementing fire control strategies on the property including the development of shaded fuel breaks. Wildfires in the Timber Production Zones would negatively affect SPI, its subsidiaries, and its employees.

Insurance Concerns

The HMPC noted that in the WUI areas, there has been increased difficulty in obtaining home insurance and the cost of insurance premiums. Some residents have experienced cancellations of their policies due to catastrophic and recent wildfires occurring throughout California which has reduced the risk tolerance of many insurance companies. This increases costs to those who live in the WUI, and in some circumstances limits where people choose to live.

Amador County Resource Conservation District Concerns

In addition to the above, the Amador County Resource Conservation District noted the following:

- Nearly 30% of the population in Amador County is elderly (ages 65+) [census info], they may have difficulty evacuating or need assistance to evacuate
- Wildfires pose a threat to life and property
- Road capabilities during evacuation to handle evacuees leaving and emergency response entering (Ingress/Egress)
- Ability of fire response teams to effectively fight wildfire
- Dense vegetation that serves as ladder fuels and leads to higher intensity fires that are harder to contain
- Need for establishment and maintenance of strategic fuel breaks to project infrastructure and communities.
- Insurance cost, Amador County residents live in the Wildland Urban Interface (WUI). The growth of rural communities increases the risk to life, property, and infrastructure during a wildlife. Many homeowners are unable to afford the cost of home hardening and land management that would reduce the risk to their homes. Insurance costs have skyrocketed in recent years and many people are left with the CA fair plan as their only option.
- Watershed impacts, high intensity wildlife pose a significant risk to upper watershed resources that much of the state depends on and provide ecological value. Amador Counties upcountry landscape is the headwaters of the Mokelumne and Cosumnes rivers. A wildfire threat to either of these rivers could have critical water resource and ecological impacts beyond Amador County, such as the downstream farming communities, CA delta, and East Bay MUD.

Local concerns for each of the participating jurisdictions can be found under the Local Concerns heading in each respective jurisdictional annex to this LHMP Update.

Assets at Risk

Assets at risk from wildfire include people and populations; structures; critical facilities and infrastructure; and natural, historic, and cultural resources. These are discussed in the following sections for the Amador County Planning Area and unincorporated Amador County.

Additionally, for each hazard in the FEMA National Risk Index in Amador County, the relevant portions of the hazard analysis done by FEMA is presented below. This includes the Hazard Risk Index Rating, Expected Annual Loss Values, Exposure Values, and the Historic Loss Ratio Rating. These are presented for the Amador County Planning Area as a whole.

Methodology (Parcels and Structures)

As part of the Fire and Resource Assessment Program (FRAP), the State Fire Marshall was mandated to map areas of significant fire hazards based on fuels, terrain, weather, and other relevant factors, including areas where winds have been identified as a major cause of wildfire spread. These zones, referred to as Fire Hazard Severity Zones (FHSZs), include non-wildland/non-urban, moderate, high, and very high FHSZs. The FHSZ map evaluates hazard, not risk. Hazard is based on the physical conditions that create a likelihood and expected fire behavior over a 30-50 year period without considering mitigation measures such as home hardening, recent wildfire, or fuel reduction efforts. Risk is the potential damage a fire can do to an area under existing conditions, accounting for any modification such as fuel reduction projects, defensible space, and ignition resistant building construction.

Effective April 1, 2024, CAL FIRE updated its Fire Hazard Severity Zone (FHSZ) maps for the State Responsibility Area (SRA) to provide updated map zones based on new science in local climate data and improved fire assessment modeling. The FHSZ model for wildland fire has two key elements: probability of an area burning and expected fire behavior under extreme fuel and weather conditions. The factors considered in determining fire hazard within wildland areas are fire history, flame length, terrain, local weather, and the potential fuel over a 50-year period. Outside of wildlands, the model considers factors that might lead to buildings being threatened, including terrain, weather, urban vegetation cover, blowing embers, proximity to wildland, fire history and fire hazard in nearby wildlands. FHSZs are not a structure loss model, as key information regarding structure ignition (such as roof type, etc.) is not included.

The new FHSZ mapping will create more accurate zone designations that can direct the implementation of mitigation strategies in areas where hazards warrant these investments. The FHSZ mapping program is still ongoing with new mapping in the LRA completed in March of 2025. Note: the FHSZ data for the Federal Responsibility Area has not been updated since 2007.

For the Amador County Planning Area, two separate analyses were performed: one for the combined SRA/FRA datasets and one for the LRA dataset. Specifically, the following datasets were utilized for the SRA/FRA analysis and contained all FHSZ hazard classes from Very High to non-wildland/non-urban: CAL FIRE State Responsibility Area (FHSZSRA_23_3) April 2024 and CAL FIRE Federal/ Areas: (Adopted SRA FHSZ 11/2007 - fhszs06_3_6). The following LRA dataset was used for the LRA FHSZ analysis: CAL FIRE Local Responsibility Area (FHSZLRA25_Phase3_v1) released in March 2025.

Since it is possible for any given parcel to intersect with multiple categories for purposes of this analysis, the parcel centroid was used to determine which FHSZ to assign to each parcel. In some cases, there are parcels in multiple fire hazard severity zones. For the purposes of this analysis, if multiple fire hazard zone intersected any portion of a parcel polygon, the entire parcel was considered to be in the highest fire risk category. The parcels were segregated and analyzed in this fashion for the entire Planning Area.

Once the CAL FIRE fire hazard severity zones were intersected, land and improved (structure) values from the Assessor data were included for each parcel and estimated content replacement values were added to the analysis. Improved parcels include those with improved structure values identified in the Amador County Assessor's database.

This methodology is used below for the FHSZ analysis of people and populations, structures, and critical facilities at risk as well as with respect to future development areas.

People and Populations

All populations are at some vulnerability to wildfire. Certain vulnerable populations are at greater risk to the effects of wildfire as well as smoke and air quality issues that wildfires bring. Vulnerable populations include:

- Unhoused
- Infants and children under age five and their caregivers
- Elderly (65 and older)
- Individuals with disabilities
- Individuals' dependent on medical equipment
- Individuals who exercise or recreate outdoors
- Individuals who work outdoors
- Individuals with impaired mobility

Amador County Planning Area residents that live in CAL FIRE FHSZs are often the most vulnerable. Not only are the residents at risk, but their homes and contents are all at risk, compounding the impacts associated with significant hazard events. To further evaluate the impact to the residential population within the Planning Area, CAL FIRE's wildfire hazard layers were overlayed on the parcel layer and linked to the Assessor data. Those residential parcel centroids that intersect the mapped FRA and SRA layers were counted and multiplied by the 2020 Census Bureau average household factors for each jurisdiction. These are shown by jurisdiction in Table 4-129. Those residential parcel centroids that intersect the mapped LRA layers were counted and multiplied by the 2020 Census Bureau average household factors for each jurisdiction. These are shown by jurisdiction in Table 4-130.

Table 4-129 Amador County Planning Area – Improved Residential Parcels and Population by CAL FIRE SRA/FRA Fire Hazard Severity Zone by Jurisdiction

Jurisdiction	Very High		High		Moderate	
	Improved Residential Parcels	Population at Risk	Improved Residential Parcels	Population at Risk	Improved Residential Parcels	Population at Risk
Amador City	1	2	0	0	0	0
Ione	0	0	0	0	0	0
Jackson	0	0	0	0	0	0
Plymouth	0	0	0	0	0	0
Sutter Creek	0	0	0	0	0	0
Unincorporated County	8,462	19,886	2,080	4,888	242	569

Source: CAL FIRE, 2024 Amador County Parcel/Assessor's Data, 2020 US Census Bureau Average Household Size – City of Amador City (2.07); City of Ione (2.29); City of Jackson (2.20); City of Plymouth (2.80); City of Sutter Creek (2.07): Unincorporated Amador County (2.35).

Table 4-130 Amador County Planning Area – Improved Residential Parcels and Population by CAL FIRE LRA Fire Hazard Severity Zone by Jurisdiction

Jurisdiction	Very High		High		Moderate	
	Improved Residential Parcels	Population at Risk	Improved Residential Parcels	Population at Risk	Improved Residential Parcels	Population at Risk
Amador City	95	197	0	0	0	0
Ione	1	2	560	1,282	242	554
Jackson	144	317	1,054	2,319	177	389
Plymouth	40	112	331	927	47	132
Sutter Creek	773	1,600	263	544	6	12
Unincorporated County	0	0	0	0	0	0

Source: CAL FIRE, 2024 Amador County Parcel/Assessor's Data, 2020 US Census Bureau Average Household Size – City of Amador City (2.07); City of Ione (2.29); City of Jackson (2.20); City of Plymouth (2.80); City of Sutter Creek (2.07): Unincorporated Amador County (2.35).

Structures

This section is presented in two sections: SRA/FRA Fire Hazard Severity Zone Analysis and LRA Fire Hazard Severity Zone Analysis.

For the following analysis, the SRA/FRA and LRA fire responsibility area layers were overlaid with the parcel data as described above and further broken out by property use and included information on both land and improved values. It should be noted that fire does not just affect structural values, fire can also affect land values. As such the Assessor's land values and all parcels were accounted for in this analysis to represent total County values at risk. However, it is highly unlikely the whole County will ever be on fire at once.

SRA/FRA Fire Hazard Severity Zone Analysis

All structures in the Amador County Planning Area have some risk to wildfire. The Amador County Planning Area parcel inventory and associated values by FRA and SRA are provided in Table 4-131. This is broken down further for the unincorporated County in Table 4-131. Table 4-131 shows FRA and SRA parcel counts, land and improved values (i.e., those with a structure improvement on the parcel), estimated content replacement values, and total values in the unincorporated County. ***Note***: while most SRA/FRA mapped areas fall within the unincorporated County areas, due to differing boundaries in mapped datasets, a few SRA/FRA mapped areas are found in the incorporated communities as shown below. Details on each jurisdiction's SRA/FRA Fire Hazard Severity Zones and property use types can be found in their respective annexes to this LHMP Update.

Table 4-131 Amador County Planning Area – Count and Value of Parcels and Structures by CAL FIRE SRA/FRA Fire Hazard Severity Zones by Jurisdiction

Jurisdiction / Fire Responsibility Area/ Fire Hazard Severity Zone	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Values	Total Value
Amador City						
SRA						
Very High	1	1	$39,032	$116,158	$58,079	$213,269
SRA Total	**1**	**1**	**$39,032**	**$116,158**	$58,079	$213,269
Amador City Total	**1**	**1**	**$39,032**	**$116,158**	**$58,079**	**$213,269**
Jackson						
SRA						
High	3	0	$8,575	$0	$0	$8,575
SRA Total	**3**	0	**$8,575**	$0	$0	**$8,575**
Jackson Total	**3**	0	**$8,575**	$0	$0	**$8,575**
Plymouth						
SRA						
High	2	0	$106,120	$0	$0	$106,120
SRA Total	**2**	**0**	**$106,120**	**$0**	$0	**$106,120**
Plymouth Total	**2**	**0**	**$106,120**	**$0**	$0	**$106,120**
Unincorporated Amador County						
FRA						
Very High	133	45	$3,484,714	$4,218,497	$2,109,249	$9,812,460
High	17	13	$295,716	$1,006,722	$359,999	$1,662,437
Moderate	142	102	$8,120,599	$10,442,127	$5,250,207	$23,812,933

Jurisdiction / Fire Responsibility Area/ Fire Hazard Severity Zone	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Values	Total Value
Non-Wildland/Non-Urban	4	3	$296,137	$492,306	$246,153	$1,034,596
FRA Total	**296**	**163**	**$12,197,166**	**$16,159,652**	**$7,965,608**	**$36,322,426**
SRA						
Very High	13,034	9,427	$1,125,553,747	$2,227,048,958	$1,247,474,536	$4,600,077,241
High	4,023	2,659	$505,375,316	$708,274,763	$450,070,234	$1,663,720,313
Moderate	472	184	$43,888,598	$74,645,928	$58,901,625	$177,436,151
SRA Total	**17,529**	**12,270**	**$1,674,817,661**	**$3,009,969,649**	$1,756,446,394	$6,441,233,704
Unincorporated Amador County Total	**17,825**	**12,433**	**$1,687,014,827**	**$3,026,129,301**	**$1,764,412,001**	**$6,477,556,129**
Grand Total	**17,831**	**12,434**	**$1,687,168,554**	**$3,026,245,459**	**$1,764,470,080**	**$6,477,884,093**

Source: CAL FIRE (FHSZ SRA 2024, FRA 2007), 2024 Amador County Parcel/Assessor's Data

Table 4-132 Unincorporated Amador County – Count and Value of Parcels and Structures by CAL FIRE SRA/FRA Fire Hazard Severity Zones by Property Use

Fire Responsibility Area / Fire Hazard Severity Zone/Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Values	Total Value
FRA						
Very High						
Agricultural	6	0	$2,036,833	$0	$0	$2,036,833
Commercial	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	81	0	$313,570	$0	$0	$313,570
Residential	46	45	$1,134,311	$4,218,497	$2,109,249	$7,462,057
Unknown	0	0	$0	$0	$0	$0
Very High Total	**133**	**45**	**$3,484,714**	**$4,218,497**	**$2,109,249**	**$9,812,460**
High						
Agricultural	0	0	$0	$0	$0	$0
Commercial	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0

Fire Responsibility Area / Fire Hazard Severity Zone/Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Values	Total Value
Miscellaneous	3	0	$0	$0	$0	$0
Residential	11	11	$241,620	$719,998	$359,999	$1,321,617
Unknown	3	2	$54,096	$286,724		$340,820
High Total	**17**	**13**	**$295,716**	**$1,006,722**	**$359,999**	**$1,662,437**
Moderate						
Agricultural	1	0	$162,302	$0	$0	$162,302
Commercial	1	1	$176,804	$58,287	$58,287	$293,378
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	35	0	$1,472,540	$0	$0	$1,472,540
Residential	105	101	$6,308,953	$10,383,840	$5,191,920	$21,884,713
Unknown	0	0	$0	$0	$0	$0
Moderate Total	**142**	**102**	**$8,120,599**	**$10,442,127**	**$5,250,207**	**$23,812,933**
Non-Wildland/Non-Urban						
Agricultural	0	0	$0	$0	$0	$0
Commercial	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	1	0	$0	$0	$0	$0
Residential	3	3	$296,137	$492,306	$246,153	$1,034,596
Unknown	0	0	$0	$0	$0	$0
Non-Wildland/Non-Urban Total	**4**	**3**	**$296,137**	**$492,306**	**$246,153**	**$1,034,596**
FRA Total	**296**	**163**	**$12,197,166**	**$16,159,652**	**$7,965,608**	**$36,322,426**
SRA						
Very High						
Agricultural	1,188	704	$161,097,114	$109,583,478	$109,583,478	$380,264,070
Commercial	209	161	$31,646,275	$165,117,421	$165,117,421	$361,881,117
Industrial	25	18	$10,243,882	$6,289,273	$9,433,910	$25,967,065
Miscellaneous	522	67	$6,181,688	$8,184,549	$0	$14,366,237
Residential	10,965	8,417	$883,454,372	$1,926,679,454	$963,339,727	$3,773,473,553
Unknown	125	60	$32,930,416	$11,194,783	$0	$44,125,199
Very High Total	**13,034**	**9,427**	**$1,125,553,747**	**$2,227,048,958**	**$1,247,474,536**	**$4,600,077,241**
High						
Agricultural	564	437	$115,304,332	$101,734,096	$101,734,096	$318,772,524

Fire Responsibility Area / Fire Hazard Severity Zone/Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Values	Total Value
Commercial	187	110	$52,084,232	$87,536,850	$87,536,850	$227,157,932
Industrial	27	12	$24,789,106	$7,186,321	$10,779,482	$42,754,909
Miscellaneous	158	8	$12,570,152	$5,628,469	$0	$18,198,621
Residential	3,043	2,069	$295,958,186	$500,039,612	$250,019,806	$1,046,017,604
Unknown	44	23	$4,669,308	$6,149,415	$0	$10,818,723
High Total	**4,023**	**2,659**	**$505,375,316**	**$708,274,763**	**$450,070,234**	**$1,663,720,313**
Moderate						
Agricultural	30	20	$4,422,859	$5,744,509	$5,744,509	$15,911,877
Commercial	39	32	$12,894,545	$37,848,948	$37,848,948	$88,592,441
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	20	0	$425,816	$0	$0	$425,816
Residential	380	131	$26,009,524	$30,616,335	$15,308,168	$71,934,027
Unknown	3	1	$135,854	$436,136	$0	$571,990
Moderate Total	**472**	**184**	**$43,888,598**	**$74,645,928**	$58,901,625	$177,436,151
SRA Total	**17,529**	**12,270**	**$1,674,817,661**	**$3,009,969,649**	$1,756,446,394	$6,441,233,704
Unincorporated Amador County Total	**17,825**	**12,433**	**$1,687,014,827**	**$3,026,129,301**	**$1,764,412,001**	**$6,477,556,129**

Source: CAL FIRE (FHSZ SRA 2024, FRA 2007), 2024 Amador County Parcel/Assessor's Data

LRA Fire Hazard Severity Zone Analysis

All structures in the Amador County Planning Area have some risk to wildfire. The Amador County Planning Area parcel inventory and associated values by LRA are provided in Table 4-133. As shown, there are no LRA areas for the unincorporated County. As such, no tabular analysis of property use is presented for unincorporated Amador County. Details on each jurisdiction's LRA Fire Hazard Severity Zones and property use types can be found in their respective annexes to this LHMP Update.

Table 4-133 Amador County Planning Area – Count and Value of Parcels and Structures by CAL FIRE LRA Fire Hazard Severity Zone by Jurisdiction

Jurisdiction/Fire Hazard Severity Zone	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Values	Total Value
Amador City						
Very High	180	111	$19,124,377	$21,078,306	$12,365,357	$52,568,040

Jurisdiction/Fire Hazard Severity Zone	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Values	Total Value
Amador City Total	**180**	**111**	**$19,124,377**	**$21,078,306**	**$12,365,357**	**$52,568,040**
Ione						
Very High	23	3	$4,044,274	$205,961	$93,636	$4,343,871
High	705	587	$73,730,102	$144,835,562	$74,739,206	$293,304,870
Moderate	294	267	$28,946,094	$71,387,728	$40,987,786	$141,321,608
Non-Wildland	1,183	1,119	$117,021,359	$280,037,906	$142,264,353	$539,323,618
Ione Total	**2,205**	**1,976**	**$223,741,829**	**$496,467,157**	**$258,084,980**	**$978,293,966**
Jackson						
Very High	213	168	$23,192,037	$54,995,054	$33,185,946	$111,373,037
High	1,421	1,164	$139,012,347	$416,400,057	$280,110,623	$835,523,027
Moderate	276	243	$25,221,616	$63,857,922	$47,288,279	$136,367,817
Non-Wildland	213	181	$14,353,404	$32,621,706	$19,727,567	$66,702,677
Outside of LRA Responsibility Area	1	0	$72,584	$0	$0	$72,584
Jackson Total	**2,124**	**1,756**	**$201,851,988**	**$567,874,739**	**$380,312,415**	**$1,150,039,142**
Plymouth						
Very High	46	40	$5,939,568	$6,628,450	$3,314,225	$15,882,243
High	482	372	$73,102,242	$102,067,788	$59,725,032	$234,895,062
Moderate	77	58	$4,502,157	$6,969,088	$4,632,529	$16,103,774
Non-Wildland	20	18	$1,599,396	$2,702,080	$1,590,355	$5,891,831
Plymouth Total	**625**	**488**	**$85,143,363**	**$118,367,406**	**$69,262,141**	**$272,772,910**
Sutter Creek						
Very High	991	815	$83,708,244	$216,257,857	$114,172,572	$414,138,673
High	414	331	$45,809,571	$106,185,022	$74,684,120	$226,678,713
Moderate	24	14	$3,607,044	$8,896,982	$8,762,973	$21,266,999
Non-Wildland	5	0	$550,346	$0	$0	$550,346
Sutter Creek Total	**1,434**	**1,160**	**$133,675,205**	**$331,339,861**	**$197,619,665**	**$662,634,731**
Grand Total	**6,568**	**5,491**	**$663,536,762**	**$1,535,127,469**	$917,644,556	$3,116,308,787

Source: CAL FIRE (FHSZ LRA 2025), 2024 Amador County Parcel/Assessor Data

Critical Facilities and Infrastructure

Wildfire present a threat to critical facilities and infrastructure. The following analysis discusses critical facilities and infrastructure. A separate analysis was performed on the critical facility inventory in the

Amador County Planning Area to determine critical facilities in fire hazard severity zones. This was done for both SRA/FRA and LRA fire hazard severity zones. Using GIS, the SRA/FRA and LRA fire hazard severity zones were overlayed on the critical facility GIS layer. Figure 4-128 shows critical facilities, as well as the SRA/FRA fire hazard severity zones. Table 4-134 details critical facilities by SRA/FRA fire hazard severity zone by facility type and count for the Planning Area. Figure 4-129 shows critical facilities, as well as the LRA fire hazard severity zones. Table 4-135 details critical facilities by LRA fire hazard severity zone by facility type and count for the Planning Area. Details of critical facility category, type, name and address by SRA/FRA and LRA fire hazard severity zones are listed in Appendix F.

Figure 4-128 Amador County Planning Area – Critical Facilities in SRA/FRA Fire Hazard Severity Zones

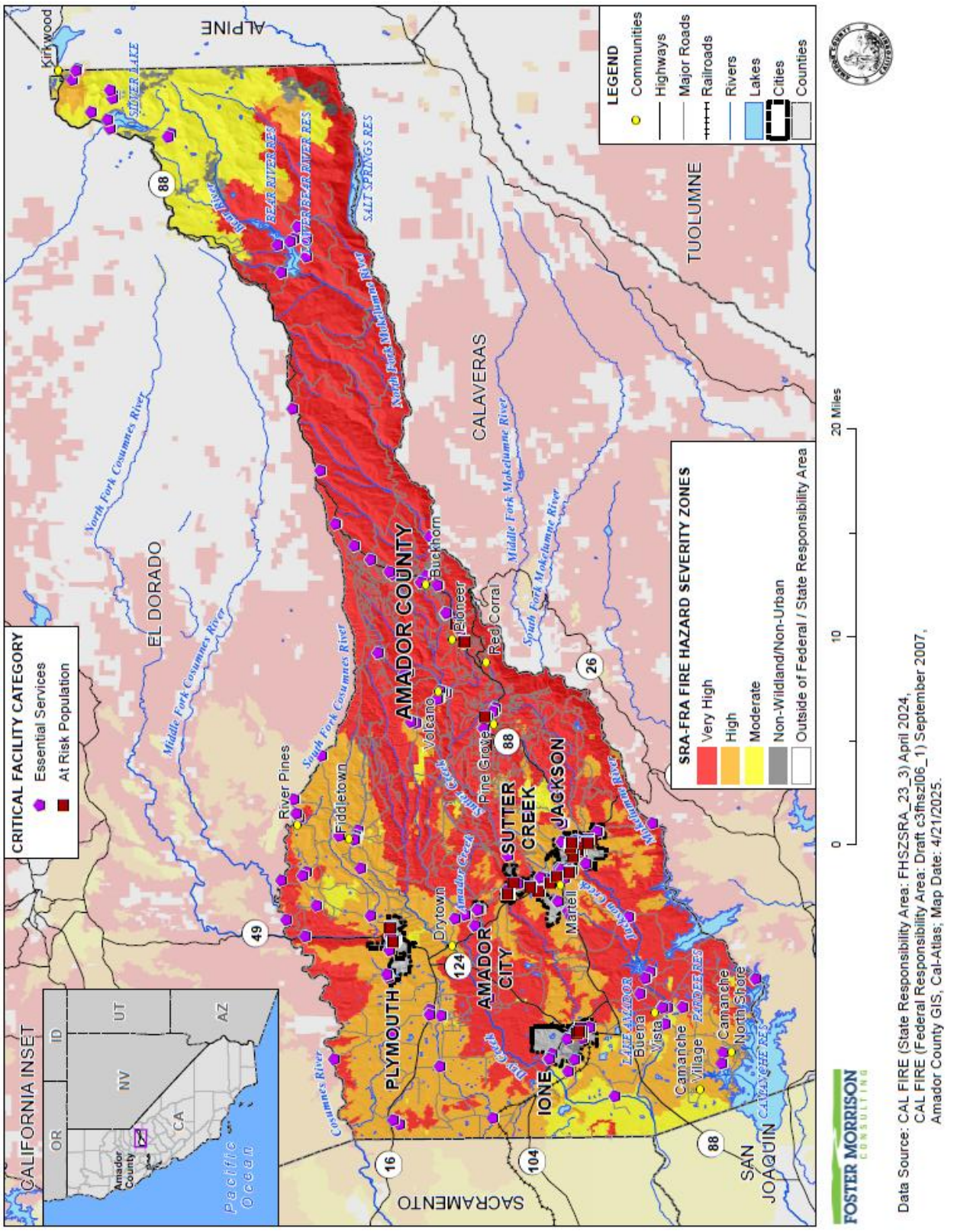


Table 4-134 Amador County Planning Area – Critical Facilities in SRA/FRA Fire Hazard Severity Zones by Jurisdiction and Category

Jurisdiction/Fire Hazard Severity Zones/Critical Facility Category	Facility Count
Plymouth	
High	
Essential Services	1
At Risk Population	0
High Total	**1**
Plymouth Total	**1**
Unincorporated Amador County	
Very High	
Essential Services	79
At Risk Population	4
Very High Total	**83**
High	
Essential Services	36
At Risk Population	2
High Total	**38**
Moderate	
Essential Services	23
At Risk Population	1
Moderate Total	**24**
Unincorporated Amador County Total	**145**
Unincorporated Alpine County	
High	
Essential Services	1
At Risk Population	0
High Total	**1**
Unincorporated Alpine County Total	**1**
Grand Total	**147**

Source: CAL FIRE, Amador County GIS

Figure 4-129 Amador County Planning Area – Critical Facilities in LRA Fire Hazard Severity Zones

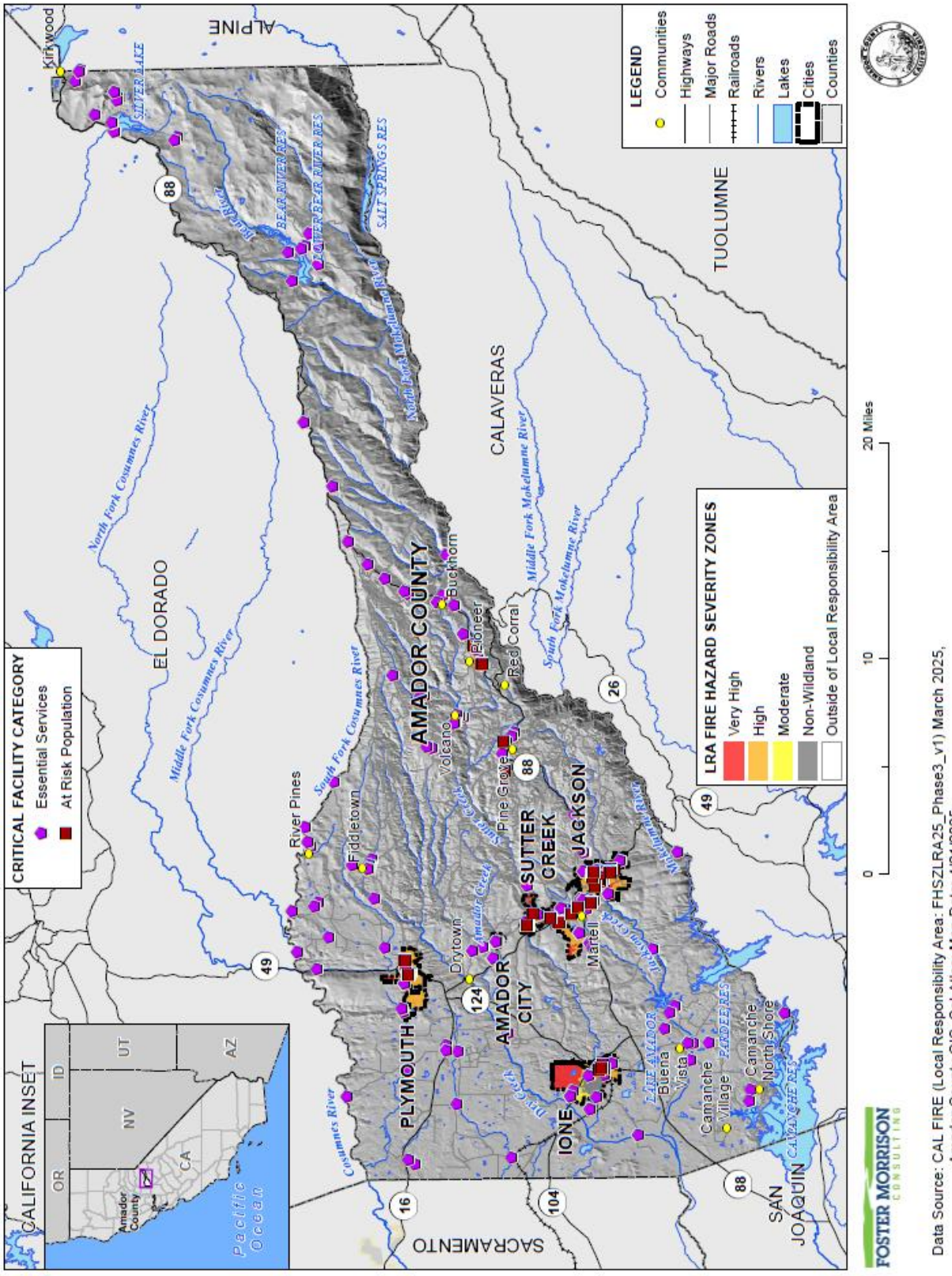


Table 4-135 Amador County Planning Area – Critical Facilities in LRA Fire Hazard Severity Zones by Jurisdiction, Category, and Type

Jurisdiction/Fire Hazard Severity Zone/Critical Facility Category	Facility Count
Amador City	
Very High	
Essential Services	3
At Risk Population	0
Very High Total	**3**
Amador City Total	**3**
Ione	
Very High	
Essential Services	1
At Risk Population	0
Very High Total	**1**
High	
Essential Services	4
At Risk Population	1
High Total	**5**
Moderate	
Essential Services	3
At Risk Population	2
Moderate Total	**5**
Non-Wildland	
Essential Services	5
At Risk Population	2
Non-Wildland Total	**7**
Ione Total	**18**
Jackson	
Very High	
Essential Services	1
At Risk Population	0
Very High Total	**1**
High	
Essential Services	17
At Risk Population	8
High Total	**25**
Moderate	
Essential Services	8

Jurisdiction/Fire Hazard Severity Zone/Critical Facility Category	Facility Count
At Risk Population	3
Moderate Total	**11**
Non-Wildland	
Essential Services	8
At Risk Population	2
Non-Wildland Total	**10**
Jackson Total	**47**
Plymouth	
High	
Essential Services	2
At Risk Population	0
High Total	**2**
Moderate	
Essential Services	2
At Risk Population	1
Moderate Total	**3**
Non-Wildland	
Essential Services	4
At Risk Population	**0**
Non-Wildland Total	**4**
Plymouth Total	**9**
Sutter Creek	
Very High	
Essential Services	2
At Risk Population	3
Very High Total	**5**
High	
Essential Services	5
At Risk Population	3
High Total	**8**
Sutter Creek Total	**13**
Grand Total	**90**

Source: CAL FIRE, Amador County GIS

Natural, Historic, and Cultural Resources

Natural, historic, and cultural resources located within areas at risk to wildfire would be vulnerable. Should a wildfire occur in the Planning Area, the impacts to natural, historic, and cultural resources could be extensive and include air pollution, contamination from water runoff containing toxic products, and other environmental discharges or releases from burned materials affecting soils, habitat areas, wildlife, and aquatic resources. Historic and cultural resources can be affected and are often more vulnerable due to their older age, construction type, and lack of fire prevention infrastructure such as sprinklers.

FEMA NRI Hazard Vulnerability Assessment

The FEMA NRI was queried for additional specific data on Amador County's vulnerability to Wildfire. The NRI contains data and analysis for 18 separate natural hazards, including wildfire. As shown in Table 4-136, wildfires could cause a total of $7,534,156 in expected annual losses, with a historic loss rating of relatively moderate. Wildfire has a relatively moderate rating for both social vulnerability and community resilience, with a risk index score of 97.4 out of 100. According to the NRI, there have been 0 wildfire events during the 2021 data set with 0.59% annual chance per year.

Table 4-136 Amador County Planning Area – Wildfire Vulnerability Ratings from FEMA NRI

NRI Hazard	Hazard Risk Index Rating*	Expected Annual Loss Values (total)**	Exposure Value (total)***	Historic Loss Ratio Rating
Wildfire	97.4	$7,534,156	$209,068,882,831	Relatively Moderate

Source: FEMA NRI Report, retrieved 4/1/2025.

*Hazard Risk Index is calculated using data for only a single hazard type, and reflect a communities expected annual loss value, community risk factors, and the adjustment factor used to calculate the risk value.

**Expected annual loss represents the average economic loss in dollars resulting from natural hazards each year.

***Exposure is a natural hazard consequence factor that is the representative value of buildings, populations, or agriculture potentially exposed to a natural hazard occurrence.

Additional information on the FEMA NRI can be found in Section 4.2 and Appendix G.

Impacts from Wildfire

Potential impacts from wildfire include loss of life and injuries; damage to structures (commercial, industrial, and residential) and other improvements, natural and cultural resources, croplands, and timber; and loss of recreational opportunities. Wildfires can cause short-term and long-term disruption to the Amador County Planning Area. Fires can have devastating effects on watersheds through loss of vegetation and soil erosion, which may impact the Planning Area by changing runoff patterns, increasing sedimentation, reducing natural and reservoir water storage capacity, and degrading water quality. Fires can also affect air quality in the Planning Area; smoke and air pollution from wildfires can be a severe health hazard. Smoke impacts may come from wildfires outside the Planning Area, as well as from within.

Although the physical damages and casualties arising from wildland-urban interface fires may be severe, it is important to recognize that they also cause significant economic impacts by resulting in a loss of function of buildings and infrastructure. Economic impacts of loss of transportation and utility services may include

traffic delays/detours from road and bridge closures and loss of electric power, potable water, and wastewater services. Schools and businesses can be forced to close for extended periods of time. Recently, the threat of wildfire, combined with the potential for high winds, heat, and low humidity, has caused PG&E to initiate a PSPS which can also significantly impact a community through loss of services, business closures, and other impacts associated with loss of power for an extended period. In addition, catastrophic wildfire can create favorable conditions for other hazards such as flooding, landslides, and erosion during the rainy season.

The impacts of a fire are felt long after the fire is extinguished. In addition to the loss of property in fires, the loss in vegetation and changes in surface soils alters the environment. When supporting vegetation is burned, hillsides become destabilized and prone to erosion. The burnt surface soils are harder and absorb less water. When winter rains come, this leads to increased runoff, erosion, and landslides in hilly areas.

Impacts that are not quantified, but can be anticipated in large future events, include:

- Injury and loss of life;
- Commercial and residential structural and property damage;
- Disruption of and damage to public infrastructure, utilities, and services;
- Damage to roads/bridges resulting in loss of mobility;
- Significant economic impact (jobs, sales, tax revenue) to the community; and
- Negative impact on commercial and residential property values

Wildfire smoke can also have negative effects to those who live in or near a fire burn area. Smoke and air pollution from wildfires can be a severe health hazard. Significant wildfires occurring in nearby northern California communities since the previous LHMP Update have created significant air pollution affecting area residents. Planning Area residents have been affected by wildfire smoke and poor air quality, from fires both within the County and from those much further away.

The Amador County Air District noted that wildfire smoke impacts populations for days and weeks at a time. The County has no control on what wildfires burn or for how long. Poor air quality poses a health risk to all individuals. However, children, adolescents, pregnant women, the elderly, the immunocompromised and those with pre-existing chronic diseases and lung conditions are especially vulnerable to the compounding detrimental health impacts of poor air quality events. Wildfire smoke creates and often exacerbates poor air quality situations. Of the many harmful components that exist in wildfire smoke, one of the most dangerous is particulate matter (PM), specifically fine PM (PM2.5). The microscopic particles of PM2.5 are so fine that they are inhaled deep into the lungs and cross the blood-air barrier to enter the bloodstream. Short-term exposure over hours or days can lead to increased asthma attacks, acute bronchitis, increased susceptibility to respiratory infections and can lead to an increased risk of heart attack for individuals with lung disease.

Ground-level ozone is another air pollutant of concern because it is a strong irritant that can cause constriction of the airways, forcing the respiratory system to work harder to provide oxygen. It can also cause other health problems including aggravated respiratory disease such as emphysema, bronchitis and asthma, lung damage, wheezing, chest pain, dry throat, headache, nausea, reduced resistance to infection, increased fatigue and weakened athletic performance. While ozone is typically seen at its highest levels

during the summer, wildfire plumes can increase ozone formation. With an increased number of prolonged wildfire smoke events impacting populations near and far from fire epicenters, it has become imperative to understand the health impact from acute and extended exposure to wildfire smoke.

Impacts to identified assets at risk to this hazard and the overall vulnerability of the County may be affected in the future by climate change (which was discussed in the hazard profile section above), changes in population patterns, and changes in land use and development. The influencing effects of these factors on this hazard are discussed further in the Future Conditions/Future Development discussion below.

Future Conditions/Future Development

Future hazard conditions may be affected by climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. Findings on this for Amador County include the following:

- Climate change is likely to exacerbate future wildfire conditions and associated impacts and vulnerability of the County to wildfire.
- Future population growth should be considered, as having more or less people in a community affects the overall hazard vulnerability to the County. Population growth in Amador County is expected to slowly continue. Additional growth within the WUI and other high fire hazard severity areas of the County would place additional populations at risk to wildfire. Additional population growth would likely bring continued diversity to the County. Vulnerable population groups could face disproportionate effects from wildfire and should be planned for. Changes in population and population patterns may or may not increase the impacts and vulnerability of the County to this hazard depending on the location and nature of growth and continued planning for future hazard conditions.
- Land use planning should be proactive to address future hazard conditions. Locating new development, structures and critical facilities and infrastructure within or near areas of wildfire risk may put additional development at risk. However, County building codes are in effect to reduce this risk and should be updated as necessary to continue to address future wildfire conditions. It should be noted that most of the growth in the County is occurring in areas outside the moderate or higher fire hazard severity zones. Thus, depending on the location of new development and adherence to protective building codes, changes in land use and development may or may not increase the impacts and associated vulnerabilities of the County to this hazard.

Future development considerations should be ongoing and proactive. Ensuring that comprehensive land use planning is conducted, regulatory requirements, such as building codes, are followed, and varying needs for different demographic groups with intersecting identities that reside within the County are considered can help to make for a more resilient community.

GIS Analysis

Amador County provided five future development areas which were used as the basis for the inventory of future development for the unincorporated County. These were mapped in GIS. Figure 4-130 show the locations of the future development areas and SRA/FRA FHSZs. Table 4-137 shows the details of the future development areas that are located in each SRA/FRA FHSZ. Figure 4-131 shows the locations of

the future development areas in the LRA FHSZ. As shown, all of these future development areas fall outside the LRA FHSZs, so no tabular analysis of LRA FHSZs is presented.

Figure 4-130 Unincorporated Amador County – Future Development in CAL FIRE SRA/FRA Fire Hazard Severity Zones

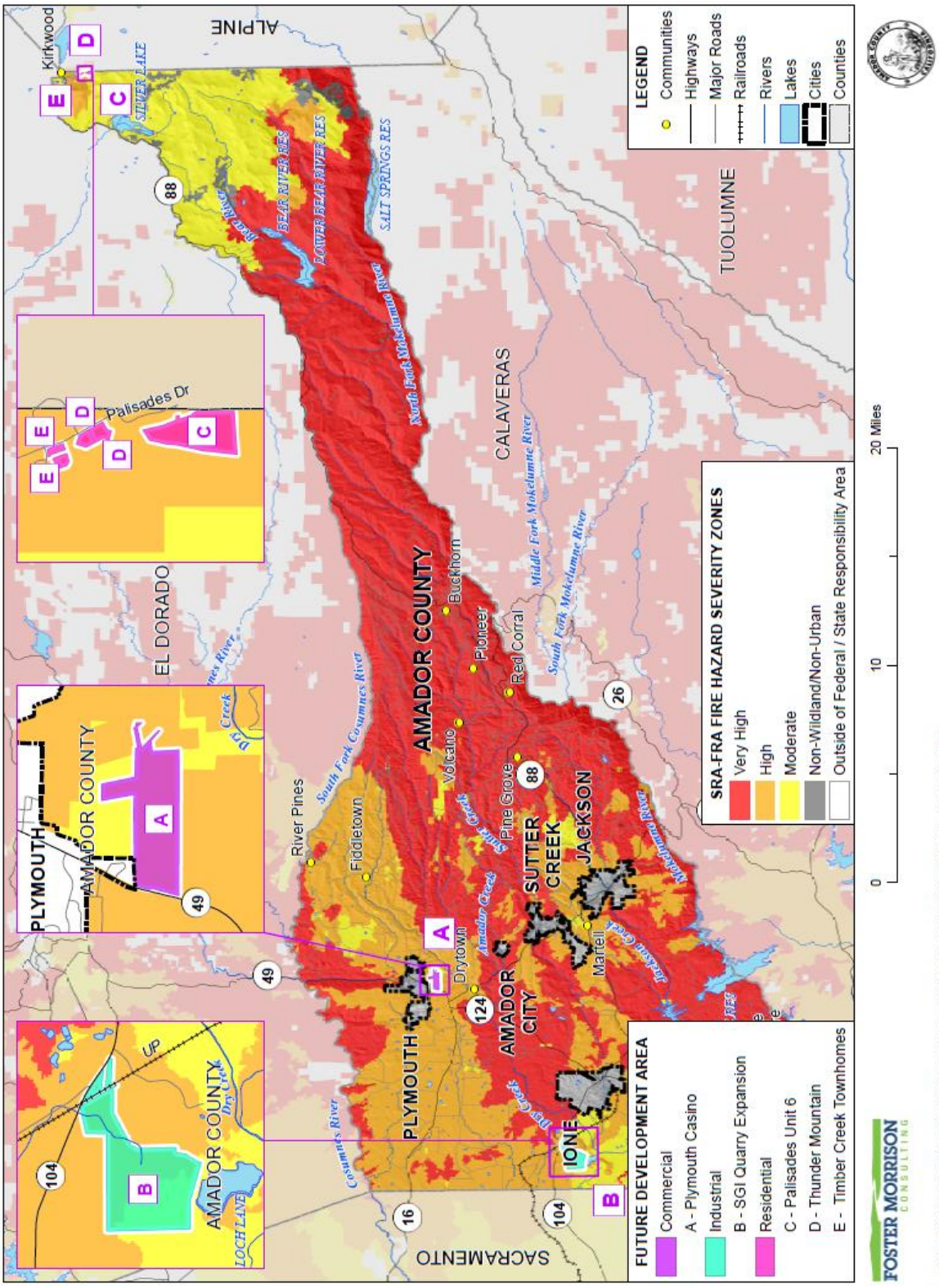
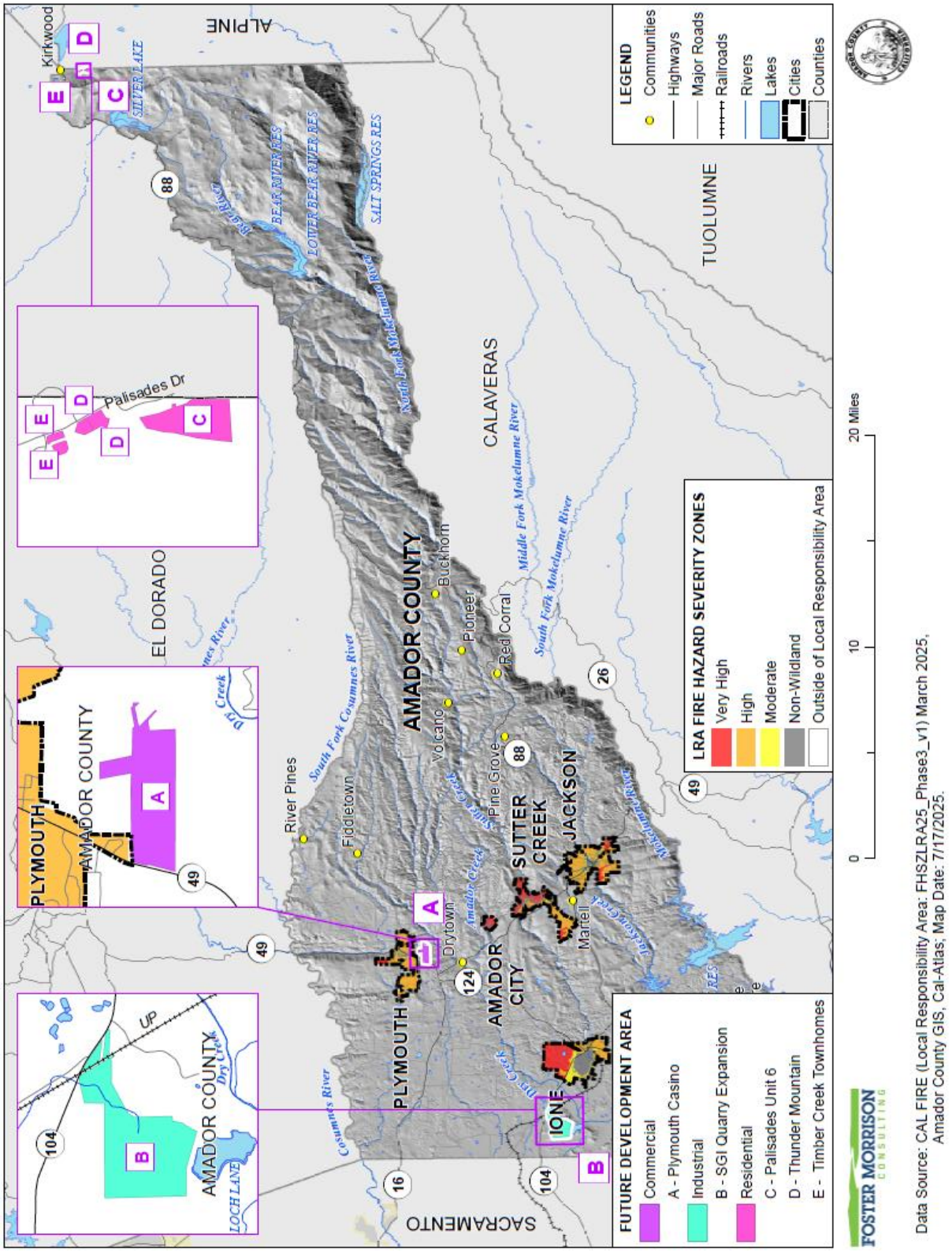


Table 4-137 Unincorporated Amador County – Future Development in SRA/FRA FHSZs with Parcel Counts and Acreages

Fire Hazard Severity Zone / Site/Map ID - Future Development	Unimproved Parcel Count	Total Unimproved Acres
High		
B - SGI Quarry Expansion	1	50
C - Palisades Unit 6	1	13
D - Thunder Mountain	2	2.5
E - Timber Creek Townhomes	2	2
High Total	**6**	**67.5**
Moderate		
A - Plymouth Casino	1	130
Moderate Total	**1**	**130**
Grand Total	**7**	**197.5**

Source: CAL FIRE, Amador County GIS

Figure 4-131 Unincorporated Amador County – Future Development in CAL FIRE LRA Fire Hazard Severity Zones



4.4 Capability Assessment

Thus far, the planning process has identified the natural hazards posing a threat to the Amador County Planning Area and described, in general, the vulnerability of the County to these risks. The next step is to assess what loss prevention mechanisms are already in place. This part of the planning process is the capability assessment. Combining the risk assessment with the capability assessment provides an overview of the County's net vulnerability to disasters, and more accurately focuses the goals, objectives, and proposed actions of this Plan.

A two-step approach is used to conduct the Capability Assessment for each participating jurisdiction to this LHMP Update. First, an inventory of common mitigation activities was made through the use of matrixes. The purpose of this effort was to identify policies and programs that were either in place, needed improvement, or could be undertaken if deemed appropriate. Second, an inventory and review of existing policies, regulations, plans, and programs was conducted to determine if they contributed to reducing hazard-related losses or if they inadvertently contributed to increasing such losses.

This section presents the County's mitigation capabilities that are applicable to the unincorporated County. These are in addition to, and supplement, the many plans, reports, and technical information reviewed and used for this LHMP Update as identified in Chapter 3 and in Chapter 4.

This assessment is divided into four sections: regulatory mitigation capabilities are discussed in Section 4.4.1; administrative and technical mitigation capabilities are discussed in Section 4.4.2; fiscal mitigation capabilities are discussed in Section 4.4.3; and mitigation education, outreach, and partnerships are discussed in Section 4.4.4.

4.4.1. Amador County's Regulatory Mitigation Capabilities

Table 4-138 lists planning and land management tools typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in unincorporated Amador County. Excerpts from applicable policies, regulations, and plans and program descriptions follow to provide more detail on existing mitigation capabilities.

Table 4-138 Amador County Regulatory Mitigation Capabilities

Plans	In Place Y/N	Does the plan address hazards? Can the plan be used to carry out mitigation actions? When was it last updated??
Capital Improvements Plan	Y	Plan is not hazard specific. 2011
Climate Change Adaptation Plan	N	
Community Wildfire Protection Plan	Y	Multiple plans exist for portions of the County. These are held by the Amador Fire Safe Council and updated when needed.
Comprehensive/Master Plan	Y	Plan addresses hazards and mitigation. Plan can be used to implement mitigation plans. 2016
Continuity of Operations Plan	N	
Economic Development Plan	Y	

Land Use Plan		Included within the County's General Plan
Local Emergency Operations Plan	Y	The County just updated it's EOP, which was finalized in 2024
Stormwater Management Plan	Y	
Transportation Plan	Y	2019
Other		
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective way to reduce hazard impacts? Is the ordinance adequately administered and enforced?**
Acquisition of land for open space and public recreation use	Y	
Building code	Y	Codes are enforced
Flood insurance rate maps	Y	Ordinance is effective and enforced.
Floodplain ordinance	Y	No. Needs update to reflect current standards
Natural hazard-specific ordinance (stormwater, steep slope, wildfire)	Y	Fire and other ordinances are effective and enforced.
Subdivision ordinance	Y	Ordinance is effective and enforced.
Zoning ordinance	Y	Ordinance is effective and enforced.
Other		
How can these capabilities be expanded and improved to reduce risk?		
The Floodplain Ordinance still needs to be updated, but the changes are minimal in that new construction is required to be a foot above the 100-year floodplain. We require the extra foot of building elevation as a matter of practice, but it should be noted that we issue permits for structures in the floodplain once every two or three years.		

As indicated in the tables above, Amador County has several plans and programs that guide the County's mitigation of development of hazard-prone areas. Starting with the Amador County General Plan, which is the most comprehensive of the County's plans when it comes to mitigation, some of these are described in more detail below.

Amador County General Plan (2016)

A general plan is a legal document, required by state law, that serves as a community's "constitution" for land use and development. The plan must be a comprehensive, long-term document, detailing proposals for the "physical development of the county or city, and of any land outside its boundaries which in the planning agency's judgment bears relation to its planning" (Government Code §65300 et seq.). Time horizons vary, but the typical general plan looks 10 to 20 years into the future. The law specifically requires that the general plan address seven topics or "elements." These are land use, circulation (transportation), housing, conservation, open space, noise, and safety. The plan must analyze issues of importance to the community, set forth policies in text and diagrams for conservation and development, and outline specific programs for implementing these policies.

Goals and policies related to mitigation from the General Plan include the following:

Land Use Element

Goal LU-3	Ensure the provision of effective law enforcement, fire, emergency medical services, and animal control throughout the county.
Policy LU-3.2	Coordinate with fire districts to maintain and improve fire service levels in the county.
Policy LU-3.3	Increase community awareness regarding public safety, fire, and emergency response issues.

Goal LU-4	Ensure adequate wastewater treatment, storage, and disposal capacity exists to serve the county's current and future demand.
Policy LU-4.2:	Consider infrastructure availability and expansion in the evaluation of individual projects.
Policy LU-4.3	Support efforts by water purveyors to educate the public on how to reduce water use, and utilize reclaimed water.
Policy LU-4.4	Encourage countywide regional coordination and organizational structures to fully implement maximum recycled water reuse opportunities throughout the county
Policy LU-4.5:	Encourage and promote water conservation and reuse to reduce new effluent disposal needs.

Goal LU-6	Ensure that adequate water supply, wastewater disposal, and public services are available prior to development.
Policy LU-6.1	Ensure that new development is able to meet water supply, wastewater disposal, and public service standards.

Goal LU-12	Reduce fire risks to existing and future structures.
Policy LU-12.1	Ensure that appropriate levels of emergency services, including fire protection, can be demonstrated for new development.
Policy LU-12.2	Ensure that new roadways meet County standards for firefighting access. These standards include minimum width, surface, grade, radius, turnaround, turnout, and bridge standards, as well as limitations on one-way roads, dead-end roads, driveways, and gate entrances.
Policy LU-12.3	Continue to ensure that the County's development code addresses evacuation and emergency vehicle access, water supplies and fire flow, fuel modification for defensible space, and home addressing and signing.
Policy LU-12.4	Ensure that new development or redevelopment in the Wildland-Urban Interface meets building and development standards to ensure adequate defensible space.

Conservation Element

Goal C-1	Ensure that all future development permitted in the county can be provided adequate amounts of water.
Policy C-1.1	Coordinate with the county's water suppliers to ensure that water is available to serve both current and planned future residential, commercial, industrial, and agricultural needs. Include upland areas in future water management plans.
Policy C-1.2	Guide future development to areas of the county where adequate water supplies can be ensured.

Goal C-1	Ensure that all future development permitted in the county can be provided adequate amounts of water.
Policy C-1.3	Limit reliance on groundwater wells as sources for community water systems. Where possible, encourage connection of developments to existing water supply systems.
Policy C-1.4	Encourage new development, renovation, landscape, and agricultural projects to include water conservation measures, including use of graywater, reclaimed, or recycled water for irrigation, water-

Goal C-2	Maintain and improve water supply planning and infrastructure.
Policy C-2.1:	Encourage integrated management of surface water and groundwater resources, wastewater, stormwater treatment and use, and the development of reclaimed water.
Policy C-2.2:	Encourage conjunctive use of groundwater and surface water by water agencies to improve water supply reliability.
Policy C-2.3	Support the county's water suppliers, including public agencies and private entities within Amador County, in their efforts to protect water rights and water supply contracts.
Policy C-2.4	Pursue management strategies that develop upstream/ downstream interregional conjunctive use/water transfer programs to meet future water needs in Amador County.
Policy C-2.5	Support efforts by water and wastewater agencies to respond to state mandates addressing the future challenges posed by climate change.
Policy C-2.6	Reduce erosion and sediment loads which might limit the lifespan of existing water storage facilities.
Policy C-2.7	Promote development patterns and practices which permit the continued use and future development of water storage and power generation facilities on the county's streams and rivers.
Policy C-2.8	Federal, state, and/or local designations of surface waters in or adjacent to the County (e.g., Federal Wild and Scenic River, National Recreation Area) are considered incompatible with the long-term water needs of Amador County.

Goal C-10	Reduce GHG emissions associated with automobile travel, electrical power generation and energy use.
Policy C-10.1	Evaluate the potential effects of climate change on the county's human and natural systems and prepare strategies that allow the County to appropriately respond and adapt.
Policy C-10.2	Develop and adopt a comprehensive strategy to reduce GHGs within Amador County by at least 15 percent from current levels by 2020.
Policy C-10.3	Guide new development to areas where pedestrian and bicycle/NEV access to existing activity centers is possible, in order to reduce the need for automobile travel and VMT.
Policy C-10.4	Work with service providers to ensure that transit offerings in the county are stable or expanding, and that transit is tailored to meet residents' needs.
Policy C-10.5	Require new development projects to incorporate building placement and design features to increase energy efficiency in new structures.
Policy C-10.6	Support green building through incentives for Leadership in Energy and Environmental Design (LEED) certification of new commercial, industrial, public, and multi-family residential buildings. Promote incentives for compliance with this standard as a way to increase the energy efficiency of new structures. Promote increased energy efficiency and green building practices through the County's use of these practices.
Policy C-10.7	Support parcel-scale energy generation, including addition of solar panels for residential structures and cogeneration for larger commercial or industrial uses.

Goal C-10	Reduce GHG emissions associated with automobile travel, electrical power generation and energy use.
Policy C-10.8	Expand recycling and waste minimization efforts, including recycling of construction and demolition materials.

Safety Element

Goal S-1	Prevent loss of life or property from flooding.
Policy S-1.1	Direct future development (as defined in "Floodplain Management Regulations" set forth in the Amador County Code) to areas outside the floodway portion of the 100-year floodplain.
Policy S-1.2	Limit development in other areas prone to flooding, including the floodway fringe, other portions of floodplains and inundation areas. Require structures in these areas to incorporate floodproofing measures, including elevation above the 100-year floodplain profile.
Policy S-1.3	Reduce urban runoff and maintain the carrying capacity of floodplains or flood channels. Require provision of on-site retention and detention basins in new development applications as needed to reduce downstream flooding hazards.
Policy S-1.4	Designate agriculture, passive parks, open space, and other low intensity uses within floodplain areas.
Policy S-1.5	Provide for construction of dams and water retention facilities on agricultural lands to support agricultural land uses, consistent with state and federal law.

Goal S-2	Reduce fire risks to current and future structures.
Policy S-2.1	Consistent with state regulations and local code requirements, require new buildings to be constructed to provide fire-defensible spaces, separated from property lines and other buildings on the same or adjacent properties by adequate building setbacks clear of brush and fuel. Require new buildings in areas of moderate to high fire risk to be constructed using building materials and designs that increase fire resistance.
Policy S-2.2	Guide new development to areas where adequate fire protection, roads, and water service are available to support fire response.
Policy S-2.3	Incorporate fire safety site planning techniques within new development applications in high- or very-high fire risk areas. Encourage building envelope or cluster development techniques to increase defensible areas.
Policy S-2.4	Work with fire districts or other agencies and property owners to coordinate efforts to prevent wildfires and grassfires including consolidation of fuel buildup abatement efforts, firefighting equipment access, and water service provision.
Policy S-2.5	Work with fire districts and other agencies to educate the public regarding fire risks and periods of elevated or extreme risk due to drought or other factors.

Goal S-3	Maintain or improve fire response times.
Policy S-3.1	Support efforts by fire districts to obtain adequate funding to provide fire protection at desired levels. Implement impact fees if needed to provide adequate fire service.
Policy S-3.2	Encourage cooperation and regional agreements among fire districts and state and federal fire agencies

Goal S-4	Protect people and property from seismic hazards.
Policy S-4.1	Enforce site-specific seismic design category requirements per the California Building Code (CBC) to minimize earthquake damage.
Policy S-4.2	Require minimum setbacks for habitable construction along streams between the stream bank and structure, based upon the susceptibility of the bank to seismic shaking-induced lurching.
Policy S-4.3	Discourage new construction of structures or improvements in or near a seismic risk area or geologic hazard area unless these projects meet design standards to minimize or eliminate seismic risk.

Goal S-5	Protect people and property from landslides, mudslides, and avalanches.
Policy S-5.1	Use the development review process to lessen the potential for erosion and landslides. Restrict site grading which steepens unstable slopes.
Policy S-5.2	Limit development in areas with high landslide, mudslide, or avalanche susceptibility.

Goal S-7	Respond appropriately and efficiently to natural or human-caused emergencies.
Policy S-7.1	Maintain a disaster response plan to coordinate response actions.
Policy S-7.2	Continue to coordinate with other local public safety and law enforcement agencies to ensure effective emergency response.
Policy S-7.3	Work with other agencies to designate evacuation routes for various natural or human-caused emergencies.
Policy S-7.4	Maintain the operational integrity of essential public

Other Amador County Plans/Studies/Programs

Amador County Emergency Operations Plan (2024)

The Amador County Office of Emergency Services coordinates planning, preparedness, response, and recovery efforts for disasters in unincorporated Amador County. The Amador County Emergency Operations Plan addresses the County's planned response to extraordinary emergency situations associated with natural disasters, technological incidents, and national security emergencies in or affecting Amador County.

Amador County Evacuation Procedures/Plan

The Amador County Sheriff's Office of Emergency Services would like the public to be prepared for evacuations and to be familiar with the evacuation terminology used by our Office. There is also a form that is designed to be distributed when time allows in an area to be evacuated. The front of the form will tell you what type of an emergency or disaster is occurring and what level of evacuation order is being issued. The back of the form gives instructions on evacuation and sheltering in place.

An Emergency Evacuation means that citizens MUST leave the area IMMEDIATELY; their life is in danger. An Emergency Evacuation notice is issued when a hazard is moving towards an area and there is an immediate threat to life and property.

A Voluntary Evacuation means that the area is likely going to be impacted and it is encouraged that those residents willing and able to leave the area do so. The medically fragile or those with livestock or large pets may want to begin making transportation arrangements. Under this evacuation order citizens do not have to leave the area. It is, however, recommended that citizens begin making arrangements to leave.

Sheltering in your home or place of business means that citizens should NOT leave the safety of the building they are currently in to leave the area. In a number of instances residents are safer staying indoors, closing the windows, shutting off the heating and air systems and staying inside the building than they would be traveling through the disaster area.

Auxiliary Communications Service Plan

The County of Amador created this Auxiliary Communication Service plan as an emergency communications unit, designed to support emergency tactical, administrative, and logistical communications. Created in 2007, the program serves many functions such as skilled personnel, resources essential to public safety communications, and doesn't require the declaration of an emergency to be utilized.

Amador County Warming and Cooling Centers Operations Guide (2024)

The purpose of the Operations Guide is to identify actions to be taken during extreme weather events in Amador County by the Amador County Sheriff's Office of Emergency Services (OES) and the Amador County Department of Social Services. Through pre-planning and resource sharing, the goal is to mitigate and minimize extreme weather health impacts within the county. This guide should also be considered during prolonged utility outages that may result during extreme weather emergencies and the potential health-related issues that may arise. This guide is maintained by the Amador County Sheriff's OES.

In addition to the use of the Centers addressed in this guide, the County may consider opening local buildings and public facilities or extending hours of operation, such as community centers, senior centers, and libraries, to provide refuge from the weather. This guide does not address the operation of these sites, nor would they be operated by Social Services staff.

Sutter Amador Hospital Plans

Though not owned or operated by Amador County, due to its importance during hazard events, capabilities of the Sutter Amador Hospital are discussed here. The Sutter Amador Hospital has the following plans, policies, and capabilities for hazard preparedness and response:

- Code Orange Hazardous Response
- Code Red Fire Response
- Earthquake Response Plan
- Emergency Management Communication Plan

- Emergency Operations Plan
- Flooding Plan
- Hazard Communication Program
- Hazardous Materials Resource Team
- Hospital Surge Response Policy
- Mass Notification Policy
- Multi-Mass Casualty Incident Plan
- Pandemic Influenzas Response Plan

Amador County Long Term Care Facility Evacuation Plan (2008)

This plan is intended for all Long-Term Care Facilities in Amador County, including facilities which are licensed by the State of California and operating under Title 22 CCR. The objective of this plan is to ensure the orderly and timely movement of patients/residents from single or multiple facilities which need to be evacuated to a safe location.

Amador County Hazardous Materials Area Plan (2014)

Amador County is home to many businesses that manufacture, store, sell, use, and dispose of hazardous materials. Additionally, large volumes of hazardous materials are transported through the county on various transportation corridors such as highways and railway. It is essential that a response plan be developed and maintained to protect the public, environment and property from an accidental release involving chemicals. This plan is known as the Amador County Hazardous Materials Area Plan, also referred to as the Area Plan. It is an Annex to the County's Emergency Operations Plan.

This Area Plan fulfills the Certified Unified Program Agency (CUPA) regulatory program requirements per Health and Safety Code 25503(c). Copies of the Area Plan are on file in the Emergency Operations Center (Cal EOC). The Area Plan can be used as a resource document in conjunction with the Amador County Emergency Operations Plan, and other local and state plans.

The Area Plan describes the County's pre-incident planning and preparedness for hazardous materials releases. It clarifies the roles and responsibilities of federal, state, and local agencies during a hazardous materials incident. It describes the County's hazardous materials incident response program, training, communications, and post-incident recovery procedures.

Amador County & Calaveras County Regional Watershed Plan (2007)

In 2006, in partnership with local governments and organizations in Amador County and Calaveras County, the LGC received additional funding to conduct this watershed planning project with communities in the two counties. The goal of the watershed planning process has been to support integration of local planning, stormwater management, watershed planning efforts. The process has also guided development of this regional watershed plan, which provides regionally appropriate solutions to challenges at the nexus of water and land use planning.

Strategic Fire Plan Amador-El Dorado Unit (2024)

The goal of the Amador – El Dorado Unit of CAL FIRE is to reduce the loss of life, property, watershed values, and other assets at risk from wildfire through a focused pre-fire management program and increased initial attack success. The roadmap to accomplish this involves collaboration between stakeholders and communities who have different complexities as it relates to project implementation and priorities regarding the threat of a wildland fire. The purpose of this Strategic Fire Plan is to provide adequate direction to departmental staff and communities within the Administrative Unit to direct resources and personnel commitments towards the implementation of this Strategic Fire Plan. The Amador - El Dorado Unit Pre-Fire Management Plan has been prepared with the following objectives in priority order.

- Support project work and planning efforts that encourage the development of safe ingress and egress routes for emergency incidents.
- Continue to provide operational training that will support safe and successful suppression operations.
- Utilize CAL FIRE and community resources to mitigate large and damaging wildfires with defensible fuel zone/fuels reduction projects at critical operational locations.
- Continue to support the implementation of fire safe clearance around structures.
- Support implementation of the 2008 WUI Building standards through cooperation with local government planning departments.
- Conduct incident analysis to evaluate Unit success in achieving the 95% threshold of keeping fires less than 10 acres in size.
- Educate the community on their role in the wildlands and support Fire Safe Council activities.
- Utilize prevention operations to reduce ignitions within the Unit.
- Nurture and build relationships with local public and private industries to develop cooperative project plans.
- Continually reassess local mitigation projects and update this Fire Plan

Amador County Climate Change and Health Profile Report (2017)

The Climate Change and Health Profile Report seeks to provide a county-level summary of information on current and projected risks from climate change and potential health impacts. This report represents a synthesis of information on climate change and health for California communities based on recently published reports of state agencies and other public data.

The content of this report was guided by a cooperative agreement between CDPH and the CDC Climate-Ready States and Cities Initiative's program Building Resilience Against Climate Effects. The goals of BRACE are to assist state health departments to build capacity for climate and health adaptation planning. This includes using the best available climate science to project likely climate impacts, identifying climate-related health risks and populations vulnerable to these impacts, assessing the added burden of disease and injury that climate change may cause, identifying appropriate interventions, planning more resilient communities, and evaluating to improve the planning effort. Communities with economic, environmental, and social disadvantages are likely to bear disproportionate health impacts of climate change.

This Climate Change and Health Profile Report is intended to inform, empower, and nurture collaboration that seeks to protect and enhance the health and well-being of all California residents. This report is part of a suite of tools that is being developed by the California Department of Public Health to support local,

regional, and statewide efforts of the public health sector to build healthy, equitable, resilient, and adaptive communities ready to meet the challenges of climate change. Along with a county-level climate change and health vulnerability assessment and state guidance documents, such as Preparing California for Extreme Heat: Guidance and Recommendations, the profile provides a knowledge base for taking informed action to address climate change.

Mokelumne/Amador/Calaveras (Integrated Regional Water Management Plan (2018)

In November 2006, the Mokelumne/Amador/Calaveras (MAC) regional partners completed the MAC Integrated Regional Water Management Plan (IRWMP or Plan). The 2006 version of the MAC IRWMP (MAC Plan) was based on guidelines and standards included in Proposition 50 as interpreted by the California Department of Water Resources (DWR) and the State Water Resources Control Board (SWRCB). In September 2008, Governor Schwarzenegger signed SB X2 1, which contains appropriations for the IRWM program from Propositions 84 and 1E (Prop 84/1E) along with criteria that DWR must apply in updating statewide standards for IRWMPs. These revised State standards for IRWMPs were released in August of 2010 and provided the guidelines by which the MAC Plan Update will be prepared. The MAC Plan Update was developed to comply with the 2012 Guidelines that were finalized by DWR in December 2012.

The 2008 MAC IRWMP update began with a reconstituted stakeholder committee (called the Regional Participants Committee or RPC), the development of Governing Procedures to guide the RPC's work, and the preparation of a Community Outreach Plan. The 2008 Update was conducted under a governance structure different than that developed for the original plan development. Specifically, the Upper Mokelumne River Watershed Authority (UMRWA), a regional water management group as defined by the California Water Code (CWC), assumed lead agency responsibility for the preparation and adoption of the updated IRWMP and established two subcommittees to oversee the document update. A Regional Participants Committee (or RPC) was formed to directly oversee the Plan update. The Board Advisory Committee was also established (replacing the earlier Steering Committee) with Board representatives from three UMRWA member agencies. This committee was charged with reconciling conflicts that may occur at the RPC, providing guidance to the Executive Officer and consultants, and ultimately recommending the updated plan for adoption by the UMRWA governing board. In addition to the updating of selected Plan sections in 2008, UMRWA also completed the Region Acceptance Process (RAP), as required by DWR, in order to become an approved IRWM region. Furthermore, because IRWM Plans are not required to follow the exact outline of the IRWM Plan Standards, the 2013 Plan Update applied a revised organization that provides a more logical progression of topics and information, hopefully making the Plan a more useful tool for the region's water managers.

This 2018 MAC Plan Update was initiated to capture updated regional information since the 2013 MAC Plan was developed and respond to updated state requirements. All required Plan elements as identified in the 2016 IRWM Plan Standards are met by this MAC Plan 2018 Update, as summarized in the following table.

Amador and Calaveras Counties Needs Assessment for Extreme Weather and Natural Disaster Prevention and Response Strategies (2022)

ACTC has developed an Extreme Weather and Natural Disaster Prevention and Response Strategies Needs Assessment Program with funding provided by Caltrans's Adaptation Planning Grant program. The Assessment Program is developing response strategies to mitigate potential natural disaster risks (primarily wildfire) within Amador and Calaveras counties.

Landforms, land cover types, and an uncertain but changing future climate put large portions of the Planning Area at risk of catastrophic wildfire and localized flooding damage. Results from predictive modeling completed by CAL FIRE's Fire and Resource Assessment Program (FRAP) show that expansive regions within Amador and Calaveras counties are located within high and very high Fire Hazard Severity Zones (FHSZ). Utility transmission corridors located within foothill elevations also contribute to elevated wildfire risk. Hundreds of miles of Amador County and Calaveras County roads are located within high and very high FHSZs.

A Community Vulnerability Model has been developed by ACTC to identify the relative risks to Amador County communities in preparation for and response to wildfire. This report evaluates important evacuation routes serving several high-risk communities and identifies potential ingress/egress impairments that may impact use of these routes during emergencies. These impairments include unmaintained defensible space, narrow roadway widths, and poor pavement condition This report also identifies additional information needed to further characterize and assess the potential performance of evacuation routes. These include locating, describing, and quantifying unmaintained defensible space (including encroaching vegetation) along roadsides, documenting roadway and shoulder widths and roadway turnouts, identifying and describing roadside drainage ditches, and locating and describing drainage under-crossings (culverts, bridges). Of these, the most critical need is the maintenance of defensible space along roadway evacuation routes.

Amador County Regional Transportation Plan (2024)

State law requires that the RTP be updated and submitted to the California Transportation Commission (CTC) every five years. Though updates are required every 5 years, in 2018, the ACTC elected to adopt a 4-year schedule to better coordinate with the 8-year Housing Element cycle required of local jurisdictions. The purpose of the RTP is to identify the Region’s short-term and long-range transportation needs and to establish policies, programs, and projects designed to meet those needs. Regional transportation improvement projects that are included in the RTP and are prioritized for funding through the Regional Transportation Improvement Program (RTIP) are then submitted to the CTC for programming every two years as part of the State Transportation Improvement Program (STIP). Projects that are proposed for funding through other sources, such as state or federal competitive grant programs are submitted according to the requirements of individual programs. In either case, improvement projects proposed for funding must typically be identified through either a local or regional transportation planning process, such as the RTP.

Community Wildfire Protection Plans

Many Community Wildfire Protection Plans have been put forward for various areas of the County. These are tracked and housed by the Amador Fire Safe Council. Existing CWPPs include:

- Amador County 2004 CWPP
- Pioneer/Volcano 2013 CWPP
- Greater Pine Grove 2013 CWPP
- High Country 2016 CWPP

Amador County Ordinances

The Amador County General Plan provides policy direction for land use, development, open space protection, and environmental quality; however, this policy direction must be carried out through numerous ordinances, programs, and agreements. The following ordinances are among the most important tools for implementing the General Plan and/or are critical to the mitigation of hazards identified in this plan.

Disaster Council (Amador County Code Title 2, Chapter 2.64)

Chapter 2.64 of the Amador County Code provides for the preparation and execution of plans for the protection of persons and property within Amador County in the event of an emergency; to ensure the continuity of local government; to guarantee the direction of the emergency management organization; and to coordinate the emergency functions of this county with all other public agencies, corporations and affected private persons. The Sheriff is designated as the Director of Emergency Services.

Chapter 2.64 further creates the Disaster Council consisting of the following: The Sheriff/Director of Emergency Services or their designee who shall be Chairman; the Chairman of the Board of Supervisors or their designee who shall be Vice-Chairman; one representative from each city appointed by City Councils; one Fire representative appointed by the Fire Chief's Association; one Law representative appointed by the Chief of Police; one representative from the School District; one representative of each of the Special Districts/Tribes; Director/Agency heads of county departments having disaster responsibility or their designee; such representative of other organizations, either civic, business, labor, veterans, professional or other organizations having an official organization having disaster responsibility; and, the Emergency Services Coordinator. The Disaster Council is empowered to develop and recommend for adoption by the Board of Supervisors emergency operations plans or practices and such policies, ordinances, or resolutions necessary to implement such plans and practices. The Disaster Council meets on a quarterly basis.

Mitigations for New Development Projects in the Rock Creek Drainage Basin (Amador County Code Title 7, Chapter 7.88)

Whenever a development project within the Rock Creek drainage basin is approved by any agency, the public works agency shall impose on said development project mitigation measures sufficient to mitigate the development project's potential to flood Amador Plaza in the event of a one-hundred-year flood event. (Ord. 1567(part), 2003).

Burning Permit and Regulations (Amador County Code Title 7, Chapter 7.32)

It is unlawful for any person to set fire to or burn any brush, logs, stumps, fallen timber, fallows, slash or grass, brush, or forest covered land or any other inflammable material; and it is unlawful for any person to burn inflammable material in any incinerator, barbeque pit or outdoor cooking stove or other such device within any portion of the unincorporated area of the county between May 1st and the date the director of the department of forestry declares, by proclamation, that the hazardous fire conditions have abated for that year, or at any other time during any year when the director of the department of forestry has declared, by proclamation, that unusual fire hazard conditions exist in the area, unless such person first obtains a written permit to do so from the constituted fire control authority within the area wherein the fire is to be set, which permit shall be issued in writing and shall state the times at which and the terms and conditions subject to which said fire shall be permitted or said burning shall be done. (Ord. 1049 §2, 1985).

Every person owning, leasing, controlling or operating any cabin, house, hotel, apiary, or other building or structure in the county, and every person leasing or controlling any such land shall at all times do all the following: maintain upon said land, around or adjacent to said cabin, house, hotel, apiary or other building or structure for a distance of not less than fifteen feet from the exterior walls or surfaces thereof; or to his or its property line, whichever is the lesser distance; provided, however, that this section shall not apply to trees, except where dead, or where the foliage of said trees shall be within ten feet of a chimney, nor shall it apply to evergreen vegetation where growing and preserved for decorative effect. (Ord. 1049 §5, 1984).

Weeds and Shrubs (Amador County Code Title 7, Chapter 7.28)

It is unlawful for any person or persons owning or possessing land in the county to permit the Scotch or Canada thistle to mature and disseminate its seed on land so owned or possessed by such person. The agricultural commissioner of Amador County, whenever he deems it necessary, may enter upon and make an inspection of any area of land located in the unincorporated territory of the county for the purpose of detecting the presence thereon of broom, and if any of said broom is found to be growing upon said area or any part of the same, he may notify in writing the record owner or person in charge or in possession of said premises of the presence and approximate location of such broom and require such person to eradicate and destroy the same, to the satisfaction of said agricultural commissioner, within a period of thirty days after such notice, or within the further extension thereof in writing signed by said commissioner, or within said period of time or such extension thereof to give his consent in writing to said agricultural commissioner authorizing said commissioner or his duly authorized representative to enter upon said premises for the purpose of removing or treating such broom at public expense.

Well Drilling Permits and Standards (Chapter 14.06)

Where the well is a water supply to serve a new single-family dwelling, no storage shall be required if and when rated well yield, based on a minimum thirty-minute air lift test, is five gallons per minute or greater. If the rated yield is from one-half to less than five gallons per minute, a minimum of two thousand gallons storage shall be provided in addition to any storage required by applicable fire regulation requirements. If the rated yield is less than one-half gallon per minute, the well shall not be considered adequate to support a single-family dwelling unless a proposal by a licensed well drilling contractor, licensed pump contractor or registered professional engineer has been submitted for review and approved by the department

proposing storage or other design features that must be implemented as a condition of well permit final approval.

Where the well is a water supply to serve two, three or four dwellings, the minimum required yield shall be ten, fifteen or twenty gpm, respectively. If the rated yield does not meet this standard, a proposal by a registered professional engineer shall be submitted for review and approval by the department proposing storage or other design features that must be implemented as a condition of well permit final approval.

Where the well is a water supply to serve nonresidential or mixed uses, the applicant shall retain a registered professional engineer to submit a proposal for review and approval by the department describing water demand and proposing storage or other design features that must be implemented as a condition of well permit final approval.

This section shall not apply to wells intended solely for nondomestic use. (Ord. 1730 §2(part), 2013).

BUILDINGS AND CONSTRUCTION - (Amador County Code Title 15)

15.04 Adoption of Uniform Building and Related Codes.

Except as hereinafter provided, the following building codes are adopted by reference as the rules and regulations governing the construction, alteration, moving, demolition, repair, use, change of use and occupancy of any building or structure within the county (except work located primarily in a public way, public utility towers and poles, mechanical equipment not specifically regulated in said codes, and hydraulic flood control structures):

- California Administrative Code, 2019 Edition, as adopted and amended by the California Building Standards Commission in the California Building Standards Code, Title 24, Part 1, of the California Code of Regulations.
- California Building Standards Code, 2019 Edition, as published by the International Code Council and amended by the California Building Standards Commission, the State Department of Housing and Community Development, the Division of State Architect, the Office of the State Fire Marshal, the Office of Statewide Health Planning and Development, the California Energy Commission, and the Building Standards Commission, Title 24, Part 2, Volumes 1 and 2, of the California Code of Regulations, together with the following appendices: Appendix A (Employee Qualifications), Appendix B (Board of Appeals), Appendix C (Group U-Agricultural Buildings), Appendix D (Fire Districts), Appendix F (Rodent Proofing), Appendix G (Flood-Resistant Construction), Appendix H (Signs), Appendix I (Patio Covers), Appendix J (Grading), Appendix K (Group R-3 and R3.1 Occupancies Protected by the Facilities of the Central Valley Flood Protection Program), and Appendix L (Earthquake Recording Instrumentation).
- California Residential Code, 2019 Edition, as adopted and amended by the California Building Standards Commission in the California Building Standards Code, Title 24, Part 2.5, of the California Code of Regulations together with the following appendices: Appendix A (Sizing and Capacities of Gas Piping), Appendix B (Sizing of Venting Systems Serving Appliances Equipped with Draft Hoods, Category I Appliances, and Appliances Listed for use with Type B Vents), Appendix C (Exit Terminals of Mechanical Draft and Direct-Vent Venting Systems), Appendix D (Recommended Procedure for Safety Inspection of an Existing Appliance Installation), Appendix E (Manufactured Housing Used as Dwellings), Appendix F (Passive Radon Gas Controls), Appendix G (Piping Standards for Various Applications), Appendix H (Patio Covers), Appendix J (Existing Buildings and Structures), Appendix

K (Sound Transmission), Appendix M (Home Day Care R-3 Occupancy), Appendix N (Venting Methods), Appendix O (Automatic Vehicular Gates), Appendix P (Sizing of Water Piping Systems, Appendix R (Light Straw-Clay Construction), Appendix S (Straw Bale Construction), Appendix T (Recommended Procedure for Worst-Case Testing of Atmospheric Venting Systems Under N1102.4 or N1105 Conditions ≤ 5ACH50, Appendix U (Solar-Ready Provisions--Detached One- and Two-Family Dwellings, Multiple Single-Family Dwellings (Townhouses)), Appendix V (Swimming Pool Safety Act), Appendix W (Areas Protected by the Facilities of the Central Valley Flood Protection Plan).

- California Electrical Code, 2019 Edition, based on the 2017 Edition National Electric Code, as published by the National Fire Protection Association, and as adopted and amended by the California Building Standards Commission in Title 24, Part 3, of the California Code of Regulations.
- California Mechanical Code, 2019 Edition, based on the 2018 Uniform Mechanical Code as published by the International Association of Plumbing and Mechanical Officials, and as adopted and amended by the California Building Standards Commission in Title 24, Part 4, of the California Code of Regulations.
- California Plumbing Code, 2019 Edition, based on the 2018 Uniform Plumbing Code as published by the International Association of Plumbing and Mechanical Officials, and as adopted and amended by the California Building Standards Commission in Title 24, Part 5, of the California Code of Regulations.
- California Energy Code, 2019 Edition, as published by the International Code Council (ICC) and as adopted and amended by the California Building Standards Commission in Title 24, Part 6, of the California Code of Regulations.
- California Historical Building Code, 2019 Edition, as published by the International Code Council (ICC) and as adopted and amended by the California Building Standards Commission in Title 24, Part 8, of the California Code of Regulations.
- California Fire Code, 2019 Edition, as published by the International Code Council (ICC) and as adopted and amended by the California Building Standards Commission in Title 24, Part 9, of the California Code of Regulations.
- California Existing Building Code, 2019 Edition, as published by the International Code Council (ICC) and as adopted and amended by the California Building Standards Commission in Title 24, Part 10, of the California Code of Regulations.
- California Green Building Standards Code, 2019 Edition, as published by the International Code Council (ICC) and as adopted and amended by the California Building Standards Commission in Title 24, Part 11, of the California Code of Regulations.
- California Referenced Standards Code, 2019 Edition, as published by the International Code Council (ICC) and as adopted and amended by the California Building Standards Commission in Title 24, Part 12, of the California Code of Regulations.
- International Property Maintenance Code, 2018 Edition (2018 is the most current edition), as published by the International Code Council (ICC). (Ord. 1791 §2(part), 2019).

Floodplain Management Regulations (Amador County Title 15, Chapter 15.16)

15.16.030 Statement of purpose.

It is the purpose of this chapter 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, 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. 1503(part), 2000).

15.16.040 Methods of reducing flood losses.

In order to accomplish its purposes, this chapter includes methods and provisions for:

- Restricting or prohibiting uses which are dangerous to health, safety, and property due to water or erosion hazards, or which result in damaging increases in erosion or flood heights or velocities;
- Requiring that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;
- Controlling the alteration of natural floodplains, stream channels, and natural protective barriers, which help accommodate or channel floodwaters;
- Controlling filling, grading, dredging and other development which may increase flood damage; and
- Preventing or regulating the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards in other areas. (Ord. 1503(part), 2000).

Fire and Life Safety Regulations (Amador County Title 15, Chapter 15.30)

15.30.440 Fire management plans.

A fire management plan may be required for any project if the project will have a significant effect on the provisions of fire protection services or when such a plan is necessary to achieve the same practical effect as the requirements of this chapter.

A fire management plan shall address the following:

- Impact on the pertinent fire protection agency's ability to provide service;
- Availability of fire protection water to the site;
- Ingress/egress and circulation, ability for vehicles to access two-lane roadways;
- Fire hazards existing within the project, including a fuel modification plan prepared by a registered professional forester when deemed necessary by the director;
- Requirements of this chapter that cannot be met due to project design or other constraints;
- Fire protection measures that are consistent with the provisions of this chapter or recognized fire protection standards; and
- Provisions for annual maintenance, which shall be included in development plans and road maintenance agreements, or as a condition of the permit of map approval. (Ord. 1778 §2 (part), 2018).

15.30.400 Setback of structures for defensible space.

All parcels one acre and larger shall provide a minimum thirty-foot setback for buildings and accessory buildings from all property lines and/or the center of a road. In order to demonstrate the same overall practical effect, a request for deviation must be accompanied by an easement or similar documentation of an irrevocable right to access the adjoining property to maintain a firebreak by removing and clearing away all flammable vegetation and other combustible growth within thirty feet of the building**.**

For parcels less than one acre, provide for the same practical effect. (Ord. 1799 §5, 2020; Ord. 1778 §2 (part), 2018).

15.30.430 Maintenance of defensible space.

The intent of this regulation is to provide guidance for implementation of Public Resources Code Section 4291(a) and (b), and minimize the spread of fire within a one-hundred-foot zone around a building or structure.

- A person that owns, leases, controls, operates, or maintains a building or structure in, upon, or adjoining any mountainous area, forest-covered lands, brush-covered lands, grass-covered lands, or any land that is covered with flammable material, and is within state responsibility area, shall do the following:
  - ✓ Within thirty feet from each building or structure, maintain a firebreak by removing and clearing away all flammable vegetation and other combustible growth pursuant to Public Resources Code Section 4291(a). Single specimens of trees or other vegetation may be retained, provided they are well spaced, well pruned, and create a condition that avoids spread of fire to other vegetation or to a building or structure.
  - ✓ Within the thirty-foot to one-hundred-foot zone (reduced fuel zone) from each building or structure (or to the property line, whichever is nearer to the structure), provide a fuel break by disrupting the vertical and/or horizontal continuity of flammable and combustible vegetation with the goal of reducing fire intensity, inhibiting fire in the crowns of trees, reducing the rate of fire spread, and providing a safer environment for fire fighters to suppress wildfire pursuant to Public Resources Code Section 4291(b).
- Any vegetative fuels identified as a fire hazard by the fire inspection official of the authority having jurisdiction shall be removed or modified, provided it is required by subsections (A)(1) and (2) of this section.
- Within the intent of the regulations, the fire inspection official of the authority having jurisdiction may approve alternative practices which provide for the same practical effects as the stated guidelines.
- Guidance for implementation of this regulation is contained in the publication "General Guidelines for Creating Defensible Space" as published by the Board of Forestry and Fire Protection by resolution adopted on February 8, 2006.
- Fuel modification shall be required to a width of ten feet on each side of a road by reducing ground fuels to less than eighteen inches in height and by maintaining tree and shrub separations necessary to reduce fuel loading. (Ord. 1778 §2 (part), 2018).

Erosion Control Ordinance (Amador County Code Title 15, Chapter 15.40)

This chapter sets forth rules and regulations by which excavation, grading, and earthwork construction, including fills and cuts, embankments, and impoundment structures (collectively "excavation") are to be

reviewed and permitted by the county. It establishes an administrative procedure for the issuance of required permits involving excavation, the approval of plans and inspection of all permitted excavation, and the establishment of measures to control erosion and other adverse impacts of excavation ("erosion control measures"). (Ord. 1619 §2(part), 2020).

All permits issued by the county causing land disturbance shall include erosion control measures except for permits and reclamation plans which are separately reviewed and permitted. Those permits covered by this chapter include but are not limited to conditional use permits, on-site septic system permits, county road encroachment permits, well permits and grading permits. All building permits shall include erosion control measures as part of the building permit. (Ord. 1619 §2(part), 2020).

Amador County Board of Supervisors Resolution No. 99-273

This resolution adopts the policy pursuant to Division 12, Part 5 of the California Health and Safety Code that vacant parcels in subdivisions, that are ten acres or smaller, will be declared a public nuisance and owner will be noticed to destroy weeds if the CAL FIRE or other authorized fire official verifies that the weeds constitute a fire hazard.

Zoning and Subdivision Ordinance (Amador County Code Title 19)

The Amador County Zoning Code has been adopted by the County and is used:

- To assist in providing a definite plan of development for the county, and to guide, control and regulate the future growth of the county, in accordance with said plan;
- To protect the character and the social and economic stability of agricultural, residential, commercial, industrial, and other areas within the county and to assure the orderly and beneficial development of such areas;
- To obviate the menace of the public safety resulting from the location of buildings and the uses thereof, and of land adjacent to highways which are a part of the streets and highways plan of the county, or which are important thoroughfares, in such manner as to cause interference with existing or prospective traffic movements on said highways.
- To encourage the most appropriate use of land; to conserve, protect and stabilize the value of property; to provide adequate open space for light and air; to prevent undue concentration of population; to lessen congestion on the streets; to facilitate adequate provisions for community utilities such as transportation, water, sewer, schools, parks and other publicly owned facilities; and to promote the public health, safety and general welfare.

No building or structure shall be erected, reconstructed or structurally altered in any manner, nor shall any building or land be used for any purpose, other than as permitted by and in conformance with this title and all ordinances, laws and maps referred to in this Chapter.

Subdivision Ordinance (Amador County Code Title 17)

Amador County's subdivision ordinance regulates the design and improvement of land divisions and the dedication of public improvements needed in connection with land divisions. It is the purpose of this title to encourage new concepts and innovations in the arrangement of building sites within subdivisions.

Deviations from the traditional mechanical approach to the subdivision of land are encouraged in order to facilitate the ultimate development of the land in a manner that will be commensurate with contemporary living patterns and technological progress.

4.4.2. Amador County's Administrative/Technical Mitigation Capabilities

Table 4-139 identifies the County personnel responsible for activities related to mitigation and loss prevention in the County.

Table 4-139 Amador County Administrative/Technical Mitigation Capabilities

Administration	In Place Y/N	Describe capability Is coordination effective?
Staff		**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	Y	Staffing is adequate and staff is trained on hazards and mitigation. There is sufficient coordination between agencies and staff.
Civil Engineer, including dam and levee safety	Y	Staffing is adequate and staff is trained on hazards and mitigation. There is sufficient coordination between agencies and staff.
Community Planner	Y	Staffing is adequate and staff is trained on hazards and mitigation. There is sufficient coordination between agencies and staff.
Emergency Manager	Y	Staffing is adequate and staff is trained on hazards and mitigation. There is sufficient coordination between agencies and staff.
Floodplain Administrator	Y	Staffing is adequate and staff is trained on hazards and mitigation. There is sufficient coordination between agencies and staff.
GIS Coordinator	N	
Planning Commission	Y	Staffing is adequate and staff is trained on hazards and mitigation. There is sufficient coordination between agencies and staff.
Other		
Technical	**Y/N**	**Has capability been used to assess/mitigate risk in the past?**
Grant writing	Y	Yes – grant writers have helped write hazard mitigation grants for Cal OES and FEMA grants.

Hazard data and information	Y	The impact fees collected for new development (traffic, fire, parks, school, and county facilities) aren't direct funding resources for hazard prevention or mitigation, although fees collected by the fire districts might be indirectly used toward fire prevention. The County could establish a capital improvement plan for hazard mitigation, but the actual source and amount of funding are uncertain.
GIS analysis	Y	
Mutual aid agreements	Y	Amador Transit
Other		
How can these capabilities be expanded and improved to reduce risk?		
GIS files of hazard layers could be used by staff to better identify various risks and development constraints when preparing project CEQA analyses. A GIS coordinator may need to be hired.		

4.4.3. Amador County's Fiscal Mitigation Capabilities

Table 4-140 identifies financial tools or resources that the County could potentially use to help fund mitigation activities.

Table 4-140 Amador County Fiscal Mitigation Capabilities

Funding Resource	In Place Y/N	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	Y	
Community Development Block Grant	Y	Mostly used for AWA infrastructure improvements.
Federal funding programs (non-FEMA)	N	
Fees for water, sewer, gas, or electric services	N	
Impact fees for new development	Y	Current fees –no; future fees - yes
State funding programs	Y	Cal OES, Cal EPA, CA DWR grants.
Stormwater utility fee	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		
Impact fees for new development are being implemented slowly. Board approval is needed for many of these items. Budgets and avenues for generating revenue are always being considered.		

4.4.4. Amador County Mitigation Education, Outreach, and Partnerships

Table 4-141 identifies education and outreach programs and methods already in place that could be/or are used to implement mitigation activities and communicate hazard-related information.

Table 4-141 Amador County Mitigation Education, Outreach, and Partnerships

Program/Organization	In Place Y/N	How widespread are each of these in your community?
Community newsletters	Y	Limited to only some Districts and Communities
Hazard awareness campaigns (such as Firewise, Storm Ready, Severe Weather Awareness Week, school programs, public events)	Y	Amador Fire Safe Council
Local news	Y	Amador Ledger Newspaper, KVGC Radio
Organizations that interact with underserved and vulnerable communities	Y	Operation Care (Domestic Violence victims), Sheriff's Office HART (Homeless Amador React Team), Amador County Homeless Task Force/Outreach (I'm not familiar w/them), Victory Village (for Veterans)
Social media	Y	Sheriff's Office mobile app and Facebook
How can these capabilities be expanded and improved to reduce risk?		
Amador County can expand its current outreach by adding quarterly emergency alert recruitment pushes, reminding residents to sign up and stay connected. Social media efforts can be broadened to Instagram, Nextdoor, and X, reaching more demographics. Firewise Community expansion will increase neighborhood-level wildfire resilience. A local Preparedness Guide, available in print and online, will provide consistent, accessible information for all hazards. Seasonal severe weather campaigns will deliver timely preparedness messages through schools, organizations, and media. Together, these actions will strengthen public engagement, broaden partnerships, and reduce overall disaster risk		

4.4.5. Other Mitigation Efforts

In addition to the tables above, the County noted the following mitigation efforts.

Amador County Public Health has put together a Public Health Preparedness App. It is dedicated to coordinating efforts to limit the health impact of emergencies within Amador County. The program facilitates partnerships with public health departments, local governments, educational institutions, community organizations, and healthcare providers. By working together, it strengthen the ability to coordinate emergency preparedness activities and respond swiftly to emerging threats.

Amador County Public Works has multiple projects currently underway related to mitigation. This includes:

- Carbondale Bridge over Willow Creek at Forest Home: Beginning in June 2024, Amador County Transportation and Public Works began replacing the Carbondale Road bridge over Willow Creek near Forest Home Road. The project includes the removal of the existing bridge structure and replacing it with a new bridge structure with a wider deck and improved railings. The roadway alignment will remain unchanged; however, the new roadway profile will be raised approximately four feet.
- Bridge Replacement Projects - 3 Bridges:

- ✓ Fiddletown Road Bridge: The Fiddletown Road Bridge, constructed in 1923, is a 32.8-foot long, 2-lane concrete arch bridge that spans over North Fork Dry Creek. The project is to remove the existing structure and reconstruct with a bridge to provide pedestrian and vehicle access. Currently, the County is completing right-of-way and permitting.
- ✓ Old Amador Road Bridge: The Old Amador Road Bridge, constructed in 1925, is a 65-foot long, 2-span bridge that spans over Rancheria Creek. The project is to remove the existing structure and reconstruct with a bridge to provide pedestrian and vehicle access. Currently, the County is completing the environmental review and design.
- ✓ Bell Road Bridge: The project will replace the existing structurally deficient bridge, constructed in 1925. The roadway at the bridge will conform to the existing roadway at approximately 400-feet from each side of the bridge. The new bridge would accommodate one 12-foot wide travel lane and two 2-foot wide shoulders. Currently, the County is completing environmental review and design.

- Upper Ridge Road Improvements Project: Amador County has secured funds in the amount of $2,300,000 for repairs and safety improvements along Upper Ridge Road, a 3.04-mile section of road from Climax Road to Highway 88 in Pine Grove. This funding is through the Priority Legislative Budget Project administered by the California Department of Transportation. Engineering design has been completed with construction of the improvements to occur in Fall 2025.

Wildfire guidance and resources are provided through County website. This includes:

- Fuel breaks implemented by ARCD/AFSC
- I/E assistance provided by AFSC
- CWPP by AFSC from 2016 High Country Community Wildfire Protection Plan - Amador Fire Safe Council

4.5 Natural Hazards Summary

As detailed in the hazard identification section, those hazards identified as a high or medium significance in Table 4-142 are considered priority hazards for mitigation planning. Those hazards that occur infrequently or have little or no impact in the Amador County Planning Area were determined to be of low significance and not considered a priority hazard. Significance was determined based on the hazard profile, focusing on key criteria such as frequency, extent, and resulting damage, including deaths/injuries and property, natural and cultural resources, and economic damage. The ability of a jurisdiction to reduce losses through implementation of existing and new mitigation measures was also considered as to the significance of a hazard. This assessment was used to prioritize those hazards of greatest significance in the Amador County Planning Area, enabling the County and participating jurisdictions to focus resources where they are most needed.

Table 4-142 Hazard Identification and Initial Determination of Priority Hazards

Hazard	Likelihood of Future Occurrence	Vulnerability	Priority Hazard
Agricultural Hazards (severe weather/pests/invasive species)	Highly Likely	High	Y

Hazard	Likelihood of Future Occurrence	Vulnerability	Priority Hazard
Avalanche	Likely	Medium	N
Climate Change	Likely	Medium	Y
Dam Failure	Unlikely	High	Y
Drought & Water shortage (w/tree mortality)	Likely	High	Y
Earthquake (w/subhazards)	Unlikely	Extremely High	Y
Floods: 1%/0.2% annual chance (w/ levee failure)	Occasional/Unlikely	High	Y
Floods: Localized Stormwater	Highly Likely	Medium	Y
Landslide, Mudslide, Debris Flow	Likely	Medium	Y
Severe Weather: Extreme Cold, Freeze, and Snow	Highly Likely	Medium	Y
Severe Weather: Extreme Heat	Highly Likely	Medium	Y
Severe Weather: Heavy Rains and Storms (Hail, Lightning)	Highly Likely	Medium	Y
Severe Weather: High Winds and Tornadoes	Highly Likely	Medium	Y
Wildfire (w/smoke and air quality)	Highly Likely	Extremely High	Y

Chapter 5 Mitigation Strategy

44 CFR §201.6(c)(3) and §201.7(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 describes the mitigation strategy process and mitigation action plan for this 2025 Amador County LHMP Update. It describes how all the participating jurisdictions met the following requirements from the 10-step planning process:

- Planning Step 6: Set Goals
- Planning Step 7: Review Possible Activities
- Planning Step 8: Draft an Action Plan

5.1 Mitigation Strategy: Overview

The results of the planning process, the risk assessment, the goal setting, the identification of mitigation actions, and the hard work of the HMPC led to the mitigation strategy and mitigation action plan for this LHMP Update. As part of the LHMP Update process, a comprehensive review and update of the mitigation strategy portion of the 2020 Amador County LHMP was conducted. Some of the initial goals and objectives from the previous LHMP were refined and reaffirmed, some goals were deleted, and others were added. The end result was a new set of goals, to reflect the completion of, or progress towards the 2020 mitigation actions, the updated risk assessment, and the new priorities of participating jurisdictions and this 2025 LHMP Update.

To support the updated mitigation strategy including updated goals, the mitigation actions from the 2020 LHMP were reviewed and assessed for their value in reducing risk and vulnerability to the Amador County Planning Area from identified hazards and further evaluated for their inclusion in this LHMP Update (See Chapter 2 What's New). Section 5.2 below identifies the new goals and objectives of this 2025 LHMP Update and Section 5.4 details the new mitigation action plan.

Taking all of the above into consideration, the participating jurisdictions and HMPC developed the following umbrella mitigation strategy for this LHMP Update:

- Communicate the hazard information collected and analyzed through this planning process as well as mitigation success stories so that the community better understands what can happen where and what they themselves can do to be better prepared.
- Implement the mitigation action plan recommendations of this Plan.
- Use existing rules, regulations, policies, and procedures already in place.
- Monitor multi-objective management opportunities so that funding opportunities may be shared and packaged, and broader constituent support may be garnered.

5.1.1. Continued Compliance with NFIP

Given the nature and extent of the flood hazard in the Amador County Planning Area, an emphasis will be placed on continued compliance with the National Flood Insurance Program (NFIP) by all communities. This Chapter 5 of the Base Plan for the County and the jurisdictional annexes for the five cities, as the six eligible NFIP communities, provides an overview of their flood management programs and continued compliance with the NFIP. Although the participating districts to this LHMP Update are not eligible NFIP communities, many of their mitigation actions and projects contain measures to promote effective floodplain management throughout the Amador County Planning Area.

To participate in the NFIP a community must adopt and enforce floodplain management regulations that meet or exceed the minimum requirements of the Program. These requirements are intended to prevent loss of life and property and to reduce taxpayer's costs for disaster relief as well as minimize economic and social hardships that result from flooding. Participation in the NFIP provides a community with access to flood insurance.

Detailed below is a description of the County's flood management program to ensure continued compliance with the NFIP. Also to be considered are the flood mitigation actions contained in this LHMP that support the ongoing efforts by the County to minimize the risk and vulnerability of the community to the flood hazard and to enhance their overall floodplain management program.

Amador County's Flood Management Program

Amador County has participated in the Regular Phase of the NFIP since September 24, 1984. Since then, the County has administered floodplain management regulations that meet the minimum requirements of the NFIP. Under that arrangement, residents and businesses paid the same flood insurance premium rates as most other communities in the country.

The Community Rating System (CRS), a voluntary program under the NFIP, was created in 1990. It is designed to recognize floodplain management activities that go above and beyond the NFIP's minimum requirements. If a community implements public information, mapping, regulatory, loss reduction and/or flood preparedness activities and submits the appropriate documentation to FEMA, then its residents can qualify for a flood insurance premium rate reduction. The County does not currently participate in the CRS program.

Presently, the County manages its floodplains in compliance with NFIP requirements and implements a floodplain management program designed to protect the people and property of the County. Floodplain regulations are a critical element in local floodplain management and are a primary component in the County's participation in the NFIP.

The County will continue to manage their floodplains in continued compliance with the NFIP. An overview of the County's NFIP status and floodplain management program is discussed on Table 5-1.

Table 5-1 Amador County NFIP Status

NFIP Topic	Comments
Staff Resources	
Who is responsible for floodplain management in your community? Provide Department/Title. Do they serve any roles other than Community Floodplain Administrator (FPA)?	Planning Director. They serve in other roles as well.
Is the Community FPA or NFIP Coordinator a Certified Floodplain Manager?	No
Is floodplain management an auxiliary function?	Auxiliary
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	Permit review, GIS, Inspections, and (minimal) education. (No outreach, No engineering)
What are the barriers to running an effective NFIP program in the community, if any?	Staffing & associated expenses.
Insurance Summary	
How many NFIP policies are in the community? What is the total premium and coverage?	23 policies $23,560 in annual premiums $4,709,000 of insurance in force
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	17 paid losses $365,920.56in paid claims. 2 substantial damage claims
How many structures (residential and non-residential) are exposed to flood risk within the community?	534 in 1% annual chance flood zone 2 in 0.2% annual chance flood zone
Are there Repetitive Loss (RL) and Severe Repetitive Loss Properties (SRL) structures in the community?	2 RL 0 SRL
Describe any areas of flood risk with limited NFIP policy coverage	No known places of limited coverage
How does the community teach property owners or other stakeholders about the importance of flood insurance?	N/A. Banks will determine if homes are in the floodplain, then require flood insurance. (Rely on external sources).
What digital sources (like the FEMA Map Service Center, National Flood Hazard Layer) or non-regulatory tools does the community use?	FEMA Map Service Center, National Flood Hazard Layer.
Compliance History	
Is the community in good standing with the NFIP?	Y
Are there any outstanding compliance issues (i.e., current violations)?	N
Who is responsible (Department, Title) for making substantial damage/improvement determinations? How does the community identify substantially damaged/improved structures? What is the process to make sure these structures are brought into compliance?	Planning Director Chuck Beatty and Chief Building Official, Todd Barr. In the past, they've used an estimate for repair from a Contractor, then compared that number to the assessed value. What process: Building Codes, Permits, Inspections, and an Elevation Survey.
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	9/22/2017 CAV

NFIP Topic	Comments
Is a CAV or CAC scheduled or needed?	No
Regulation	
When did the community enter the NFIP?	9/24/1984
Are the FIRMs digital or paper?	Digital
Has the community adopted the NFIP minimum floodplain management criteria via local regulation? Date of current local regulation?	No, the current Floodplain Development Ordinance was adopted in 2000. However, the County applies the required 2-foot clearance above floodplain elevation for new construction.
Has the community adopted the latest effective FIRM? Date adopted?	Yes, the latest FIRMs have an effective date of May 20, 2010.
How does the community enforce local floodplain regulations and monitor compliance?	Projects are evaluated during the building permit plan-check review process. If a floodplain permit is needed, an Elevation Certificate is required for lowest floor level.
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	Meet minimum requirements.
How are Letters of Map Change (LOMCs) tracked and compiled?	New DFIRMs are downloaded regularly which include the latest LOMCs, LOMRs, and CLOMRs
Provide an explanation of the permitting process.	Site plans are reviewed to ensure projects are outside SFHAs or Elevation Certificates are provided for projects within SFHAs
Community Rating System	
Does the community participate in CRS? If so, what is the community's CRS Class Ranking?	No
What categories and activities provide CRS points and how can the class be improved?	N/A
Does the plan include CRS planning requirements?	N/A

Source: FEMA CIS, FEMA PIVOT, Amador County

*FEMA CIS and PIVOT databases record this data differently; thus results utilized differ depending on the source.

5.1.2. Integration of Mitigation with Post Disaster Recovery and Mitigation Strategy Funding Opportunities

Hazard mitigation actions are essential to weaving long-term resiliency into all community recovery efforts so that at-risk infrastructure, development, and other community assets are stronger and more resilient for the next severe storm or hazard event. Mitigation measures to reduce the risk and vulnerability of a community to future disaster losses can be implemented in advance of a disaster event and also as part of post-disaster recovery efforts.

Mitigation applied to recovery helps communities become more resilient and sustainable. It is often most efficient to fund eligible infrastructure mitigation through FEMA's Public Assistance mitigation program if the asset was damaged in a storm event. Mitigation work can be added to project worksheets if they can be proven to be cost-beneficial.

Integration of mitigation into post disaster recovery efforts should be considered by all communities as part of their post disaster redevelopment and mitigation policies and procedures. Post-disaster redevelopment and mitigation policies and procedures are evaluated and updated as part of the Emergency Operations Plan (EOP) updates and other emergency management plans for each community.

These EOP's and other emergency management documents, through its policies and procedures, seek to mitigate the effects of hazards, prepare for measures to be taken which will preserve life and minimize damage, enhance response during emergencies and provide necessary assistance, and establish a recovery system in order to return the community to their normal state of affairs. Mitigation is emphasized as a major component of recovery efforts.

Mitigation Strategy Funding Opportunities

An understanding of the various funding streams and opportunities enable the communities to match identified mitigation projects with the grant programs that are most likely to fund them. Additionally, some of the funding opportunities can be utilized together. Mitigation grant funding opportunities available pre- and post- disaster include the following.

FEMA HMA Grants

Cal OES administers four main types of HMA grants: (1) Hazard Mitigation Grant Program, (2) Pre-Disaster Mitigation Program, (3) Flood Mitigation Assistance Program, and (4) Building Resilient Infrastructure and Communities. Eligible applicants for the HMA include state and local governments, certain private non-profits, and federally recognized Indian tribal governments. While private citizens cannot apply directly for the grant programs, they can benefit from the programs if they are included in an application sponsored by an eligible applicant.

FEMA Public Assistance Section 406 Mitigation

The Robert T. Stafford Disaster Relief and Emergency Assistance Act provides FEMA the authority to fund the restoration of eligible facilities that have sustained damage due to a presidentially declared disaster. The regulations contain a provision for the consideration of funding additional measures that will enhance a facility's ability to resist similar damage in future events.

Community Development Block Grants

The California Department of Housing and Community Development administers the State's Community Development Block Grant (CDBG) program with funding provided by the U.S. Department of Housing and Urban Development. The program is available to all non-entitlement communities that meet applicable threshold requirements. All projects must meet one of the national objectives of the program – projects must benefit 51 percent low- and moderate-income people, aid in the prevention or clearance of slum and blight, or meet an urgent need. Grant funds can generally be used in federally declared disaster areas for CDBG eligible activities including the replacement or repair of infrastructure and housing damaged during, or as a result of, the declared disaster.

Small Business Loans

SBA offers low-interest, fixed-rate loans to disaster victims, enabling them to repair or replace property damaged or destroyed in declared disasters. It also offers such loans to affected small businesses to help them recover from economic injury caused by such disasters. Loans may also be increased up to 20 percent of the total amount of disaster damage to real estate and/or leasehold improvements to make improvements that lessen the risk of property damage by possible future disasters of the same kind.

Increased Cost of Compliance

Increased Cost of Compliance (ICC) coverage is one of several resources for flood insurance policyholders who need additional help rebuilding after a flood. It provides up to $30,000 to help cover the cost of mitigation measures that will reduce flood risk. ICC coverage is a part of most standard flood insurance policies available under NFIP.

5.2 Goals and Objectives

44 CFR §201.6(c)(3)(i) and §201.7(c)(3)(i): [The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

Up to this point in the planning process, the participating jurisdictions, along with the HMPC, have organized resources, assessed hazards and risks, and documented mitigation capabilities. The resulting goals, objectives, and mitigation actions were developed based on these tasks. The HMPC held a series of meetings and exercises designed to achieve a collaborative mitigation strategy as described further throughout this section. Appendix C documents the information covered in these mitigation strategy meetings, including information on the goals development and the identification and prioritization of mitigation alternatives by the HMPC and participating jurisdictions.

During the initial goal-setting meeting, the HMPC reviewed the results of the hazard identification, vulnerability assessment, and capability assessment. This analysis of the risk assessment identified areas where improvements could be made and provided the framework for the HMPC to formulate planning goals and objectives and to develop the mitigation strategy for the Amador County Planning Area.

Goals were defined for the purpose of this mitigation plan as broad-based public policy statements that:

- Represent basic desires of the community;
- Encompass all aspects of community, public and private;
- Are nonspecific, in that they refer to the quality (not the quantity) of the outcome;
- Are future-oriented, in that they are achievable in the future; and
- Are time-independent, in that they are not scheduled events.

Goals are stated without regard to implementation. Implementation cost, schedule, and means are not considered. Goals are defined before considering how to accomplish them so that they are not dependent on the means of achievement. Goal statements form the basis for objectives and actions that will be used as means to achieve the goals. Objectives define strategies to attain the goals and are more specific and measurable.

HMPC members were provided with the list of goals from the 2020 LHMP as well as a list of other sample goals to consider. The team was told that they could use, combine, or revise the statements provided or develop new ones, keeping the risk assessment in mind. Each member was asked to provide three goal statements. Goal statements were collected and grouped into similar themes and provided to the HMPC. Some of the statements were determined to be better suited as objectives or actual mitigation actions and were set aside for later use. Next, the HMPC developed objectives that summarized strategies to achieve each goal. Edits and refinements to these new goals and resulting objectives were provided by the HMPC until the team came to consensus on the final goals and objectives for this 2025 LHMP Update.

Based on the risk assessment review and goal setting process, the HMPC identified the following goals, which provide the direction for reducing future hazard-related losses within the Amador County Planning Area.

Goal #1: Provide protection for people's lives, property, public health, and the environment and reduce risk and losses from natural hazards

- Minimize impact to existing development
- Minimize impact to future development
- Minimize economic and resource impact
- Promote resiliency strategies
- Consider and prioritize the use of prevention measures such as land use controls and code enhancements

Goal #2: Provide protection for critical facilities, infrastructure, utilities and services from hazard impacts

- Protect and improve resiliency of critical facilities, services, and community lifelines from hazard impacts to protect life and reduce loss of property
- Implement critical facility upgrades, retrofits, and mitigation measures to ensure reliability of services
- Update and maintain GIS list of critical facilities: Essential Services, At-Risk Populations, Hazardous Materials Facilities

Goal #3: Improve community (public and stakeholder) awareness, education, and preparedness to natural hazard events

- Enhance public/stakeholder outreach, education and preparedness planning for all hazards of concern and for all populations, including underserved and vulnerable populations
- Reinforce emergency response systems
- Foster household preparedness and self-responsibility for hazard mitigation
- Increase public and stakeholder knowledge and awareness about the risk and vulnerability to identified hazards and how to take responsibility for and mitigate these risks with a focus on high priority hazards such as wildfire and flood
- Leverage existing public outreach and education mechanisms such as community coalitions and other existing forums; expand social media presence and local community boards
- Increase use of technology to communicate hazard information (e.g., GIS)
- Provide education and outreach on evacuation routes, signage, roles and responsibilities, as well as on various emergency communication modes

Goal #4: Build community resilience and increase communities' ability to be prepared for, respond to, and recover from a disaster event

- Improve community capabilities to mitigate hazards, reduce losses, and to better recover from disasters
- Integrate mitigation into planning and decision making by embedding mitigation strategies into everyday county policies, capital projects, and other similar mechanisms
- Improve interagency (local, state, federal) emergency coordination, communication, and operational capacity to ensure effective community preparedness, response and recovery
- Maintain current service levels and continue internal and operational training
- Enhance alert and warning systems and ensure effective system redundancies
- Improve emergency communication systems with reliable backup (e.g., cell phones, radios, sirens, reverse 911, multi-media, etc.)
- Improve identification, education, and emergency notifications of vulnerable and underserved populations
- Enhance the use of shared resources/Develop a strong mutual aid support system
- Improve and make better use of technology (e.g., GIS)
- Establish and expand GIS technologies to map hazards and community assets for mitigation planning and to support hazard response and community recovery
- Maintain coordination of disaster plans, data, and information with changing DHS/FEMA and State requirements
- Support and build upon evacuation planning and sheltering efforts in the County
- Mitigate future hazard losses through adequate land use/facilities planning

Goal #5: Reduce fire severity and intensity in Amador County and surrounding lands

- Reduce life safety issues, property loss, natural resource impacts, and damages associated with wildfires
- Prevent and reduce wildfire ignitions
- Increase agency and jurisdictional coordination to reduce wildfire risk, severity and intensity
- Increase vegetation management countywide to reduce wildfire losses
- Be proactive in identifying and prioritizing mitigation funding to minimize risk and vulnerability to wildfire
- Prioritize wildfire mitigation around critical facilities and infrastructure
- Support efforts to gain access to affordable insurance for all communities including underserved and vulnerable populations

Goal #6: Maintain FEMA Eligibility/Position the communities for Grant funding

- Improve community ability to be competitive/successful with grant funding opportunities from application development to project delivery
- Establish and share best practices among agencies for development of grant applications, project permits, etc.
- Educate (and advocate) local officials to support local access to funding.

5.3 Identification and Analysis of Mitigation Actions

44 CFR §201.6(c)(3)(ii) and §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.

In order to identify and select mitigation actions to support the mitigation goals, each hazard identified in Section 4.1 was evaluated at the completion of the risk assessment as part of the second prioritization process to determine which hazards were priorities for mitigation strategy planning. Only those hazards that were determined to be a priority hazard for each participating jurisdiction were considered further in the development of hazard-specific mitigation actions. Those hazards not considered a priority for mitigation strategy development were eliminated from further consideration because the risk of a hazard event to the participating jurisdiction is unlikely, the vulnerability of the participating jurisdiction is low, or capabilities are already in place to mitigate adverse impacts. Further, the resulting mitigation strategy presented in this Chapter focuses on those mitigation actions that each jurisdiction has the authority, resources, and capacity to consider for implementation over the next 5-years covered by this LHMP Update. Table 5-2 and Table 5-3 provide a listing of priority hazards by jurisdiction to be addressed in the mitigation strategy portion of this Plan.

Table 5-2 Amador County Planning Area: Mitigation Action Priority Hazards by Jurisdiction

Hazard	Amador County	City of Amador City	City of Jackson	City of Ione	City of Plymouth	City of Sutter Creek
Agricultural Hazards (severe weather/pests/invasive species)	X					
Avalanche*						
Climate Change	X	X	X	X	X	X
Dam Failure	X			X		X
Drought & Water shortage (w/ tree mortality)	X	X	X	X	X	X
Earthquake (w/subhazards)	X			X		X
Floods: 1%/0.2% annual chance (w/ levee failure)	X		X	X	X	X
Floods: Localized Stormwater	X	X	X	X	X	X
Landslide, Mudslide, Debris Flow	X	X		X		X
Severe Weather: Extreme Cold, Freeze, and Snow	X			X		
Severe Weather: Extreme Heat	X	X	X	X	X	X
Severe Weather: Heavy Rains and Storms (Hail, Lightning)	X	X		X	X	X
Severe Weather: High Winds and Tornadoes	X	X	X	X		
Wildfire (w/smoke and air quality)	X	X	X	X	X	X

*while initially a priority hazard for the County Planning Area, after completion of the risk assessment, it was determined that avalanche is a low priority hazard for mitigation planning purposes.

Table 5-3 Amador County Planning Area: Mitigation Action Priority Hazards by Jurisdiction

Hazard	Amador Water Agency	Jackson Valley Irrigation District
Agricultural Hazards (severe weather/pests/invasive species)	X	X
Avalanche*		
Climate Change	X	X
Dam Failure	X	X
Drought & Water shortage (w/ tree mortality)	X	X
Earthquake (w/subhazards)	X	X
Floods: 1%/0.2% annual chance (w/ levee failure)	X	X
Floods: Localized Stormwater	X	
Landslide, Mudslide, Debris Flow	X	
Severe Weather: Extreme Cold, Freeze, and Snow	X	X
Severe Weather: Extreme Heat	X	
Severe Weather: Heavy Rains and Storms (Hail, Lightning)	X	
Severe Weather: High Winds and Tornadoes	X	
Wildfire (w/smoke and air quality)	X	X

*while initially a priority hazard for the County Planning Area, after completion of the risk assessment, it was determined that avalanche is a low priority hazard for mitigation planning purposes.

It is important to note, however, that all the Hazards addressed in this LHMP are included in the multi-hazard public awareness mitigation actions as well as in other multi-hazard, emergency management actions, and other hazard-specific actions, providing benefits to all participating jurisdictions to this 2025 LHMP Update.

Once it was determined which hazards warranted the development of specific mitigation actions, the participating jurisdictions and HMPC analyzed viable mitigation options that supported the identified goals and objectives. The HMPC was provided with the following list of categories of mitigation actions, which originate from the Community Rating System:

- Prevention
- Property protection
- Structural projects
- Natural resource protection
- Emergency services
- Public information

The HMPC was provided with examples of potential mitigation actions for each of the above categories. The HMPC was also instructed to consider both future and existing buildings in considering possible mitigation actions. A facilitated discussion then took place to examine and analyze the options. Appendix C provides a detailed review and discussion of the six mitigation categories to assist in the review and identification of possible mitigation activities or projects. Also utilized in the review of possible mitigation measures is FEMA's publication on Mitigation Ideas, by hazard type. Prevention type mitigation

alternatives were discussed for each of the priority hazards. This was followed by a brainstorming session that generated a list of preferred mitigation actions by hazard.

5.3.1. Prioritization Process

Once the mitigation actions were identified, the HMPC was provided with several decision-making tools, including FEMA's recommended prioritization criteria, STAPLEE sustainable disaster recovery criteria; Smart Growth principles; and others, to assist in deciding why one recommended action might be more important, more effective, or more likely to be implemented than another. STAPLEE stands for the following:

- Social: Does the measure treat people fairly? (e.g., different groups, different generations)
- Technical: Is the action technically feasible? Does it solve the problem?
- Administrative: Are there adequate staffing, funding, and other capabilities to implement the project?
- Political: Who are the stakeholders? Will there be adequate political and public support for the project?
- Legal: Does the jurisdiction have the legal authority to implement the action? Is it legal?
- Economic: Is the action cost-beneficial? Is there funding available? Will the action contribute to the local economy?
- Environmental: Does the action comply with environmental regulations? Will there be negative environmental consequences from the action?

In accordance with the DMA requirements, an emphasis was placed on the importance of a benefit-cost analysis in determining action priority. Other criteria used to assist in evaluating the benefit-cost of a mitigation action includes:

- Contribution of the action to save life or property
- Availability of funding and perceived cost-effectiveness
- Available resources for implementation
- Ability of the action to address the problem

The initial list of mitigation actions carried forward from the 2020 LHMP and new actions identified during this planning process were reviewed and prioritized using the criteria (alternatives and selection criteria) in Appendix C.

With these criteria in mind, the HMPC were each given a set of 9 colored dots, three each of red, blue, and green. The dots were assigned red for high priority (worth five points), blue for medium priority (worth three points), and green for low priority (worth one point). The HMPC was asked to use the dots to prioritize actions with the above criteria in mind. The point score for each action was totaled. Appendix C contains the total score given to each identified mitigation action.

The process of identification and analysis of mitigation alternatives allowed the HMPC to come to consensus and to prioritize recommended mitigation actions. During the voting process, emphasis was placed on the importance of a benefit-cost review in determining project priority; however, this was not a quantitative analysis. The team agreed that prioritizing the actions collectively enabled the actions to be ranked in order of relative importance and helped steer the development of additional actions that meet the more important objectives while eliminating some of the actions which did not garner much support.

Benefit-cost was also considered in greater detail in the development of the Mitigation Action Plan detailed below in Section 5.4 The cost-effectiveness of any mitigation alternative will be further considered in greater detail through performing benefit-cost project analyses when seeking FEMA mitigation grant funding for eligible actions associated with this 2025 LHMP Update.

Recognizing the limitations in prioritizing actions from multiple jurisdictions and departments and the regulatory requirement to prioritize by benefit-cost to ensure cost-effectiveness, the participating jurisdictions and HMPC decided to pursue actions that contributed to saving lives and property as first and foremost, with additional consideration given to the benefit-cost aspect of a project. This process drove the development of a determination of a high, medium, or low priority for each mitigation action, and a comprehensive prioritized mitigation action plan for the Amador County Planning Area.

5.4 Mitigation Action Plan

44 CFR §201.6(c)(3)(iii) and §201.7(c)(3)(iii): [The mitigation strategy section shall include] an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

This mitigation action plan was developed to present the recommendations developed by the HMPC for how the Amador County Planning Area can reduce the risk and vulnerability of people, property, critical facilities and infrastructure, natural and cultural resources, and the economy to future disaster losses. Emphasis was placed on both the existing built environment and future development. This mitigation action plan summarizes who is responsible for implementing each of the prioritized actions as well as when and how the actions will be implemented. Each action summary also includes a discussion of the benefit-cost review conducted to meet the regulatory requirements of the Disaster Mitigation Act.

Table 5-4 identifies all mitigation actions for participating jurisdictions to this LHMP Update. For each mitigation action item included in Table 5-4, a detailed mitigation implementation strategy has been developed. The detailed descriptions for each mitigation action are included in each respective jurisdictional annex to this LHMP.

The mitigation action plan summarized below contains both new action items developed for this 2025 LHMP Update as well as old actions being carried forward from the 2020 LHMP. Table 5-4 indicates whether the action is new or from the 2020 LHMP and Chapter 2 contains the details for each 2020 mitigation action item indicating whether a given action item has been completed, deleted, or deferred.

As described throughout this 2025 LHMP Update, the Amador County Planning Area has many risks and vulnerabilities to identified hazards. Although many possible mitigation actions, as detailed in Appendix C, were brainstormed and prioritized during the mitigation strategy meetings, the resulting mitigation strategy presented in this Chapter 5 of this LHMP focuses only on those mitigation actions that are both reasonable and realistic for the communities to consider for implementation over the next 5-years covered by this 2025 Update. Thus, only a portion of the actions identified in Appendix C have been carried forward into the mitigation strategy presented in Table 5-4. Although many good ideas were developed during the mitigation action brainstorming process, the reality of determining which priority actions to develop and include in this LHMP Update came down to the actual priorities of communities, individuals and departments based in part on department direction, staffing, and available funding. The overall value of the mitigation action table in Appendix C is that it represents a wide-range of mitigation actions that can be consulted and developed for this LHMP Update during annual plan reviews and the formal 5-year update process.

It is also important to note that the participating jurisdictions have numerous existing, detailed action descriptions, which include benefit-cost estimates, in other planning documents, such as stormwater and drainage plans, flood and water management plans, fire plans, climate plans, and capital improvement budgets and reports. These actions are considered to be part of this LHMP, and the details, to avoid duplication, should be referenced in their original source document. The HMPC also realizes that new

needs and priorities may arise as a result of a disaster or other circumstances and reserves the right to support new actions, as necessary, as long as they conform to the overall goals of this LHMP Update.

Further, it should be clarified that the actions included in this mitigation strategy are subject to further review and refinement; alternatives analyses; and reprioritization due to funding availability and/or other criteria. The participating jurisdictions are not obligated by this document to implement any or all of these projects. Rather this mitigation strategy represents the desires of the jurisdictions to mitigate the risks and vulnerabilities from identified hazards. The actual selection, prioritization, and implementation of these actions will also be further evaluated in accordance with the mitigation categories and criteria contained in Appendix C.

It should be noted that many of the projects submitted by each jurisdiction in Table 5-4 benefit all jurisdictions whether or not they are the lead agency. Further, many of these mitigation efforts are collaborative efforts among multiple local, state, and federal agencies. In addition, the public outreach actions, as well as many of the emergency services actions, apply to all hazards regardless of hazard priority. Collectively, this multi-jurisdictional mitigation strategy includes only those actions and projects which reflect the actual priorities and capacity of each jurisdiction to implement over the next 5-years covered by this 2025 LHMP Update.

Table 5-4 Amador County Planning Area Mitigation Actions

Action Title	New Action/ Previous Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Amador County					
Multi-Hazard Actions					
Action 1. Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	Previous Action	X	X		Prevention
Action 2. Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness	Previous Action	X	X	X	Prevention Public Education
Action 3. Backup Power Projects for Critical Facilities & Infrastructure	Previous Action	X	X		Prevention Property Protection Natural Resource Protection
Action 4. Establish and Fund a Full-Time Geographic Information Systems (GIS) position for Hazard Mitigation and Emergency Planning	Previous Action	X	X		Prevention Emergency Services
Action 5. Enhance and Harden Cellular and Repeater Communications Infrastructure Countywide	Previous Action	X	X		Property Protection Structural
Action 6. Upgrade and Replace Countywide Emergency Radio Communications Infrastructure	Previous Action	X	X		Prevention Emergency Services

Action Title	New Action/ Previous Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Action 7. Emergency Water Storage & Hauling Infrastructure Project	Previous Action	X	X		Prevention Emergency Services
Action 8. Launch of PHapp Mobile Preparedness Public Health Application	New Action	X	X		Prevention Property Protection Natural Resource Protection
Agricultural Hazard Actions					
Action 9. Invasive Pests (Insect)	Previous Action	X	X		Property Protection Natural Resource Protection
Action 10. Invasive Pests (Weeds)	Previous Action	X	X		Property Protection Natural Resource Protection
Climate Change Actions					
Action 11. Climate Resilience through Multi-Hazard Mitigation	New Action	X	X		Prevention Property Protection Natural Resource Protection
Dam Failure, Flood, Localized Flood, and Heavy Rains and Storm Actions					
Action 12. Flood & Dam Failure Resilience Plan	New Action	X	X	X	Prevention Property Protection Natural Resource Protection
Earthquake Actions					
Action 13. Amador County Earthquake Preparedness & Seismic Resilience Plan	New Action	X	X		Prevention Property Protection Natural Resource Protection
Landslide Actions					
Action 14. Landslide Hazard Mitigation & Slope Stability Plan	New Action	X	X		Prevention Property Protection Natural Resource Protection
Severe Weather: Extreme Cold, Freeze, and Snow Actions					
Action 15. Severe Winter Weather Resilience Plan	New Action	X	X		Prevention Property Protection Natural Resource Protection
Severe Weather: Extreme Heat Actions					
Action 16. Extreme Heat Resilience Plan	New Action	X	X		Prevention Property Protection Natural Resource Protection
Wildfire, Drought, and Extreme Heat Actions					

Action Title	New Action/ Previous Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Action 17. Tree Mortality Program Coordinator	New Action	X	X		Prevention Property Protection Natural Resource Protection
Action 18. Countywide wildfire resiliency coordination GIS mapping project to support fuels reduction efforts	New Action	X	X		Prevention Property Protection Natural Resource Protection
Action 19. Forest Health Projects	New Action	X	X		Prevention Property Protection Natural Resource Protection
Action 20. Ingress/Egress Phases I and II: Public Education and Fuels Reduction	Previous Action	X	X		Prevention Property Protection Natural Resource Protection
Action 21. Community Fuel Break Network	Previous Action	X	X		Prevention Property Protection Natural Resource Protection
Action 22. Defensible Space Assistance	New Action	X	X		Prevention Property Protection Natural Resource Protection
Action 23. Defensible Space Public Education	New Action	X	X		Public Education
Action 24. Develop Amador County CWPP and Implementation of Identified Projects	Previous Action	X	X		Prevention Property Protection Public Education Natural Resource Protection
Action 25. Vegetation Management projects – Monitoring and Maintenance	Previous Action	X	X		Property Protection Natural Resource Protection
City of Amador City					
Action 1. Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	Previous Action	X	X		Prevention
Action 2. Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness	Previous Action	X	X	X	Prevention Public Education
Action 3. Old Hwy 49/Main Street Slope and Road Stabilization	Previous Action	X	X	X	Property Protection Natural Resource Protection
Action 4. Cooling Center/Severe Weather Center	New Action	X	X		Structural

Action Title	New Action/ Previous Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Action 5. Amador Creek Annual Cleaning projects	New Action	X	X	X	Property Protection Natural Resource Protection
Action 6. Stormwater Masterplan Development and Implementation	Previous Action	X	X	X	Property Protection Natural Resource Protection
Action 7. Vegetation Management and Perimeter Wildfire Protection Fuel Break	Previous Action	X	X		Property Protection Natural Resource Protection
City of Ione					
Action 1. Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	Previous Action	X	X		Prevention
Action 2. Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness	Previous Action	X	X	X	Prevention Public Education
Action 3. Develop a Climate Adaptation Plan	New Action	X	X	X	Prevention Public Education
Action 4. Implement Water Conservation and Drought Preparedness Program	New Action	X	X		Prevention Property Protection Natural Resource Protection
Action 5. Update Floodplain Ordinance and Join Community Rating System (CRS)	Previous Action	X	X	X	Prevention Property Protection Natural Resource Protection
Action 6. Develop a Storm Water Master Plan	Previous Action	X	X	X	Prevention Public Education
Action 7. Establish a Cooling Center Network and Shelter Upgrades	Previous Action	X	X		Emergency Services Prevention Property Protection Natural Resource Protection
Action 8. Implement Urban Forestry and Debris Management Program	New Action	X	X		Prevention Property Protection Natural Resource Protection
Action 9. Enhance Wildfire Preparedness and Defensible Space	New Action	X	X		Prevention Property Protection Natural Resource Protection
Action 10. Develop a Sustainable Sutter Creek Maintenance Program	New Action	X	X		Prevention Property Protection Natural Resource Protection

Action Title	New Action/ Previous Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
City of Jackson					
Action 1. Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	Previous Action	X	X		Prevention
Action 2. Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness	Previous Action	X	X	X	Prevention Public Education
Action 3. Creation of Drone Program	New Action	X	X		Property Protection Natural Resource Protection
Action 4. Backup Power Projects for Critical Facilities and Infrastructure (e.g. Generators, Batteries, Solar, Etc.)	New Action	X	X		Property Protection Structural
Action 5. Creek Excavation and Annual Clearing Projects	Previous Action	X	X	X	Property Protection Natural Resource Protection
Action 6. Pitt Street Bridge Replacement	New Action	X	X	X	Structural
Action 7. Mattley Street Erosion Project	New Action	X	X	X	Prevention Property Protection Natural Resource Protection
Action 8. Home Hardening Education Program/Go Bags, ARC	New Action	X	X		Prevention Property Protection Natural Resource Protection
Action 9. Defensible Space Public Education	Previous Action	X	X		Public Education
Action 10. Fuel Break Projects	New Action	X	X		Prevention Property Protection Natural Resource Protection
Action 11. Jackson Fire Station 131 Replacement Project	New Action	X	X		Structural
City of Plymouth					
Action 1. Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	Previous Action	X	X		Prevention
Action 2. Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness	Previous Action	X	X	X	Prevention Public Education
Action 3. Develop a Community Wildfire Prevention Plan	New Action	X	X		Prevention Public Education

Action Title	New Action/ Previous Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Action 4. Repairs of Old Sacramento Road to Reduce Flooding and Road Blockage	New Action	X	X	X	Prevention Property Protection Natural Resource Protection
Action 5. Additional Water Tank Storage	Previous Action	X	X		Structural
City of Sutter Creek					
Action 1. Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	Previous Action	X	X		Prevention
Action 2. Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness	Previous Action	X	X	X	Prevention Public Education
Action 3. Auditorium, Community Center, and WWTP Backup Power Generators	New Action	X	X	X	Structural
Action 4. Development of Walking Paths, Native Tree Protection, and Native Tree Species Planting	Previous Action	X	X		Prevention Property Protection Natural Resource Protection
Action 5. Henderson Underdrain	New Action	X	X	X	Structural
Action 6. Recycled Water System for New Development	New Action	X	X		Structural
Action 7. Early EQ Warning Program	New Action	X	X		Prevention Property Protection Natural Resource Protection
Action 8. Sutter Creek Excavation/Annual Cleaning Projects	Previous Action	X	X	X	Prevention Property Protection Natural Resource Protection
Action 9. Stormwater Masterplan Development and Implementation	Previous Action	X	X	X	Prevention Property Protection Natural Resource Protection
Action 10. Culvert Cleaning Projects	Previous Action	X	X	X	Prevention Property Protection Natural Resource Protection
Action 11. Karsan Drive Tributary Slope and Road Stabilization	New Action	X	X		Structural Property Protection Natural Resource Protection

Action Title	New Action/ Previous Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Action 12. Cooling Center/Severe Weather Center	New Action	X	X		Prevention Property Protection Natural Resource Protection
Action 13. Vegetation Management Enforcement and Perimeter Wildfire Protection Fuel break	Previous Action	X	X		Prevention Property Protection Natural Resource Protection
Amador Water Agency					
Action 1. AWA Tank Flexibility Connectors	New Action	X	X		Structural
Action 2. Camanche WWTP Treatment, Disposal, and Effluent Storage Upgrades	New Action	X	X		Structural Property Protection Natural Resource Protection
Action 3. CAWP Transmission Main Improvements and Tank D Replacement	New Action	X	X		Structural Property Protection Natural Resource Protection
Action 4. CAWP Tiger Creek Afterbay Alternate Supply	New Action	X	X		Structural Property Protection Natural Resource Protection
Action 5. Ione WTP Backwash Handling Improvements	New Action	X	X		Structural Property Protection Natural Resource Protection
Action 6. Tanner Clearwell Replacement	New Action	X	X		Structural Property Protection Natural Resource Protection
Action 7. Tanner WTP Backwash Drying Beds	New Action	X	X		Structural Property Protection Natural Resource Protection
Action 8. Tank Replacement/ Tank Repair	New Action	X	X		Structural Property Protection Natural Resource Protection
Action 9. Amador and Ione Water Systems Taste and Odor Mitigation	Previous Action	X	X		Structural Property Protection Natural Resource Protection
Action 10. Replacement of Two Hypalon Lined and Covered Tanks with New Tanks	Previous Action	X	X		Structural Property Protection Natural Resource Protection

Action Title	New Action/ Previous Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Action 11. Mt. Crossman Main Area Tank for Upper CAWP System	Previous Action	X	X		Structural Property Protection Natural Resource Protection
Action 12. Martell Regional Lift Station and Collection System Improvements	New Action	X	X		Structural Property Protection Natural Resource Protection
Action 13. Mace Meadows Pump Station Flooding	New Action	X	X	X	Structural Property Protection Natural Resource Protection
Action 14. Water Treatment Plant Raw Water Bypasses	New Action	X	X		Structural Property Protection Natural Resource Protection
Action 15. Upgrade Fire Pumps	New Action	X	X		Structural Property Protection Natural Resource Protection
Action 16. Tanner WTP Flow Control and Reliability Improvements	New Action	X	X		Structural Property Protection Natural Resource Protection
Action 17. Ione Reliability Capacity Expansion and Site Security	New Action	X	X		Structural Property Protection Natural Resource Protection
Jackson Valley Irrigation District					
Action 1. Aquatic Invasive Species Monitoring Plan and Decontamination Station	Previous Action	X	X		Natural Resource Protection
Action 2. Long Term Water Solutions Analysis Due to Climate Change	Previous Action	X	X		Property Protection Natural Resource Protection
Action 3. Jackson Creek Dam Spillway Apron Extension Project	Previous Action	X	X	X	Structural Property Protection Natural Resource Protection
Action 4. Lake Amador Spillway Rubber Dam Project	Previous Action	X	X	X	Structural Property Protection Natural Resource Protection
Action 5. JVID Water Procurement and Additional Water Storage Study	Previous Action	X	X		Property Protection Natural Resource Protection

Action Title	New Action/ Previous Action	Address Current Development	Address Future Development	Continued NFIP Compliance	Mitigation Type
Action 6. Jackson Creek Streambank and Levee Maintenance Project	Previous Action	X	X	X	Structural Property Protection Natural Resource Protection
Action 7. Lake Amador Drive Box Culvert Expansion Project	Previous Action	X	X	X	Structural Property Protection Natural Resource Protection

Amador County Mitigation Actions

Multi-Hazard Actions

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

Hazards Addressed: Multi-hazard (Agricultural Hazards (severe weather/pests/invasive species), Avalanche, Climate Change, Dam Failure, Drought & Water shortage (w/ tree mortality), Earthquake (w/subhazards), Floods: 1%/0.2% annual chance (w/ levee failure), Floods: Localized Stormwater, Landslide, Mudslide, Debris Flow, Severe Weather: Extreme Cold, Freeze, and Snow, Severe Weather: Extreme Heat, Severe Weather: Heavy Rains and Storms (Hail, Lightning), Severe Weather: High Winds and Tornadoes, Wildfire (w/smoke and air quality))

Goals Addressed: 1, 2, 3, 4, 5, 6

Issue/Background (Problem Statement): Local jurisdictional reimbursement for mitigation projects and cost recovery after a disaster is guided by Government Code Section 8685.9 (Assembly Bill (AB) 2140).

Project Description: Specifically, this section requires that each applicable 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 of the LHMP into the Safety Element of the General Plan may be by reference or incorporation.

Other Alternatives: No action

Existing Planning Mechanisms through which Action will be Implemented: Safety Element of General Plan

Responsible Office/Partners: Amador County Planning Department

Benefits (Losses Avoided): Incorporation of an adopted LHMP into the Safety Element of the General Plan will help jurisdictions maximize the cost recovery potential following a disaster.

Potential Funding (Local Budgets, Grant Funds, etc.): Local budgets: General Fund, Staff Time

Timeline: Within year 1 as part of LHMP adoption

Priority (H, M, L): High

Action 2. Comprehensive Public Education and Outreach Enhancement for All-Hazards Preparedness

Hazards Addressed: Multi-hazard (Agricultural Hazards (severe weather/pests/invasive species), Avalanche, Climate Change, Dam Failure, Drought & Water shortage (w/ tree mortality), Earthquake (w/subhazards), Floods: 1%/0.2% annual chance (w/ levee failure), Floods: Localized Stormwater, Landslide, Mudslide, Debris Flow, Severe Weather: Extreme Cold, Freeze, and Snow, Severe Weather:

Extreme Heat, Severe Weather: Heavy Rains and Storms (Hail, Lightning), Severe Weather: High Winds and Tornadoes, Wildfire (w/smoke and air quality))

Goals Addressed: 1, 2, 3, 4, 5, 6

Issue/Background (Problem Statement): Amador County residents and visitors face a wide range of natural and human-caused hazards. The 2020 Amador County LHMP identified a need for improved public understanding of risk and individual preparedness, especially in rural or high-risk areas. Public education efforts have been limited by staff capacity, funding, and coordination among local partners. Many residents lack basic preparedness items (e.g., Go Bags), do not understand evacuation protocols, or are unaware of available resources like ARC shelters or emergency alerts. Enhanced, accessible, and ongoing outreach is necessary to ensure the public is informed and empowered before, during, and after emergencies.

Project Description: Develop and implement a comprehensive, year-round public education and outreach program focused on multi-hazard preparedness across all communities within Amador County. This program will include:

- Regular in-person and virtual workshops on Go Bag preparation, family communication plans, evacuation planning, and shelter-in-place procedures.
- Partnership with schools, community groups, and businesses to distribute preparedness information.
- Quarterly public safety campaigns via social media, local radio, and print media.
- Bilingual outreach materials (English & Spanish) tailored to vulnerable populations.
- Distribution of American Red Cross materials and integration of ARC support services in outreach events.
- Creation and promotion of an "Amador Ready" webpage and/or integration with existing Amador County Sheriff's Office mobile application with hazard information, evacuation maps, emergency kit checklists, and alert registration links.
- Community drills and outreach booths at local events.

Other Alternatives:

- Status Quo: Continue limited outreach through existing channels (e.g., occasional Facebook posts)
- Digital-Only Strategy: Focus solely on online outreach and alert system, omitting in-person events and direct engagement.
- Emergency-Only Messaging: Limit outreach to periods immediately before/during active disasters.

These alternatives lack the consistency, equity, and multi-platform engagement needed to reach the entire population effectively.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Existing Public Outreach Programs, County website,

Responsible Office/Partners: Amador County Sheriff's Office of Emergency Services, American Red Cross, Amador County Public Health

Benefits (Losses Avoided):

- Increased personal and household preparedness reduces reliance on emergency services during disasters.
- Faster and more orderly evacuations.
- Greater community resilience and recovery capacity.
- Reduced injury and loss of life during emergencies.
- Reduced costs associated with unprepared populations during disaster response.
- Improved public trust and cooperation with emergency officials.

Potential Funding (Local Budgets, Grant Funds, etc.):

- FEMA Hazard Mitigation Grant Program (HMGP)
- Building Resilient Infrastructure and Communities Grant (BRIC)
- Emergency Management Performance Grant (EMPG)
- Public Health Emergency Preparedness Funds
- PG&E
- Cal-OES Grants
- County General Fund

Timeline:

- 0-2 years
  - ✓ Establish stakeholder working group
  - ✓ Develop education materials and outreach schedule
  - ✓ Launch first outreach campaign and public workshops
  - ✓ Coordinate w/ARC

- 3-5 years
  - ✓ Expand program to underserved and high-risk communities
  - ✓ Evaluate effectiveness via public surveys
  - ✓ Update materials and incorporate new hazards or best practices
  - ✓ Launch website and incorporate resources into existing mobile application

Project Priority (High, Medium, Low): High

Action 3. Backup Power Projects for Critical Facilities & Infrastructure

Hazards Addressed: Multi-hazard (Agricultural Hazards (severe weather/pests/invasive species), Avalanche, Climate Change, Dam Failure, Drought & Water shortage (w/ tree mortality), Earthquake (w/subhazards), Floods: 1%/0.2% annual chance (w/ levee failure), Floods: Localized Stormwater, Landslide, Mudslide, Debris Flow, Severe Weather: Extreme Cold, Freeze, and Snow, Severe Weather: Extreme Heat, Severe Weather: Heavy Rains and Storms (Hail, Lightning), Severe Weather: High Winds and Tornadoes, Wildfire (w/smoke and air quality))

Goals Addressed: 1, 2, 3, 4, 5, 6

Issue/Background (Problem Statement): Amador County is frequently impacted by power outages caused by Public Safety Power Shutoffs (PSPS), wildfire threats, and other extreme weather events. The 2020 LHMP identified that many of the County's critical facilities, including Emergency Operations

Centers (EOCs), fire stations, law enforcement offices, water/sewer systems, shelters, and communication towers, lack reliable, long-term backup power systems.

Although some progress has been made in this area, the lack of redundancy at many facilities poses a serious threat to emergency response, medical care, public safety, and essential infrastructure continuity during disasters. Some facilities rely on outdated or undersized generators, while others have no backup system at all. Investing in diversified back power solutions such as generators, battery storage, and solar power with storage will significantly increase the County's resilience.

Project Description: This mitigation project will include:

- Conducting a countywide assessment of existing backup power capabilities and gaps at critical facilities and infrastructure nodes (e.g., EOCs, fire stations, law enforcement offices, water/wastewater treatment plants, shelters, communication towers.)
- Prioritizing Upgrades based on vulnerability, service population, and hazard exposure.
- Procuring and installing diesel, propane, or natural gas generators where appropriate.
- Implementing solar-plus-storage microgrids for high-use public buildings or community shelters to reduce reliance on fuel.
- Ensuring all backup systems are maintained and regularly tested, and that staff are trained in proper use.

Other Alternatives:

- Do Nothing: Continue relying on aging or absent backup system, risking loss of function during outages
- Mobile Generators Only: Deploy trailer-mounted generators when outages occur. However, this option is limited by fuel supply, logistics, and deployment delays.
- Only Solar Installations: Focus solely on solar energy without storage. This does not address nighttime outages or cloudy-day failures.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Emergency Plans

Responsible Office/Partners: Amador County Sheriff's Office of Emergency Services, Amador County General Services Administration, Amador County Public Works, PG&E, Local law enforcement agencies and fire stations, and Special Districts

Benefits (Losses Avoided):

- Continuity of essential government functions during disasters
- Maintenance of communications and coordination in emergency response
- Protection of vulnerable populations who depend on shelter and medical facilities
- Avoidance of water/wastewater system failure and association environmental & public health risks
- Reduced economic and service disruption during PSPS or natural hazard events
- Increased confidence in local government preparedness

Potential Funding (Local Budgets, Grant Funds, etc.):

- FEMA Hazard Mitigation Grant Program (HMGP)
- FEMA Building Resilient Infrastructure & Communities Program (BRIC)

- Cal-OES Grants
- California Energy Commission Resilient Communities program
- PG&E Grant Program

Timeline:

- Short Term:
  - ✓ Facility power needs assessment
  - ✓ Project scoping and grant application
  - ✓ Procurement for priority sites

- Medium Term:
  - ✓ Full deployment at prioritized sites
  - ✓ Development of testing/maintenance schedule
  - ✓ Training

- Long Term:
  - ✓ Expansion to secondary facilities
  - ✓ Solar microgrid installation at designated resilience hubs or shelters
  - ✓ Ongoing system maintenance and lifecycle replacement

Project Priority (High, Medium, Low): High

Action 4. Establish and Fund a Full-Time Geographic Information Systems (GIS) position for Hazard Mitigation and Emergency Planning

Hazards Addressed: Multi-Hazard

Goals Addressed: 1, 2, 3, 4, 5, 6

Issue/Background (Problem Statement): The 2020 Amador County LHMP highlights the need for improved hazard mapping, risk analysis, evacuation route modeling, and real-time data sharing to support emergency response and mitigation. Geographic Information Systems (GIS) are essential tools in identifying hazard exposure, modeling impact areas, planning evacuations, coordinating resources, and informing the public.

Currently, Amador County lacks a dedicated, full-time GIS professional to support countywide hazard mitigation and emergency management functions. A permanent GIS position would greatly enhance the County's ability to plan for, respond to, and recover from disasters.

Project Description: Hire and fund a full-time County GIS Specialist under the Department of Information Technology or the Planning Department, responsible for the following activities:

- Maintain and update hazard layers (e.g., wildfire zones, floodplains, evacuation zones, infrastructure maps)
- Support hazard mitigation planning with risk assessments and vulnerability analysis
- Develop GIS tools and dashboards for decision-makers and first responders

- Assist in creating and maintaining evacuation maps, emergency shelter data, and situational awareness platforms
- Generate public-facing tools and maps for community preparedness
- Integrate GIS into Continuity of Operations Plans (COOP), Emergency Operations Plans (EOP), and LHMP updates
- Partner with state agencies (e.g., Cal OES, CalFire) and local jurisdictions for GIS data exchange and coordination

Other Alternatives:

- Status Quo: Continue without a GIS Specialist
- Contract GIS: Outsourcing may work temporarily but lacks the institutional knowledge, continuity, and cost-effectiveness of a full-time role.
- Regional Shared GIS Resource: Explore partnership with nearby counties. While potentially cost-saving, this limits the responsiveness needed for Amador-specific needs.

Existing Planning Mechanism(s) through which Action Will Be Implemented: County budgets and staffing plans

Responsible Office/Partners: Amador County Planning Department, Amador County Information Technology Department

Benefits (Losses Avoided):

- Improved identification of hazard-prone areas and vulnerable populations
- Faster, data-driven emergency response and evacuation coordination
- Enhanced public information during disasters (e.g., interactive evacuation maps)
- More competitive grant applications with data-backed risk assessments
- Improved planning for infrastructure investments and resource deployment
- Increased operational efficiency and interagency coordination
- Better compliance with FEMA and Cal OES hazard mitigation and emergency management standards

Potential Funding (Local Budgets, Grant Funds, etc.): FEMA Hazard Mitigation Grant Program (HMPG), Building Resilient Infrastructure & Communities Grant (BRIC), State Homeland Security Program (SHSP), County General Fund

Timeline:

- Short Term: (0-1 year)
  - ✓ Identify funding source(s)
  - ✓ Update job description and classification
  - ✓ Hire GIS Specialist

- Medium Term: (1-3 years)
  - ✓ Develop and integrate GIS systems across departments
  - ✓ Complete first phase of hazard mapping and public dashboards

- Long Term: (Ongoing)
  - ✓ Maintain, update, and expand GIS capabilities

- ✓ Integrate GIS into all County hazard and resilience planning

Project Priority (High, Medium, Low): High

Action 5. Enhance and Harden Cellular and Repeater Communications Infrastructure Countywide

Hazards Addressed: Multi-Hazard

Goals Addressed: 1, 2, 3, 4, 5, 6

Issue/Background (Problem Statement): Amador County's mountainous terrain, rural population, and dependence on above-ground infrastructure make it particularly vulnerable to communications failures during disasters. The 2020 Amador County LHMP identifies communication outages as a recurring vulnerability, especially during PSPS events and wildfires when towers often lose power or become damaged. Several areas of the county also suffer from limited or no cellular coverage under normal conditions, complicating emergency response and public alerting.

Inadequate cell service undermines public warning systems (e.g., Wireless Emergency Alerts), responder coordination, and public ability to call for help. A hardened, redundant cellular and repeater infrastructure is essential for life safety and effective disaster response.

Project Description:

- Cell Coverage Assessment & Planning:
  - ✓ Conduct a countywide assessment of cell coverage gaps and tower vulnerabilities.
  - ✓ Identify critical areas lacking service (e.g., evacuation routes, shelters, fire-prone zones).
- Infrastructure Enhancements:
  - ✓ Construct new permanent cell towers and repeaters in underserved and high-risk zones.
  - ✓ Install backup generators, solar panels, and/or battery storage at existing tower sites.
  - ✓ Partner with cellular providers to harden critical sites against wildfire and power loss.
- Deployable Assets:
  - ✓ Acquire or pre-position mobile cellular repeaters (e.g., COWs – Cells on Wheels) for rapid deployment during outages.
  - ✓ Integrate mobile units into emergency operations planning and exercises.
- Public-Private Coordination:
  - ✓ Work with Verizon, AT&T, FirstNet, and other carriers to upgrade existing assets, share infrastructure data, and co-fund new installations.
  - ✓ Ensure interoperability with county radio and dispatch systems.

Other Alternatives:

- Status Quo: Rely on existing cellular networks and hope for carrier-driven upgrades. This leaves many areas exposed to prolonged outages and slow recovery
- Satellite Phones Only: Provide satellite phones to key personnel. Helpful for redundancy, but impractical for widespread public communication and limited bandwidth.

- Fixed Wireless Mesh Network: Establish a proprietary emergency communication network. Expensive and redundant where cell improvements are more scalable.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Emergency plans: EOP and Annexes

Responsible Office/Partners: Amador County Sheriff's Office of Emergency Services, Local Fire Departments, Local Police Departments, American Legion Ambulance, and/or Cell Providers

Benefits (Losses Avoided):

- Improved public access to emergency alerts and warnings
- Greater responder coordination and situational awareness
- Reduced response times and faster resource deployment
- Increased survivability of communication infrastructure during PSPS and natural disasters
- Continuity of public safety services in remote and rural areas
- Reduced loss of life and property due to faster emergency response
- Greater equity in access to emergency services across all parts of the county

Potential Funding (Local Budgets, Grant Funds, etc.): FEMA Hazard Mitigation Grant Program (HMGP), FEMA Building Resilient Infrastructure and Communities (BRIC), California Public Utilities Commission (CPUC) PSPS Mitigation Funds, California Office of Emergency Services (Cal OES) Infrastructure Grants, or State Homeland Security Program (SHSP)

Timeline:

- Short-Term (0–1 year):
  - ✓ Conduct coverage assessment and planning
  - ✓ Identify funding sources and partnerships
  - ✓ Procure mobile repeaters for initial deployment

- Medium-Term (1–3 years):
  - ✓ Construct new towers/repeaters in prioritized zones
  - ✓ Install backup power and hardening features
  - ✓ Conduct community outreach and integration with EOP

- Long-Term (3–5+ years):
  - ✓ Maintain and upgrade infrastructure as technology evolves
  - ✓ Expand coverage to remaining underserved areas
  - ✓ Conduct periodic testing and disaster communication exercises

Action 6. Upgrade and Replace Countywide Emergency Radio Communications Infrastructure

Hazards Addressed: Multi-Hazard

Goals Addressed: 1, 2, 3, 4, 5, 6

Issue/Background (Problem Statement): Reliable emergency communications are critical for coordinated response and life safety during disasters. The 2020 Amador County LHMP identifies aging and fragmented radio infrastructure as a major vulnerability for first responders, particularly law enforcement, fire, EMS, and emergency management personnel. Key issues include:

- Inadequate coverage in mountainous and rural areas
- Limited interoperability between jurisdictions
- Increasing equipment failure due to age and deferred maintenance
- Power and connectivity vulnerabilities at key repeater sites.

Without a modern and resilient communications network, Amador County's response capacity is significantly reduced in fast-moving or multi-agency events.

Project Description: Modernize and expand the County's emergency communications network through phased replacement of radios, repeaters, towers, and supporting infrastructure. The project will include:

- Assessment and mapping of current coverage gaps and equipment condition
- Replacement of aging repeaters, antennas, and associated hardware
- Transition to P25 Phase II digital trunked radio systems (where appropriate)
- Installation of redundant power (generators, batteries, solar) at repeater sites
- Development of radio interoperability plans with CalFire, CHP, neighboring counties, and local fire/law enforcement agencies
- Standardization and bulk procurement of portable and mobile radios for field staff
- Integration with GIS and dispatch systems for improved situational awareness
- Installation of equipment in priority locations.

Other Alternatives:

- Status Quo: Continue using legacy systems until failure. This increases the risk of communications breakdown during emergencies.
- Partial Upgrade: Replace only mobile or portable radios. This improves user equipment but does not guarantee improved coverage, repeaters, or interoperability gaps.
- Leased Network Services: Contract with private carriers of regional networks. While supplemental, this does not provide the resilience of a dedicated county system.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Amador County Emergency Operations Plan

Responsible Office/Partners: Amador County Sheriff's Office, Local Fire Departments, Local Police Departments, American Legion Ambulance, Amador County Public Works

Benefits (Losses Avoided):

- Reliable, 24/7 emergency communications in all hazard scenarios
- Faster response and coordination in mutual aid/multi-agency incidents
- Enhanced responder safety and situational awareness
- Reduced delays and errors in dispatch and field operations
- Increased coverage in rural and high-risk areas
- Avoidance of system failure during PSPS and natural disasters

Potential Funding (Local Budgets, Grant Funds, etc.): FEMA Hazard Mitigation Grant Program (HMGP), FEMA Homeland Security Grant Program (HSGP), Cal-OES Grants, Partner Agencies, County General Fund

Timeline:

- Short Term: (0-1 year)
  - ✓ Conduct full system audit
  - ✓ Identify funding sources and develop engineering specifications
  - ✓ Apply for grants and secure budget

- Medium Term: (1-3 years)
  - ✓ Begin phased installation of new infrastructure
  - ✓ Deploy upgraded radios to field personnel
  - ✓ Train users on systems and interoperability protocols

- Long Term: (3-5 years)
  - ✓ Full system modernization
  - ✓ Integrate with GIS, Dispatch, and Mutual Aid systems
  - ✓ Maintain and test backup power and resilience measures

Project Priority (High, Medium, Low): High

Action 7. Emergency Water Storage & Hauling Infrastructure Project

Hazards Addressed: Multi-Hazard

Goals Addressed: 1, 2, 3, 4, 5, 6

Issue/Background (Problem Statement): Amador County relies on a limited number of surface water and groundwater sources to supply drinking water, agriculture, fire suppression, and emergency shelter needs. The 2020 LHMP recognizes drought, wildfire, and infrastructure failure as major threats to water supply, particularly for vulnerable rural communities, critical facilities, and fire protection services.

Many small water systems and private wells are vulnerable to prolonged outages during emergencies. In particular, wildfires and PSPS events can disrupt pumping stations and storage tank operations. There is also a growing need for mobile water hauling and emergency storage systems for use during system outages, contamination incidents, or when traditional delivery methods fail.

A coordinated emergency water storage and hauling system will enhance community resilience, reduce reliance on bottled water during crises, and support firefighting operations during peak wildfire seasons.

Project Description: This project involves the development and deployment of a countywide emergency water storage and hauling capability, in partnership with the State of California. Key components include:

- Fixed Emergency Storage Tanks
  - ✓ Install large-capacity water storage tanks in strategic locations (fire stations, public works yards, rural community centers, schools, shelters, etc.,)

- Water Hauling Equipment
  - ✓ Procure water tenders and tanker trailers capable of delivering water to remote or disconnected areas.
- Water Fill Stations
  - ✓ Develop or expand public and emergency-use water fill stations accessible to mutual aid partners and residents.
  - ✓ Ensure capability for gravity or pump-powered access during power failures.
- Mobile Treatment Units
  - ✓ Explore inclusion of mobile water purification of chlorination systems to treat hauled water as needed.
- Integration with State Emergency Water Program
  - ✓ Coordinate with State resources and planning efforts for pre-positioning assets and technical support.

Other Alternatives:

- Status Quo: Continue relying on ad hoc bottle water distribution or private contracts during emergencies. This is inefficient, slow, and costly during large-scale disasters.
- Facility-by-Facility Resilience: Have each critical facility develop its own water backup. This leads to inconsistent standards and lacks centralized coordination.
- Reservoir Expansion Only: Long-term solution but does not address short-term water transport and emergency needs.

Existing Planning Mechanism(s) through which Action Will Be Implemented: SB552 Drought plan and other Drought and water supply plans; Emergency Operations Plans

Responsible Office/Partners: Amador County Sheriff's Office of Emergency Services, Amador Water Agency, Amador County Environmental Health, Amador County Public Works, Local Fire Departments & Schools, California Department of Water Resources, and Amador County and California Department of Public Health

Benefits (Losses Avoided):

- Rapid deployment of water for fire suppression and public health emergencies.
- Reduced public exposure to contaminated or unavailable water supplies
- Continuity of operations at emergency shelters and critical facilities
- Lower costs and delays from emergency bottle water procurement
- Increased capacity to serve remote and underserved populations.
- Support for agricultural continuity during prolonged droughts or outages
- Enhanced interagency coordination and mutual aid readiness

Potential Funding (Local Budgets, Grant Funds, etc.): FEMA Hazard Mitigation Grant Program (HMPG), FEMA Building Resilient Infrastructure & Communities (BRIC), California Department of Water Resources Grants, California Climate Resilience Program, State Water Resources Control Board Emergency Drinking Water Funds, USDA Rural Development Programs

Timeline:

- Short Term: (0-1 year)
  - ✓ Conduct needs assessment and stakeholder engagement
  - ✓ Identify priority sites for tanks and hauling support
  - ✓ Secure design specs, environmental compliance, and funding applications.

- Medium Term: (1-3 years)
  - ✓ Procure and install emergency storage systems
  - ✓ Purchase and train staff on hauling equipment
  - ✓ Establish fill stations and storage rotation schedules

- Long Term: (3-5 years)
  - ✓ Integrate water logistics into emergency exercises
  - ✓ Maintain, inspect, and rotate emergency water stocks
  - ✓ Expand program to new sites and incorporate mobile treatment

Project Priority (High, Medium, Low): High

Action 8. Launch of PHapp Mobile Preparedness Public Health Application

Hazards Addressed: Public Health Emergencies, Disease Outbreaks, Extreme Weather Events, Wildfire Smoke/Power Outages, Hazardous Material Events

Goals Addressed: 1, 2, 3, 4, 5, 6

Issue/Background (Problem Statement): Amador County is a rural jurisdiction with geographically dispersed and vulnerable populations, including seniors, individuals with limited mobility, and those with limited access to technology or communication systems. Ensuring timely, trusted communication during a public health emergency has historically been a challenge, particularly in areas with limited infrastructure or unreliable cell service.

Project Description: Amador County Public Health has partnered with Wehealth and its Public Health Preparedness Platform, PHapp. This app was created to provide a free, county-specific mobile application that delivers real-time public health alerts and information to residents. The app enables Public Health to send notifications during emergencies, disease outbreaks, extreme weather events, or other threats. Key features include local event alerts, customizable notification settings, and an easy-to-use design that increases community access to credible information and supports emergency preparedness.

Other Alternatives:

- Use of social media or county website only (less direct and time-sensitive)
- Reverse 911 system (limited flexibility and scope)
- Printed materials (not viable for real-time alerts)

Existing Planning Mechanism(s) through which Action Will Be Implemented:

- Public Health Emergency Preparedness Plans
- Mass Communication Plan

- Local Hazard Mitigation Plan

Responsible Office/Partners: Amador County Public Health Emergency Preparedness Program, Amador County Public Health Communications Team, PHapp (Wehealth), National Weather Service-Sacramento station-NWS, Amador Air District-AAD, Food and Drug Administration-FDA, Center for Disease Control-CDC

Benefits (Losses Avoided):

- Faster, more equitable communication with all community members
- Increased emergency readiness across vulnerable populations
- Reduced misinformation and confusion during crises
- Improved coordination with response partners

Potential Funding (Local Budgets, Grant Funds, etc.):

- HPP/PHEP Grants-(Though these programs and their budgets have been reduced again for the FY 25-26, so we're unsure of future sustainability)
- In-kind support through PHapp partnership
- Other potential funding opportunities?

Timeline: Initial App Launch: Late Spring, 2025; Ongoing Engagement and Integration: FY 2025-2027

Project Priority (High, Medium, Low): Medium

Agricultural Hazard Actions

Action 9. Invasive Pests (Insect)

Hazards Addressed: Invasive Pests (Insect)

Goals Addressed: 1, 2, 3, 4, 6

Issue/Background (Problem Statement): Invasive insects can decimate local agricultural crops such as grapes, walnuts, and timber. They also are known to vector disease and pathogens such as Pierces' disease.

Project Description: Monitoring invasive insects through urban and crop specific insect traps to located and delimitate the introduction and spread of these insects.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: California Department of Food & Agriculture (CDFA) annual Pest Detection agreements with Amador County to deploy and service traps each season. Treatments to control infestations may be possible if found.

Responsible Office/Partners: Amador County Department of Agriculture / California Department of Food & Agriculture (CDFA)

Benefits (Losses Avoided): If insects that make there way into Amador County are trapped/found and eliminated before they establish an infestations in the commercial agricultural areas. This will reduce the possible losses to production Agriculture in Amador County.

Potential Funding (Local Budgets, Grant Funds, etc.): State funding through CDFA and Amador County general fund support through the Amador County Department of Agriculture

Timeline: Seasonal and ongoing for the 5 years covered by this LHMP

Project Priority (High, Medium, Low): Medium

Action 10. Invasive Pests (Weeds)

Hazards Addressed: Invasive Pests (Weeds)

Goals Addressed: 1, 2, 3, 4, 6

Issue/Background (Problem Statement): Invasive insects can decimate local agricultural crops such as grapes, walnuts, and timber. They also are known to vector disease and pathogens such as Pierces' disease.

Project Description: Monitoring invasive insects through urban and crop specific insect traps to located and delimitate the introduction and spread of these insects.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: California Department of Food & Agriculture (CDFA) annual Pest Detection agreements with Amador County to deploy and service traps each season. Treatments to control infestations may be possible if found.

Responsible Office/Partners: Amador County Department of Agriculture / California Department of Food & Agriculture (CDFA)

Benefits (Losses Avoided): If insects that make there way into Amador County are trapped/found and eliminated before they establish an infestations in the commercial agricultural areas. This will reduce the possible losses to production Agriculture in Amador County.

Potential Funding (Local Budgets, Grant Funds, etc.): State funding through CDFA and Amador County general fund support through the Amador County Department of Agriculture

Timeline: Seasonal and ongoing for the 5 years covered by this LHMP

Project Priority (High, Medium, Low): Medium

Climate Change Actions

Action 11. Climate Resilience through Multi-Hazard Mitigation

Hazards Addressed: Climate Change, Wildfire and wildfire smoke, Extreme heat/heat waves, Drought & Water Scarcity, Flooding associated w/intense storms

Goals Addressed: 1, 2, 3, 4, 5, 6

Issue/Background (Problem Statement): Climate projections indicate increasing frequency and severity of heat waves, drought, wildfire, and associated air quality issues within Amador County. Such shifts exacerbate threats to public health—especially for vulnerable groups including older adults, children, and people with chronic conditions—as noted in the County's health profile report CDPH. Infrastructure, agriculture, and water systems face growing strain under these conditions. Without proactive mitigation and adaptation strategies, cumulative impacts will degrade community resilience and critical services.

Project Description:

- Wildland Fuel Reduction + Community Defensible Space Program
  - ✓ Fire Districts + Public Works + Planning + ARCD + OES
  - ✓ Expand fuel-break maintenance, educational outreach for property owners, seek grants for defensible space & home hardening.
- Heat-Wave Response Infrastructure
  - ✓ Public Health + OES + Environmental Health
  - ✓ Grow Cooling Center location options (libraries, community centers, etc.)
  - ✓ Establish Community Outreach registration programs for vulnerable individuals.
- Drought Resilience
  - ✓ Amador Water Agency + Ag Dept + Planning + OES
  - ✓ Promote water conversation, incentives for drought-resistant landscaping, monitoring for groundwater and surface water readiness.
- Flood Mitigation Enhancements
  - ✓ Public Works + Planning + OES
  - ✓ Update mapping for extreme storm/flood zones, implement natural stormwater retention projects, improve infrastructure drainage in high-risk areas

Other Alternatives:

- Status Quo: Continue current hazard programs without targeted climate focus.
  - ✓ Pros: minimal new resource needs.
  - ✓ Cons: Vulnerabilities deepen as climate intensifies; uncoordinated responses.
- Narrow Hazard-Specific Approach: Tackle each hazard separately (e.g. wildfire fuels reduction, heat shelters, flood control).
  - ✓ Pros: focused interventions.
  - ✓ Cons: Misses synergies; resource duplication; limited cross hazard preparedness.
- Integrated Climate-Hazard Action Plan (Preferred): A coordinated package of mitigation, adaptation, public health, and infrastructure actions that addresses multiple climate enhanced hazards and target vulnerable populations for greatest benefit.

Existing Planning Mechanism(s) through which Action Will Be Implemented: General Plan Elements, Related hazard plans: Drought, Flood, Extreme Weather, Wildfire, others

Responsible Office/Partners: Fire Districts, Public Works, Planning, ARCD, Environmental Health, Ag Dept, OES

Benefits (Losses Avoided): Reduced property damage, Lower firefighting costs, improved public health, fewer heat-related deaths/hospitalizations, protection for vulnerable groups, sustained water supply, protection of agricultural.

Potential Funding (Local Budgets, Grant Funds, etc.): HMGP, BRIC, FMA, Cal-Fire

Timeline: Within 5 years

Project Priority (High, Medium, Low): Medium

Dam Failure, Flood, Localized Flood, and Heavy Rains and Storm Actions

Action 12. Flood & Dam Failure Resilience Plan

Hazards Addressed: Dam Failure Inundation, Flooding, Localized Flooding, Heavy Rains & Snow

Goals Addressed: 1, 2, 3, 4, 6

Issue/Background (Problem Statement): Amador County is downstream of several reservoirs and dams with dam-failure inundation zones. In heavy storm, snowmelt, or seismic events – even slow-release – can produce catastrophic downstream flooding. Localized floods also occur in low-lying areas and roads during intense rainfall or snowmelt. Existing maps and emergency plans are limited in community-wide reach, and residents in inundation zones map lack awareness or preparedness. The County's floodplain management and hazard vulnerability reports note widespread exposure to these risks.

Project Description:

- Dam Safety & Emergency Action Planning
  - ✓ OES + DWR
  - ✓ Map & review inundation zones; coordinate with DWR inundation mapping guidelines.
  - ✓ Update or develop EAPs for relevant dams; train first responders.
  - ✓ Conduct community education on dam risk and evacuation protocols
- Flood Mitigation & Infrastructure
  - ✓ Public Works + Planning + OES
  - ✓ Assess & upgrade culverts, drainage systems in flood-prone areas
  - ✓ Retrofit critical infrastructure (roads, bridges) to withstand high-flow scenarios.
  - ✓ Establish or expand retention basins, bioswales, and natural stormwater features to reduce peak flows.
- Snowpack & Storm Preparedness
  - ✓ Public Works + Cal-Trans +OES
  - ✓ Monitor snowpack and melting trends; issue alerts when rapid thaw risk is high
  - ✓ Clear critical drainage channels before spring thaws; pre-position sandbags, barriers
  - ✓ Train community volunteers in flood watch and flood response support
- Community Engagement & Equity
  - ✓ Planning + OEs
  - ✓ Host outreach in communities within inundation zones; including underserved and remote residents

Other Alternatives:

- Status Quo – Rely on existing flood/dam plans.
  - ✓ Cons: Low awareness, limited mitigation, reactive responses only.
- Partial Upgrades – Improve flood infrastructure (culverts, drainage) without dam safety coordination.
  - ✓ Cons: Dam failure hazard remains unmanaged; siloed approach.
- Integrated Flood/Dam Resilience Strategy (Preferred) – Develop coordinated actions across dam safety, flood infrastructure, emergency awareness and planning to reduce both dam-related and localized flood risk.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Emergency Plans, Related hazard plans: Dam EAPs, Flood, Extreme Weather, others

Responsible Office/Partners: OES, DWR, Public Works, Planning, Cal-Trans

Benefits (Losses Avoided): Timely dam-failure warnings and evacuation systems prevent fatalities and injuries. Structural upgrades and stormwater management reduce damage to homes, roads, utilities. Proactive planning diminishes rescue efforts, road closures, and cleanup expenses. Hardening drainage and tech improves transportation resilience and minimizes closures. Educated residents respond more quickly in emergencies, reducing chaos and loss.

Potential Funding (Local Budgets, Grant Funds, etc.): FEMA grants (HMA related), Cal-OES, California/DWR

Timeline: Annually and within 5 years

Project Priority (High, Medium, Low): Medium

Earthquake Actions

Action 13. Amador County Earthquake Preparedness & Seismic Resilience Plan

Hazards Addressed: Earthquakes. Secondary hazards: landslides, utility disruption, structural failure, HAZMAT releases.

Goals Addressed: 1, 2, 3, 4, 6

Issue/Background (Problem Statement): Amador County lies near the Foothills Fault System and is within shaking influence from larger regional faults such as the Calaveras and Hayward systems. While catastrophic earthquakes are less frequent than in coastal California, moderate events can cause significant damage due to:

- Older unreinforced masonry (URM) buildings in historic towns (Sutter Creek, Jackson, Ione).
- Critical infrastructure (bridges, utilities, emergency facilities) built prior to modern seismic standards.
- Limited public preparedness for earthquake response.

Damage from a moderate earthquake could disrupt transportation, emergency response, water and power supply, and historic/cultural preservation.

Project Description:

- Seismic Risk Assessment & Mapping
  - ✓ Update seismic hazard mapping for faults, liquefaction zones, and landslide-prone slopes.
  - ✓ Identify critical facilities and lifeline infrastructure at greatest seismic risk.
- Structural Mitigation & Retrofits
  - ✓ Prioritize retrofits of County-owned critical facilities
  - ✓ Support grant-funded retrofits for schools and private, critical businesses (grocery, fuel, medical)
  - ✓ Assess bridges, overpasses and water/wastewater systems for seismic safety upgrades.
- Nonstructural Hazard Reduction
  - ✓ Secure nonstructural hazards in government buildings (equipment, shelving, HAZMAT)
  - ✓ Promote nonstructural mitigation for businesses and homeowners through outreach.
- Public Education & Preparedness
  - ✓ Expand community earthquake preparedness programs (Great California ShakeOut)
  - ✓ Distribute preparedness kits, evacuation guidance and Drop-Cover-Hold training materials.

Other Alternatives:

- Status Quo – Maintain current preparedness activities.
  - ✓ Cons: No reduction in structural vulnerability; high recovery costs.
- Targeted Retrofits Only – Focus exclusively on high-risk URM buildings.
  - ✓ Cons: Leaves other critical infrastructure and community preparedness gaps.
- Comprehensive Seismic Resilience Program (Preferred) – Combines structural mitigation, infrastructure upgrades, and community preparedness to reduce life-safety risk and economic losses.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Capital Improvement Plans

Responsible Office/Partners: OES, Planning, Building Department, Public Works, Facilities, Public Health

Benefits (Losses Avoided): Reduced fatalities and injuries from building collapse, falling debris, and utility failure. Lower repair/reconstruction costs by retrofitting vulnerable structures before an event. Protects historic downtowns and heritage structures that contribute to tourism. Keeps government, emergency services, utilities, and businesses functional post-event.

Potential Funding (Local Budgets, Grant Funds, etc.): HMGP, BRIC, FEMA Public Assistance (post event), Cal-OES, PG&E

Timeline: Within 5 years

Project Priority (High, Medium, Low): Medium

Landslide Actions

Action 14. Landslide Hazard Mitigation & Slope Stability Plan

Hazards Addressed: Landslides, debris flow, rockfalls, secondary impacts to infrastructure, utilities, and emergency access

Goals Addressed: 1, 2, 3, 4, 6

Issue/Background (Problem Statement): Amador County's terrain includes steep slopes, weathered rock, and soils susceptible to movement during intense rainfall, seismic shaking, or following wildfire. High-risk areas include:

- Road corridors (e.g., Hwy 88, mountain passes, rural canyon roads)
- Hillsides above residential areas
- Post-burn slopes where vegetation loss increases runoff and erosion

Landslides can block roads, isolate communities, damage structures, disrupt utilities, and require costly emergency repairs. Preventive slope stabilization and early-warning efforts can reduce these impacts.

Project Description:

- Risk Assessment & Mapping
  - ✓ Update landslide hazard maps using recent geologic surveys, post-fire assessments, and LiDAR terrain analysis.

Prioritize slopes adjacent to critical transportation routes and populated areas.

- Slope Stabilization & Infrastructure Protection
  - ✓ Install retaining walls, rockfall netting or soil nails in high-risk road cuts
  - ✓ Improve drainage systems to reduce water saturation of slopes
  - ✓ Re-vegetate burned or disturbed slopes to prevent erosion
- Monitoring & Early Warning
  - ✓ Implement slope movement monitoring (survey markers, inclinometers) in high-risk areas.
  - ✓ Coordinate with Cal-Trans and regional agencies for debris flow and slope failure alerts.
- Public Education & Preparedness
  - ✓ Provide information to residents in slide-prone areas about warning signs (soil cracks, leaning trees) and evacuation readiness.
  - ✓ Offer guidance on private slope stabilization and drainage management
- Post-Fire Landslide Risk Reduction
  - ✓ Conduct rapid risk assessments after wildfires to identify slopes at risk of post-burn debris flow.
  - ✓ Pre-position sandbags, barriers, and erosion-control materials before winter storms.

Other Alternatives:

- Status Quo – Respond to landslides as they occur.
  - ✓ Cons: High emergency repair costs; extended road closures; recurring damage.
- Reactive Engineering Approach – Stabilize only after major failures.

- ✓ Cons: Costly, disrupts transportation, does not prevent recurring damage.
- Proactive Risk Reduction & Slope Management (Preferred) – Identify high-risk areas, stabilize proactively, improve drainage, and establish early-warning and response capabilities.

Existing Planning Mechanism(s) through which Action Will Be Implemented: None

Responsible Office/Partners: Planning, OES, Public Works, Public Health, Fire Departments

Benefits (Losses Avoided): Prevents fatalities and injuries from sudden slope failure or debris flow. Keeps key roads open, avoiding isolation of communities and emergency access delays. Preventive stabilization is far less expensive than repeated emergency clearance and reconstruction. Protects power lines, pipelines and communications infrastructure from slope failures.

Potential Funding (Local Budgets, Grant Funds, etc.): HMGP, BRIC, FEMA Public Assistance (post event), Cal-OES.

Timeline: Within 5 years

Project Priority (High, Medium, Low): Medium

Severe Weather: Extreme Cold, Freeze, and Snow Actions

Action 15. Severe Winter Weather Resilience Plan

Hazards Addressed: Extreme cold temperatures, hard freezes, heavy snow accumulation, secondary impacts (power outages, transportation disruption, structural damages, agricultural losses)

Goals Addressed: 1, 2, 3, 4, 6

Issue/Background (Problem Statement): Amador County experiences periodic extreme cold snaps, heavy snow, and prolonged freezes, especially at higher elevations along the Hwy 88 corridor and rural foothill areas. Risks include:

- Life safety hazards to vulnerable populations (elderly, medically fragile, low-income households without adequate heating).
- Infrastructure and utility impacts from ice, snow load, and downed power lines.
- Agricultural losses from freezes affecting vineyards, orchards, and livestock.
- Transportation hazards from snow/ice-covered roads impacting emergency access and commerce.

Without coordinated mitigation and preparedness, these events can cause costly disruptions and threaten health and safety.

Project Description:

- Vulnerable Population Protection
  - ✓ Develop extreme cold emergency outreach list (elderly, medically dependent)
  - ✓ Expand warming center locations (libraries, community centers) with backup power
  - ✓ Obtain and provide blankets, space heaters, and transport support to vulnerable residents.
- Infrastructure & Utility Hardening
  - ✓ Insulate exposed water line in County facilities; promote similar measures for homes.
  - ✓ Work w/PG&E and utilities to reduce tree/ice damage to power infrastructure
  - ✓ Assess structural capacity of critical facilities for snow load
- Transportation & Snow Management
  - ✓ Maintain snow removal capacity for priority roads, especially emergency access routes
  - ✓ Pre-position de-icing materials, snow plows and barricades in high-elevation areas
- Agricultural Freeze Protection
  - ✓ Promote frost prevention method for vineyards, orchards, and livestock
  - ✓ Provide grants or technical assistance for frost fans, wind machines and water systems
- Public Outreach & Education
  - ✓ Disseminate extreme cold/snow preparedness guidance (winter kits, heating safety)
  - ✓ Share road closure, storm alerts, and freeze warning through multiple channels.

Other Alternatives:

- Status Quo – Maintain current winter storm response.
  - ✓ Cons: Continues high costs from emergency heating, storm repairs, and agricultural losses.
- Focused Agricultural Support – Target frost protection for crops and livestock only.

- ✓ Cons: Does not address life safety, infrastructure, or transportation impacts.
- Comprehensive Winter Resilience Strategy (Preferred) – Integrates life safety, infrastructure protection, agricultural mitigation, and preparedness measures.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Emergency Plans,

Responsible Office/Partners: Public Health, Red Cross, OES, Public Works

Benefits (Losses Avoided):

- Life Safety: Prevents hypothermia, frostbite, and cold-related deaths.
- Property Protection: Reduces burst pipes, roof damage from snow loads, and utility failures.
- Agricultural Stability: Limits crop and livestock losses, preserving agricultural economy.
- Economic Continuity: Maintains transportation access for commerce and emergency services.
- Lower Emergency Costs: Reduces spending on emergency shelter, storm repairs, and power restoration.

Potential Funding (Local Budgets, Grant Funds, etc.): HMGP, BRIC, FEMA Public Assistance (post event), Cal-OES

Timeline: Within 5 years

Project Priority (High, Medium, Low): Medium

Severe Weather: Extreme Heat Actions

Action 16. Extreme Heat Resilience Plan

Hazards Addressed: Extreme Heat Waves, Prolonged high temperature periods. Secondary impacts: Power outages, wildfires, drought intensification, health emergencies

Issue/Background (Problem Statement): Amador County experiences periodic heat waves that can last several days or longer. Risks include:

- Life safety hazards for vulnerable populations (elderly, children, medically fragile, outdoor workers).
- Health emergencies from heat stroke, dehydration, and exacerbation of existing illnesses.
- Power reliability risks from increased energy demand for cooling.
- Economic impacts to agriculture, livestock, and outdoor industries.

Extreme heat events are projected to increase in frequency and intensity, making proactive mitigation essential.

Project Description:

- Vulnerable Population Protection
  - ✓ Identify high-risk individuals and maintain an emergency contact registry (elderly, medically dependent)
  - ✓ Expand cooling center locations (libraries, community centers, with backup power
  - ✓ Transportation support for vulnerable residents
- Energy Reliability & Resilience
  - ✓ Coordinate w/PG&E to minimize planned outages during extreme heat events
  - ✓ Install backup generators or solar battery systems at designated cooling centers and critical facilities
- Community Preparedness & Outreach
  - ✓ Disseminate heat safety guidance (hydration, cooling, recognizing heat illness symptoms)
  - ✓ Partner w/employers, schools, and outdoor recreation programs to promote safe heat practices
- Agricultural & Outdoor Workforce Protection
  - ✓ Provide technical guidance & support for livestock cooling systems, irrigation timing, and worker safety compliance.

Other Alternatives: No Action

- Status Quo – Continue current response-based approach.
  - ✓ Cons: Reactive only, does not reduce vulnerability or prevent health impacts.
- Targeted Cooling Centers Only – Establish limited cooling facilities during extreme heat.
  - ✓ Cons: Addresses immediate safety but not infrastructure or community-wide resilience.
- Comprehensive Heat Resilience Strategy (Preferred) – Combines life safety measures, infrastructure improvements, community outreach, and energy resilience.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Emergency Management Plans

Responsible Office/Partners: Public Health, OES, Public Works, PG&E, Ag Dept

Benefits (Losses Avoided):

- Life Safety: Prevents heat-related deaths and medical emergencies.
- Health System Relief: Reduces ER visits and hospitalizations during heat events.
- Economic Stability: Protects agricultural output, outdoor work productivity, and tourism.
- Infrastructure Resilience: Reduces strain on power systems and prolongs facility service life.
- Community Confidence: Demonstrates proactive protection for vulnerable residents.

Potential Funding (Local Budgets, Grant Funds, etc.): HMGP, BRIC, Cal-OES

Timeline: Within 5 years

Project Priority (High, Medium, Low): Medium

Wildfire, Drought, and Extreme Heat Actions

Action 17. Tree Mortality Program Coordinator

Hazards Addressed: Wildfire, Drought and Water Shortage, Severe Weather: Extreme Heat, Severe Weather: High Winds and Tornadoes (any natural hazard that affects dead and dying trees along County roads.

Goals Addressed: 1, 2, 4, 5, 6

Issue/Background (Problem Statement): Due to drought and insect infestation, trees within Amador County have been dying. The Tree Mortality Program was set up to mitigation hazard trees along County roads, thus addressing risk to the public from falling trees, while removing excess wood fuel from key roadways that would be utilized as ingress and egress during wildfire events.

Project Description: Commencing January 2017 Amador County implemented the TMP. TSS Consultants was retained as Coordinator to facilitate dead/dying tree mitigation.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: The County has existing contracts to identify and remove infected and dead trees throughout the County.

Responsible Office/Partners: County GSA

Benefits (Losses Avoided): Public safety

Potential Funding (Local Budgets, Grant Funds, etc.): US Forest Service match funding.

Timeline: Commencement date: Jan 2017. Project is ongoing

Project Priority (High, Medium, Low): Medium

Action 18. Countywide Wildfire Resiliency Coordination GIS Mapping Project to Support Fuels Reduction Efforts

Hazards Addressed: Wildfire

Goals Addressed: 1, 2, 4, 5, 6

Issue/Background (Problem Statement): Fuels reduction efforts are carried out by public agencies and private landowners across the county. Most are planned and implemented by the agency or landowner within their jurisdiction according to their own strategy and priorities. Some cooperative agreements exist for coordinated landscape-scale wildfire protection, but it is a challenge to share, store and update geographic information across entities, which is essential for project management and planning.

Project Description: Geographic data from wildfire mitigation projects planned and implemented by any land management agency or private landowner, if appropriate, will be shared with Amador County Planning Department: GIS and Mapping. The information will be added to the existing GIS viewer (ArcGIS Experience platform), in a publicly viewable and downloadable format. Additional layers essential for fuels reduction project planning such as roads, watercourses, parcels, will also be updated regularly in the platform.

Other Alternatives: Sharing of paper or digital maps. Sharing of individual files when multi-agency/landowner maps are required.

Existing Planning Mechanism(s) through which Action Will Be Implemented: The Amador County Community Wildfire Protection Plan (CWPP) will be rewritten in 2025-2026. It will include geographically specific risk and hazard analyses and identify past, present and future wildfire mitigation actions. County-wide coordinated GIS mapping will build off this work with regular updates.

Responsible Office/Partners: Amador County Planning Department, CALFIRE Amador-El Dorado Unit, Amador Fire Safe Council, Amador Resource Conservation District, Amador Fire Protection District, Bureau of Land Management – Mother Lode Field Office, El Dorado National Forest, Sierra Pacific Industries

Benefits (Losses Avoided): The cost of personnel time required for inter-agency collaboration will be significantly reduced if there is one accessible source which contain updated geographic information associated with wildfire mitigation projects.

Potential Funding (Local Budgets, Grant Funds, etc.): Local budgets will be required to maintain the database and existing GIS viewer. Grant-funded work will supplement the program, for example the rewriting of the CWPP in 2025-2026 and the associated geographic information that will be compiled and analyzed.

Timeline: 2025 - no end date

Project Priority (High, Medium, Low): High

Action 19. Forest Health Projects

Hazards Addressed: Wildfire

Goals Addressed: 1, 2, 4, 5, 6

Issue/Background (Problem Statement): Historic wildfire suppression, the expansion of residences within the Wildland Urban Interface (WUI), and climate change have resulted in extreme risk and vulnerability to wildfire within and beyond the County. Forested areas within the WUI are typically overcrowded with vegetation. Non-industrial private landowners and public land management agencies have limited financial means for fuels reduction treatments.

Project Description: Forest Health projects refer to landscape-scale vegetation management to improve ecosystem functions including the reduction of potential wildfire severity through fuels reduction. The Jackson Creek Forest Health Project was the first of its kind and scale in the County. The Project assisted non-industrial forest landowners in the WUI to thin overcrowded forests across over one thousand acres through mechanical mastication, hand treatment and targeted grazing. The Amador Resource Conservation District intends to implement similar projects in other areas of the County.

Other Alternatives: California Forest Improvement Program (Natural Resource Conservation Service). Assists individual landowners.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Amador County CWPP. Firewise Communities may propose Forest Health project ideas to the Amador Resource Conservation District, who will evaluate their feasibility and seek funding opportunities for planning and implementation.

Responsible Office/Partners: Firewise Communities, Amador Resource Conservation District, CALFIRE Amador-El Dorado Unit, Bureau of Land Management – Mother Lode Field Office

Benefits (Losses Avoided): Vegetative fuels reduction will reduce the intensity of future wildfires in treated areas.

Potential Funding (Local Budgets, Grant Funds, etc.): CALFIRE Forest Health grants

Timeline: Ongoing and within 1-5 years covered by this LHMP

Project Priority (High, Medium, Low): Medium

Action 20. Ingress/Egress Phases I and II: Public Education and Fuels Reduction

Hazards Addressed: Wildfire

Goals Addressed: 1, 2, 4, 5, 6

Issue/Background (Problem Statement): Vegetative growth adjacent to roads presents a danger to residents on their evacuation routes and to emergency services en route towards their destination in a wildfire situation. This is a continual maintenance issue along County- and private- maintained roads which serve as evacuation routes. Many residents in the WUI depend on a single evacuation route.

Project Description: Through the Community Ingress/Egress Project Phases I & II which concluded in 2025:

- Evacuation routes were identified, mapped and prioritized.
- Public outreach was conducted
- 113 miles of fuels reduction treatment was implemented along 113 miles of road, within 20 feet of the road edge.

The program will continue in the future pending additional grant funding.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: The Amador Fire Safe Council is seeking additional funding opportunities to resume the program.

Responsible Office/Partners: Amador County Public Works, Amador Fire Safe Council, CALFIRE Amador-El Dorado Unit, and Amador Fire Protection District

Benefits (Losses Avoided): The avoided loss of life and damage to property that can result if emergency access routes are blocked is invaluable.

Potential Funding (Local Budgets, Grant Funds, etc.): CALFIRE Fire Prevention grants, Sierra Nevada Conservancy grants

Timeline: Ongoing. Intent to obtain funding and resume program in late 2025

Project Priority (High, Medium, Low): High

Action 21. Community Fuel Break Network

Hazards Addressed: Wildfire

Goals Addressed: 1, 2, 4, 5, 6

Issue/Background (Problem Statement): Historic wildfire suppression, the expansion of residences within the Wildland Urban Interface (WUI), and climate change have resulted in extreme risk and vulnerability to wildfire within and beyond the County. Forested areas within the WUI are typically overcrowded with vegetation. Non-industrial private landowners and public land management agencies have limited financial means for fuels reduction treatments.

Project Description: Shaded fuel breaks facilitate wildfire suppression activities in strategic locations along ridgetops and main access routes. They are forested areas that are thinned to significantly reduce understory vegetation, ladder fuels, and crown connectivity of remaining overstory trees. Since the Amador Fire Safe Council (AFSC) was formed in 2002, the following fuel breaks have been implemented in the County:

- Mitchell Mine
- Pine Acres
- River Pines
- Tiger Creek
- Upper Rancheria

Community-based project proposals drive the expansion of the fuel break network to new project areas. The AFSC evaluates, plans and implements projects on a rolling basis.

Several fuel breaks are in planning including:

- Butte Mountain
- Mount Crossman
- Pine Grove Corridor
- Rendic (Amador City)
- Thompson Ridge
- Volcano Hills

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: Firewise Communities may propose Fuel Break project ideas to the Amador Fire Safe Council, who will evaluate their feasibility and seek funding opportunities for planning and implementation. The Community Wildfire Protection Plan rewrite of 2025-2026 will identify and prioritize areas for new fuel breaks.

Responsible Office/Partners: Amador Fire Safe Council, Firewise Communities, CALFIRE Amador-El Dorado Unit, Amador Fire Protection District, Bureau of Land Management – Mother Lode Field Office

Benefits (Losses Avoided): A network of shaded fuel breaks aid firefighters to contain wildfires, reducing the extent of damage done to land and property.

Potential Funding (Local Budgets, Grant Funds, etc.): CALFIRE Wildfire Prevention grants, Sierra Nevada Conservancy grants, and Bureau of Land Management grants

Timeline: Ongoing and annually within the next 5 years and beyond, depending on funding

Project Priority (High, Medium, Low): High

Action 22. Defensible Space Assistance

Hazards Addressed: Wildfire

Goals Addressed: 1, 2, 4, 5, 6

Issue/Background (Problem Statement): A significant portion of the County's residents who live within the Wildland Urban Interface (WUI) are seniors, veterans, disabled, and/or earn a low income. Defensible Space can be a challenge for any homeowner or resident to maintain, especially for the above listed vulnerable sectors of the population.

Project Description: A Defensible Space Assistance Pilot Program is in development to aid disadvantaged residents of the County to treat vegetation within 100 feet of their homes. The Pilot Program will assist at least 75 households, after which additional funding will be required.

Other Alternatives: Defensible Space Education

Existing Planning Mechanism(s) through which Action Will Be Implemented: Amador Resource Conservation District is developing the pilot program through a CALFIRE Wildfire Prevention grant.

Responsible Office/Partners: Amador Resource Conservation District, Amador Fire Protection District, and CAL FIRE Amador-El Dorado Unit

Benefits (Losses Avoided): Properly maintained Defensible Space reduces risk of damage to homes during wildfire and reduces risk of fire spreading beyond a home where a fire ignites.

Potential Funding (Local Budgets, Grant Funds, etc.): CALFIRE Wildfire Prevention grants, Sierra Nevada Conservancy grants

Timeline: Program to begin accepting applications Fall 2025. Ongoing and annually within the next 5 years and beyond, depending on funding

Project Priority (High, Medium, Low): High

Action 23. Defensible Space Public Education

Hazards Addressed: Wildfire

Goals Addressed: 1, 2, 4, 5, 6

Issue/Background (Problem Statement): Of Amador County's 41,259 residents, 23,500 live within the State Responsibility Area and the Wildland Urban Interface (2020 U.S. Census). Maintaining Defensible Space 100 feet around homes is the responsibility of the homeowner and mandated by the state of California, but compliance is challenging to achieve.

Project Description: Public education is necessary to inform residents of Defensible Space standards and requirements, which are complex and require close attention to understand and apply to one's personal property. Several organizations within the County provide education and outreach through community events and print and online resources.

Amador Fire Protection District consistently hosts public outreach events and makes home visits for Defensible Space Assessments upon request free of charge.

A Defensible Space and Firewise Landscaping demonstration site is being developed at Pioneer Veterans Hall to serve as a publicly accessible full-scale example for residents to educate themselves.

University of California Cooperative Extension: Master Gardeners hosts a Defensible Space, Home Hardening and Firewise Landscaping workshop once per year.

Red Cross provides Defensible Space, Home Hardening and Wildfire Preparedness education and outreach, emergency go-bags, and smoke detectors.

Other Alternatives: Enforcement of Public Resources Code 4291 of Government Code 51182

Existing Planning Mechanism(s) through which Action Will Be Implemented: Amador Fire Protection District: Public Information Officer, Firewise Communities, ARCD Defensible Space Assistance Program

Responsible Office/Partners: Amador Fire Protection District, Amador Fire Safe Council, Amador Resource Conservation District, CALFIRE Amador-El Dorado Unit, Red Cross, Amador County Board of Supervisors, and University of California Cooperative Extension: Master Gardeners

Benefits (Losses Avoided): Properly maintained Defensible Space reduces risk of damage to homes during wildfire and reduces risk of fire spreading beyond a home where a fire ignites.

Potential Funding (Local Budgets, Grant Funds, etc.): County budget: Amador Fire Protection District, CALFIRE Wildfire Prevention Grants

Timeline: Ongoing and annually within the next 5 years and beyond, depending on funding

Project Priority (High, Medium, Low): High

Action 24. Develop Amador County CWPP and Implementation of Identified Projects

Hazards Addressed: Wildfire

Goals Addressed: 1, 2, 4, 5, 6

Issue/Background (Problem Statement): The Community Wildfire Protection Plan (CWPP) for all of Amador County was written in 2004. Since then, several CWPP's were written for planning units within the county, but most have passed their 10-year planning horizon.

Project Description: The Amador County CWPP will be rewritten in 2025-2026.

Other Alternatives: Do not update the CWPP, remain ineligible for some wildfire mitigation funding sources.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Amador Fire Safe Council is facilitating the CWPP development process using BLM grant funding.

Responsible Office/Partners: Amador Fire Safe Council, Amador County Office of Emergency Services, CALFIRE Amador-El Dorado Unit, Amador Fire Protection District, Bureau of Land Management – Mother Lode Field Office, El Dorado National Forest, Cities of Amador City, Ione, Jackson, Plymouth, Sutter Creek, Firewise Communities

Benefits (Losses Avoided): Establish a coordinated strategy among stakeholders in the County for wildfire mitigation, especially fuels reduction project prioritization and reduction of structural ignitability. Become eligible for additional wildfire mitigation funding sources.

Potential Funding (Local Budgets, Grant Funds, etc.): Bureau of Land Management Fuels Management and Community Fire Assistance Program

Timeline: 2025-2026. Rewrite every 10 years.

Project Priority (High, Medium, Low): High

Action 25. Vegetation Management projects – Monitoring and Maintenance

Hazards Addressed: Wildfire

Goals Addressed: 1, 2, 4, 5, 6

Issue/Background (Problem Statement): Fuels reduction projects in the Wildland Urban Interface on private nonindustrial forest lands and public lands are typically implemented using grant funds. After the initial treatment and conclusion of the grant, vegetation quickly grows back and fuel loads return, but historically funding has not been secured for follow-up treatments.

Project Description: A Monitoring and Maintenance program will be established to track and manage the following types of fuels reduction projects (Mitigation Actions described in previous Worksheets):

- Forest Health
- Community Fuel Break Network
- Ingress/Egress

Information obtained through monitoring will allow for the prioritization of maintenance treatments to retain the benefits of fuels reduction projects beyond the initial treatment period. Maintenance plans will be informed by the Community Wildfire Protection Plan (CWPP).

In 2025, Amador Fire Safe Council began planning a monitoring program, and intends to fully develop it by 2026. Maintenance treatments will require continuous grant solicitations and awards.

Other Alternatives: CALFIRE Vegetation Management Program (VMP). For some project areas within the Community Fuel Break Network, a VMP may be established to enable CALFIRE contribution to fuels management through prescribed fire and mechanical treatments.

Existing Planning Mechanism(s) through which Action Will Be Implemented: No standardized system yet exists. Some follow-up treatment has been implemented within the grant period intended for the initial treatment on one Community Fuel Break: Mitchell Mine.

Responsible Office/Partners: Amador Fire Safe Council, Firewise Communities, CALFIRE Amador-El Dorado Unit, Amador Fire Protection District, Bureau of Land Management – Mother Lode Field Office, Amador County Public Works

Benefits (Losses Avoided): Consistent monitoring and maintenance of fuels reduction projects would extend the wildfire mitigation benefits of initial treatments beyond just 2-3 years.

Potential Funding (Local Budgets, Grant Funds, etc.): CALFIRE Wildfire Prevention grants, CALFIRE Forest Health grants, Sierra Nevada Conservancy grants, Bureau of Land Management grants

Timeline: Ongoing and annually within the next 5 years and beyond, depending on funding

Project Priority (High, Medium, Low): High

Chapter 6 Plan Adoption

44 CFR §201.6(c)(5): [The local hazard mitigation plan shall include] documentation that the plan has been formally approved by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, county commissioner, Tribal Council).

The purpose of formally adopting this 2025 Amador County LHMP Update is to secure buy-in from each participating jurisdiction, raise awareness of the Plan, and formalize the Plan's approval and implementation. The adoption of this LHMP Update completes Planning Step 9 of the 10-step planning process: Adopt the Plan, in accordance with the requirements of DMA 2000. For the unincorporated County and the two incorporated communities, this adoption resolution also addresses AB 2140 requiring adoption by reference or incorporation into the Safety Element of the General Plan. Two resolutions were created – one for the County and incorporated communities and one for the special districts.

The governing board for each jurisdiction has adopted this 2025 Amador County LHMP Update by passing a resolution. A copy of the generic resolutions is included in Appendix D: Adoption Resolution.

Chapter 7 Plan Implementation and Maintenance

44 CFR §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.

Implementation and maintenance of this 2025 Amador County LHMP Update is critical to the success of hazard mitigation in the Amador County Planning Area. Plan implementation and maintenance is Planning Step 10 of the 10-step planning process. Accordingly, 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 in local hazard mitigation planning.

Chapter 3, Planning Process, includes information on the implementation and maintenance process since the adoption of the 2020 LHMP Update. This chapter includes information on the implementation and maintenance process for the development of this Plan, the 2025 Amador County LHMP Update.

7.1 Implementation

Once adopted, this 2025 Amador County LHMP Update faces the truest test of its worth: implementation. While the Plan contains many worthwhile actions, the County and all participating jurisdictions will need to decide which action(s) to undertake first. Two factors should be considered when making that decision: the priority assigned to the mitigation actions in the Plan 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 local general plans, stormwater plans, Emergency Operations Plans (EOPs), evacuation plans, and other hazard and emergency management planning efforts by the participating jurisdictions. These jurisdictions already implement policies and programs to reduce losses to life and property from hazards. This 2025 LHMP Update builds upon the momentum developed through prior, related planning and mitigation programs and recommends implementing actions, where possible, through other programs.

Mitigation is most successful when it is incorporated into the day-to-day functions and priorities of government and development. Implementation can be accomplished by adhering to the schedules identified for each action through sustained collaborative efforts, highlighting the mutual benefits of proposed mitigation actions, and the Amador County jurisdictions, its stakeholders, and the public. This is achieved through the routine actions of monitoring agendas, attending meetings, and promoting mitigation initiatives to enhance the safety and sustainability of the community. Additional mitigation strategies may include consistent and ongoing enforcement of existing policies and the vigilant review of programs for coordination and multi-objective opportunities to enhance mitigation.

Simultaneously, it is important to continuously monitor potential funding opportunities to finance mitigation actions. This may include identifying funding sources to meet local matching funds requirements under FEMA pre- and post-disaster mitigation grant programs, and other sources. When funding does become available, the participating jurisdictions will be better positioned to capitalize on the opportunity.

Responsibility for Implementation of Goals and Activities

The elected officials, executive leadership teams, responsible staff and departments, and emergency management offices of the participating jurisdictions are charged with implementation of various activities in the 2025 LHMP Update. During annual reviews as described later in this section, each participating jurisdiction should conduct an assessment of progress toward meeting the goals and activities of the LHMP Update. At that time, recommendations may be made to modify timeframes for the completion of identified mitigation actions, identify funding sources, and work with responsible entities to implement the actions. On an annual basis, the priority of various mitigation actions may be adjusted. Some activities that are found not to be feasible may be removed from the Plan entirely, while other mitigation actions unforeseen during the Plan development process may be added.

7.1.1. Role of the LHMP Update Planning Committee in Implementation and Maintenance

With adoption of this Plan, each participating jurisdiction will be responsible for LHMP implementation and maintenance. The HMPC identified in Chapter 3 (or a similar committee) will reconvene annually to ensure mitigation strategies are being implemented, and the County and Cities continue to maintain compliance with the NFIP. The Amador County, Office of Emergency Services (County OES), will continue in its role as project lead for LHMP implementation and maintenance. As such, County OES, as LHMP project lead, and all participating jurisdictions will continue their relationship, and will plan to convene the same or similar HMPC when preparing the subsequent LHMP Update. The County OES project lead, with support from participating jurisdictions and the LHMP Update HMPC will:

- Act as a forum for hazard mitigation issues;
- Disseminate hazard mitigation ideas and activities to all participants;
- Pursue the implementation of high-priority, low/no-cost recommended actions;
- Ensure hazard mitigation remains a consideration for community decision makers;
- Maintain a vigilant monitoring of multi-objective cost-share opportunities to help the community implement the Plan's recommended actions for which no current funding exists;
- Monitor and assist in the implementation and update of this Plan;
- Report on Plan progress and recommended changes to the governing boards for all participating jurisdictions; and
- Inform and solicit input from the public.

The primary duty of the County and all participating jurisdictions and the HMPC is to see the LHMP Update successfully carried out and to report to their governing boards and the public on the status of LHMP implementation and mitigation opportunities. Other duties include reviewing and promoting mitigation

proposals, considering stakeholder concerns about hazard mitigation, passing concerns on to appropriate entities, and posting relevant information about the LHMP on the websites of participating jurisdictions.

7.2 Maintenance

Plan maintenance implies an ongoing effort to monitor and evaluate LHMP implementation and to update the Plan as progress, roadblocks, or changing circumstances are encountered.

7.2.1. Maintenance Schedule

Amador County OES, as project lead, in conjunction with the LHMP leads for all participating jurisdictions, is responsible for initiating Plan reviews. In order to monitor progress and update the mitigation strategies identified in the mitigation action plan, County OES, LHMP leads from other participating jurisdictions, and the HMPC will revisit this Plan annually each year and following a hazard event to review and document progress on Plan implementation. Amador County OES will also submit a five-year written update to the State and FEMA Region IX, unless disaster or other circumstances (e.g., changing regulations) require a change to this schedule. With this 2025 LHMP Update anticipated to be fully approved and adopted in early 2026, the next required written update of the Plan must be completed by early 2031. Amador County OES will initiate the Plan Update – which may include applying for grant funding to hire professional services to assist in preparing the 2031 LHMP Update. The 2031 LHMP Update development process should be initiated in 2028 to ensure the 2031 LHMP Update can be funded and completed by this 2025 Amador County LHMP's expiration date.

7.2.2. Maintenance Evaluation 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;
- Increased vulnerability as a result of new development (and/or annexation); and/or
- Increased vulnerability resulting from unforeseen or new circumstances.

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 infrastructure inventories; and
- Incorporate new action recommendations or changes in action prioritization.

Changes will be made to this Plan to accommodate for actions that have failed or are not considered feasible after a review of their consistency with established criteria, time frame, community priorities, and/or

funding resources. All mitigation actions will be reviewed during the monitoring and update of this Plan to determine feasibility of future implementation. Updating of this LHMP will be by written changes and submissions, as the participating jurisdictions and HMPC deem appropriate and necessary, and as approved by the governing boards of each participating jurisdiction. In keeping with the five-year update process, the HMPC will convene public meetings to solicit public input on this LHMP Update and its routine maintenance, and the final product will be again adopted by the governing boards of each participating jurisdiction.

Annual Plan Review Process

For the LHMP Update review process, the County OES lead, and the LHMP leads for each of the participating jurisdictions, will be responsible for facilitating, coordinating, and scheduling reviews and maintenance of the LHMP. ***The LHMP is intended to be a living document.*** The review of the 2025 LHMP Update will normally occur on an annual basis each year and will be conducted by the HMPC as follows:

- County OES will place an advertisement in the local newspaper and will utilize other public outreach mechanisms, such as e-newsletters, social media blasts, and others, advising the public of the date, time, and place for each annual review of the LHMP Update and will be responsible for leading the meeting to review the Plan.
- Notices will be mailed to the members of the HMPC, federal, state, and local agencies, non-profit groups, local planning agencies, representatives of business interests, neighboring communities, and others advising them of the date, time, and place for the review.
- County/City/District/Tribal officials will be noticed by email and telephone or personal visit and urged to participate.
- Members of any participating jurisdiction's planning commissions and other appointed commissions and groups will also be noticed by email and either by telephone or personal visit.
- Prior to the review, department heads and others tasked with implementation of the various activities will be queried concerning progress on each activity in their area of responsibility and asked to present a report at the review meeting.
- The local news media will be contacted, and a copy of the current LHMP will be available for public comment at Amador County OES as project lead.
- After the review meeting, minutes of the meeting and an annual report will be prepared by the participating jurisdictions and the HMPC and posted on the Amador County LHMP webpage for the public.
- A copy of the 2025 LHMP Update will be continually posted on the LHMP website for the participating jurisdictions.

Criteria for Annual Reviews

The criteria recommended in 44 CFR 201 and 206 will be utilized in reviewing and updating the 2025 LHMP Update. More specifically, the reviews should include the following information:

- Community growth or change in the past year.
- The number of substantially damaged or substantially improved structures by flood zone.

- The renovations to public infrastructure including water, sewer, drainage, roads, bridges, gas lines, and buildings.
- Natural hazard occurrences that required activation of the Emergency Operations Center(s) (EOC) and whether or not the event resulted in a federal disaster declaration.
- Natural hazard occurrences that were not of a magnitude to warrant activation of the EOC or a federal disaster declaration but were severe enough to cause damage in the community or closure of businesses, schools, or public services.
- The dates of hazard events and descriptions.
- Documented damages due to the events.
- Closures of places of employment or schools and the number of days closed.
- Road or bridge closures due to the hazard and the length of time closed.
- Assessment of the number of private and public buildings damaged and whether the damage was minor, substantial, major, or if buildings were destroyed. The assessment will include residences, mobile homes, commercial structures, industrial structures, and public buildings, such as schools and public safety buildings.
- Review of the status of implementation of projects (mitigation strategies) including projects completed will be noted. Projects behind schedule will include a reason for delay of implementation.
- Review of any changes in federal, state, and local policies to determine the impact of these policies on the community and how and if the policy changes can or should be incorporated into the next LHMP Update.

7.2.3. Incorporation into Existing Planning Mechanisms

Another important implementation mechanism that is highly effective and low-cost is incorporation of the 2025 LHMP Update recommendations and their underlying principles into other jurisdictional plans and mechanisms. Where possible, Plan participants will use existing plans and/or programs to implement hazard mitigation actions. As previously stated in Section 7.1 of this Plan, mitigation is most successful when it is incorporated into the day-to-day functions and priorities of government and development. The point is re-emphasized here. As described in this LHMP's capability assessment, the participating jurisdictions already implement policies and 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 these other program mechanisms. These existing mechanisms include:

- General and master plans
- Emergency Operations Plans and other emergency management efforts
- Jurisdictional ordinances
- Flood/stormwater management/master plans
- Climate Plans
- Capital Improvement Plans and budgets
- Other plans and policies outlined in the capability assessment
- Other plans, regulations, and practices with a mitigation focus

Participating jurisdictions and HMPC members involved in these other planning and program mechanisms will be responsible for integrating the findings and recommendations of this LHMP with these other plans,

programs, etc., as appropriate. As described in Section 7.1 Implementation, 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; and
- 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.

Examples of incorporation of the 2025 LHMP Update into existing planning mechanisms include:

1. As recommended by Assembly Bill 2140, the County and Cities should adopt (by reference or incorporation) this LHMP into the Safety Element of their General Plans. Evidence of such adoption (by formal, certified resolution and text within the body of the Safety Element) shall be provided to CAL OES and FEMA.
2. Integration of wildfire actions identified in this mitigation strategy with the actions and implementation priorities established in existing and new Community Wildfire Protection Plans and other fire plans. Key people responsible for development and implementation of these plans participated on the HMPC. Key projects were identified and integrated specifically into this LHMP, while others currently of lessor priority should be referenced in their source document. Actual implementation of these projects will likely occur through the CWPP's processes through the efforts of each responsible jurisdiction and department.
3. Integration of many of the infrastructure, roads, and facility improvement projects with the jurisdictional Capital Improvement Programs.
4. Use of risk assessment information to inform future updates of the hazard analysis in the Emergency Operations Plans and related emergency management efforts for all participating jurisdictions.

Each jurisdiction will consider incorporation of the LHMP into planning mechanisms listed on Table 7-1.

Table 7-1 LHMP Incorporation into other Planning Mechanisms

Jurisdiction	General Plans / Master Plans/ Strategic Plans	EOP / Emergency Plans	CWPP / Fire Plans	CIP	Flood / Stormwater / Watershed Plans	Other Plans: Drought/ Water Management/ Climate Plans/ Other
Amador County	X	X	X	X	X	X
City of Amador City	X	X			X	X
City of Ione	X	X				X
City of Jackson	X	X			X	X
City of Plymouth	X	X			X	X
City of Sutter Creek	X	X				X

Jurisdiction	General Plans / Master Plans/ Strategic Plans	EOP / Emergency Plans	CWPP / Fire Plans	CIP	Flood / Stormwater / Watershed Plans	Other Plans: Drought/ Water Management/ Climate Plans/ Other
Amador Water Agency	X	X		X		X
Jackson Valley Irrigation District	X	X		X		X

In addition, the mitigation actions included within each jurisdictions' mitigation strategy contain a category identifying "Existing Planning Mechanism(s) through which Action will be Implemented" that contains how each mitigation action is related to other planning mechanisms and jurisdictional programs. Those can be found in Chapter 5 of the Base Plan for the County and within each jurisdictions' annex to this Base Plan.

Efforts should continuously 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 LHMP.

7.2.4. Continued Public Involvement

Continued public involvement is a crucial element of successful Plan implementation. The update process provides an opportunity to solicit participation from new and existing stakeholders and to publicize success stories from the 2025 LHMP implementation and seek additional public comment. The Plan maintenance and update process will include continued public and stakeholder involvement and input through attendance at designated committee meetings, web postings, press releases to local media, and through public hearings.

Public Involvement Process for Annual Reviews

The public will be noticed by placing an advertisement in the newspaper and will utilize other public outreach mechanisms, such as e-newsletters, social media blasts, and others specifying the date and time for the review and inviting public participation. The HMPC, local, state, and regional agencies will be notified and invited to attend and participate.

Public Involvement for Five-year Update

When the participating jurisdictions and HMPC reconvenes for the next LHMP Update, they will coordinate with all stakeholders participating in the planning process—including those that joined the committee since the planning process began—to update and revise the Plan. In reconvening, the HMPC will identify a public outreach subcommittee, which will be responsible for coordinating the activities necessary to involve the greater public. The subcommittee will develop a plan for public involvement and will be responsible for disseminating information through a variety of media channels detailing the LHMP update process. As part of this effort, public meetings will be held, and public comments will be solicited on the LHMP Update draft. In addition, continued public involvement and outreach efforts will place an emphasis on identifying and inviting representatives from underserved and vulnerable populations to be part of the next, 2031

Amador County LHMP Update. As a starting point the underserved and vulnerable population groups identified for this 2025 LHMP Update will be contacted to invite them to the 2031 LHMP Update process with additional groups identified and added to meet the ongoing goal of mitigation planning for the whole community.